

**ADDIS ABABA UNIVERSITY  
SCHOOL OF GRADUATE STUDIES**

**URBAN AGRICULTURE AS A LIVELIHOOD STRATEGY OF  
LOWINCOME HOUSEHOLDS: THE CASE OF DESSIE TOWN OF  
AMHARA REGION**

**BY  
GETU BEKELE**



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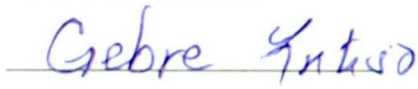
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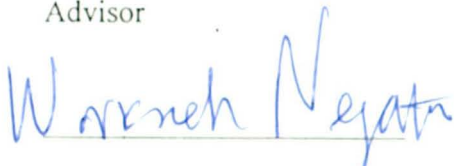
  
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## ABSTRACT

Urban agriculture is a generic concept that encompasses a wide variety of activities such as the growing of crops and the raising of animals in and around urban areas for food and other purposes. Crop cultivation and animal raising is widely practiced in Dessie town as a socio-economic and livelihood enhancing strategy. This paper essentially discusses urban vegetable farming in Dessie town. To examine the practice various data collection instruments were employed. Primary data was collected through census and other qualitative methods such as interview, case studies, focus group discussions, and direct observations. Besides, related documents were reviewed in order to support the study with the secondary sources. The study intends to set out the socio-economic profile of the urban farmers; the facet socio-economic contribution it rendered to the low income households engaged in the practice and constraining factors of the practice; production orientations, farming practice, production sites and the livelihood assets employed. The paper explores the major shocks that compelled the low income households (who compose 71% of the enumerated households) to adopt urban farming as their livelihood strategy in the urban environment. The results of the study reveal that people of diverse occupational groups, educational level, age groups, place of origin have been involved in the urban food production activities of the town. Findings on the reasons for participation in farming show that low income households of the town are involved in the practice to improve their food security status and diversify their livelihood options. The study discusses in detail the role that vegetable cultivation plays in the social integration of disadvantaged groups and in improving the food security, employment opportunities and income of the households involved. Results of the study reveal that 20% of the leafy vegetables are produced in the inner part of the town and the other 80% is produced in the peri-urban areas of the town. Major impeding factors of the practice include lack of access to urban farmland and insecure tenure system; lack of access to basic services such as extension and credit facilities; lack of access to some salient farm inputs and institutional constraints, knowledge gaps, non existence of policy framework for urban agricultural activities in general for vegetable farming in particular. Governmental and non-governmental organizations coordinated efforts to capitalize the benefits of food insecure low income households and to address the challenges of OVS (which is of course a good start); adoption of the practitioners new improved technologies are among the major findings of the study. The study further shows the need for governmental and non -governmental organizations to coordinate efforts in creating an enabling policy environment and other facilities to maximize the benefits of farming households in Dessie town.

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2011-PLR	Dessie Town HIV/AIDS Prevention and Control Office	
20110	Dessie Urban Fresh and Healthy City	
2014	Geometric Constraints for Urban	
2018	Ministry of Education (National Curriculum)	
2020	Food and Agriculture Organization of United Nations	
2021	Government Organization	
2022	Human Resource Virus	
2023	International Theological Department of	
2024	International Development Studies (IDS)	
2025	International Institute of Rural Reconstruction	
2026	International Labour Office	
2027	Least Developed Countries	
2028	Local Government Department	
2029	National Urban Policy Institute	
2030	Organization for Economic Cooperation and Development	
2031	Department of Urban and Slums	
2032	People Living With HIV/AIDS	
2033	World Bank Network of Resource Centers on Urban Agriculture	

## Acronyms

AAU	Addis Ababa University
AIDS	Acquired Immune Deficiency Syndrome
ANRS	Amhara National Regional State
BoLSA	Bureau of Labour and Social Affairs
BoWULD	Bureau of Work and Urban and Labour Development
CSA	Central Statistical Authority
DFID	Development for International Development (UK)
DTEO	Dessie Town Education Office
DTHAPCO	Dessie Town HIV/AIDS Prevention and Control Office
DTTIO	Dessie Town Trade and Industry Office
ECA	Economic Commission for Africa
ETB	Ethiopian Birr (National Currency)
FAO	Food and Agriculture Organization of United Nations
GOs	Government Organizations
HIV	Human Immune Virus
IDRC	International Development Research Centre
IDS	Institute of Development Studies (UK)
IIRR	International Institute of Rural Reconstruction
IMF	International Monetary Fund
LDCs	Less Developed Countries
NGOs	Non- Government Organizations
NUPI	National Urban Plan Institute
OECD	Organization for Economic Cooperation and Development
OVS	Orphan and Vulnerable Students
PLWAS	People Living With HIV/AIDS
RUAF	International Network of Resource Centres on Urban Agriculture and

SLF	Sustainable Livelihood Framework
SSA	Sub-Saharan Africa
UA	Urban Agriculture
UN	United Nations
UNDP	United Nations Development Program
UPA	Urban and Peri -urban Agriculture
UPA	Urban and Peri- urban Agriculture
WRI	World Resource Institute

## Glossary of Local Terms

Amarach	Alternative of some thing
Dega	Cold weather area
Duaa	A ceremonial act conducted by a group men to ask God something good to individuals or to the entire community
Gibbir	Especial public invitations during the imperial times
Gullit	A type of petty trade usually carried out in an open air on roadside, flat surfaces etc.
Iddir	Informal social organization established by individuals to help each other in times of death and other social needs
Injera	Pan -cake like bread
Iqul	To share some thing equally
Kebele	The lowest administration unit
Mahiber	Religious and other form of association
Sefer	A small community neighbourhood
Shiro	Ground peas or beans used to make stew
Wat	Stew (slowly cooked food in a container
Woreda	District level government administration unit

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the Study

Urban and peri-urban agriculture is prevalent in varying degrees in both developed and developing countries worldwide (Egal et al, 2001). Although it is still under estimated, different researches revealed that it improves the socio-economic as well as the health conditions of the urban poor and vulnerable families, and more specifically, of women and children (Duchemin et al, 2009).

Globally, about 800 million people are presently involved in practicing urban agriculture in and around cities and contribute to feeding urban dwellers (UNDP, 1996:26). The report further noted that, two hundred million are farmers who are engaged in producing for market in the world and one hundred and fifty million of them are full time employed. The total produce of the urban farmers is approximately estimated at 15 percent of the world's food products (Drechsel, et al 1999; Duchemin et al, 2009).

Although there are city farmers in both developing and industrialized countries, the livelihoods of urban poor women in developing countries depend fully or partly on urban agriculture (Van Veenhuizen, 2006). In Africa, particularly in sub-Saharan Africa, where food insecurity is a serious problem, traditional form of farming has been a long-established source of livelihood for a considerable number of urban dwellers. Mougeot (1994a in Foeken 2004) and Ruel and associates (1998 in Swift and Hamilton, 2001) estimated that as many as 40 percent of the urban population in Africa is involved in urban agriculture.

Over the past two decades, urban agriculture has got attention and expanded tremendously in Africa due to "economic recession and structural adjustment policies" (Obudho and Foeken, 1999:1). This resulted in exacerbating the growth of unemployment rates and food prices and the subsequent increase in urban poverty. In response to these challenges, substantial number of urban dwellers has begun to produce some food for themselves (Ibid). Thus, recently its contribution to urban food security and poverty alleviation has become a subject of interest for many African countries.

When it comes to Ethiopia, urban agriculture is a traditional practice in which the urban dwellers are used to keeping different animals and/ or growing some cereal crops and vegetables adjacent to their home. Such practices are essentially for household consumption, with a few amounts for sale (Axumite et al, 1994). In recent years, due to the increasing number of urban residents and parallel increase in urban poverty and food insecurity problems substantial number of the urban poor and other disadvantaged households are engaged in the industry in Addis Ababa and other big and medium level towns of the country(Girma, 2008).

In Dessie town, the present study indicates that urban agriculture has multiple roles and functions in providing some answers to the unique social, economical and environmental challenges posed by fast urban population growth due to internal factors, influx of population plagued by periodic drought from neighbouring woredas. Despite such significant contribution, urban agriculture has not been given attention by researchers and the policy implementers. Thus, this paper intends to examine the role that urban agriculture has in alleviating the food insecurity and other socio-economic problems of low income households of Dessie. Attempts are made to explore the backgrounds of the practitioners (their social, economical, farming knowledge, gender, age and education status, etc.); challenges and opportunities, and socio economic and other benefits that urban agriculture provides, its actual and potential contribution to sustainable urban development of the area will also be the focus of this study.

## 1.2 Statement of the Problem

Some empirical studies indicate that urban agriculture as one of urban functions plays an important role in enhancing urban food security, nutrition and health conditions of the urban dwellers involved in it (Mougeot, 2006). It has also a role to play in creating urban job opportunities and generation of income especially for the urban poor group; facilitating the social inclusion of disadvantaged groups (Van Veenhuizen, 2006).

Contrary to the above approach, economic-development theorists, Marxist and modernists see urban agriculture as an oxymoron (Tinker, 1994). Agriculture in urban setting is considered as a backward rural practice, and it is often perceived as archaic, temporary and inappropriate. Hence, urban agriculture (UA) has been overlooked, underestimated and under reported (UNDP, 1996).

With the views mentioned above in mind, the study explored the practice in Dessie with the intention to shed light on the current and potential benefits (food security, income generation, employment opportunities and social integration of marginalized group) it renders to the households involved in it and local development of the town. Though there are some studies conducted on the sector prior to this study, anthropological aspects of the practice and the practitioners have not been covered. Thus, this paper intends to set out the ethnographic account of the practitioners in relation to urban agriculture activities of the study area.

### 1.3 Significance of the Study

As already stated, the socio-economic, environmental and public health advantages that urban agriculture provides have not been yet applauded. Research like this one is instrumental in improving our knowledge about the contribution that UA makes in serving as a vital coping strategy for food in secured low income households.

Small, intensive cultivation of vegetables with micro-irrigation techniques and growing vegetables by using different grow bags / containers /is among the new knowledge to be adopted and scaled up in Dessie and else where in the country as viable means of food self reliance. The importance of creating enabling environment for Orphan and Vulnerable Students (OVS) to farm on vacant land available in school compounds is closely examined. Thus, it is the new lesson that may add new information so as to maximize the benefits of children in synonymous scenario in the region in general and in Dessie town in particular. A new start exhibited by the governmental and non-governmental organizations to jointly mobilize resources for the benefits of food insecure households and Orphan and Vulnerable Students is an imperative new lesson that needs to be nurtured in other areas too.

Policy recommendations on the integration of UA into the urban development and land zoning and use plan will serve as an imperative input to policy makers. Besides, findings and recommendations on the strategies to be followed in enhancing the access to vacant land of the town would benefit Governmental Organizations (GOs), Non -Governmental Organizations (NGOs), and other stake holders which are already in the practice and those which may wish to join in future.

Further more, the research will add some information to the limited researches (almost all focusing on Addis Ababa) conducted so far and the findings of the study will serve to bridge the existing gaps in knowledge and sensitizes possible policy reforms and development interventions in urban agriculture activities of the town. This study also draws the attention of the researcher's further investigation on the untouched or neglected aspects of the sector.

## 1.4 Research Objectives and Research Questions

### General Objective

The over all objective of this research is to investigate the role that urban agriculture has in enhancing the livelihoods of urban poor households.

### Specific Objectives

1. To identify the socio-economic profile i.e., gender, farming knowledge and income status of the urban farmers.
  - Who are the farmers of Dessie town?
2. To examine the socio-economic effects of urban agriculture on the Practitioners.
  - Does it contribute to the food security of the farmers in terms of the three food security defining elements ?
  - Does it enhance the employment opportunities of the households involved?
  - What are the social benefits it provides? Does it contribute to the social integration and gender equity of women?
3. To explore the constraints and challenges of urban agriculture
  - What are the main constraints?
  - How do they affect urban agriculture? Who is most affected? Solution?
  - Are there any under or non utilized resources?

## **1.5 Research Methods**

Data collection process of this study began in Dec 2009 and lasted in the early days of March 2010. The field work was under taken for 80 days. The first week of the first month was used to organize the field work and create conducive atmosphere for the research. Prior to the commencement of the field work, an extensive survey of literature on urban agriculture and other related issues to the general and specific objectives of the study was carried out so as to acquaint the researcher with concepts and theoretical knowledge on the subject under study.

In order to examine the household's status and multifaceted features i.e., their vulnerability contexts, the access they have to different resources, strategies employed, the social relations they have in the society, the outcome gained, etc., qualitative research method is essentially employed. Besides, so as to come up with the socio economic profile of the practitioners and to set out some of the most important features of the practice in the study area census method was used. Thus, this study employed different data collection techniques namely, interview, census, case studies, direct observation, and document review. The data obtained using different instruments are thematically organized and analyzed essentially in explanatory qualitative method.

### **1.5.1. Data Collection**

#### **A. Census**

The target population of this research is low income households who practice urban agriculture in Dessie town. However, data were lacking on the issue under consideration. Thus, in order to enlist farming households of the town and identify the socio-economic profile and the type farming they are engaged in, a complete enumeration was carried out across the study area in co-operation with urban agriculture office of the town. A total of 28 enumerators drawn from ten kebeles were deployed for the census. The enumerators were grade ten and above students and their prime duty were to seek out the households practicing urban farming through house to house and face to face interview. Prior to their deployment, they were provided half a day comprehensive orientation on the questions set for interview, data recording and ethical issues. The researcher and two professionals from urban agriculture office daily supervised the activities of the enumerators.

## B. Interviews

Informant interviews were conducted based on interview guides set for the study so as to seek answers to the specific question of the research basically about the reasons for their engagement in urban farming, livelihood assets they have or lacked, socio-economic benefits they gained and the main challenges they faced etc. Interview as a data collection method was also used to investigate the past and present experience of the research subjects. Within this context, this research relied on the information explored from three categories of informants. The first category constituted 30(14 male and 16 female) informants from among households engaged in vegetable production.

The first five informants were identified through the help of development workers of the area and the remaining 25 interviewee were identified through the networks of one after the other, snowballing technique. So as to exploit the rich knowledge and experience they have on the sector, 2 informants drawn from Dessie Town UA Office and 4 informants drawn from NGOs working on urban agriculture formed the second group. The final group comprised 6 orphan and destitute students (two students were drawn from three schools) who have been engaged in vegetable production in their respective school compounds.

All interviews were conducted face to face and informants were interviewed individually and voluntary bases. Prior to each interview, attention was paid by the researcher to establish a rapport and build their trust by disclosing to them about who and from where the researcher is, the purpose of the study, confidentiality of some private issues they want to keep secret etc. In line with this, it is worth mentioning that my rich knowledge of the area has profoundly helped me to easily establish a rapport and gain cooperation and support from different individuals, government and non-government organizations. Informed consent principle was followed through out the course of the field work. All interviews were conducted as per the time comfortable to the interviewees. Households involved in urban agriculture were interviewed at their home, farming land and any other convenient place chosen by them. The interviewees were highly encouraged to express their ideas freely from their own perspectives. During each session of interview, field notes were taken with out any alteration of the words and expressions used by the informants.

### **C. Focus group discussions ( FGDs)**

So as to explore group reflections on the major benefits that urban farming has provided to the households engaged, constraints and future actions; and in order to check data obtained from other sources, four group discussions were conducted. Each group comprised members ranging from 6-10 individuals and informally organized from different professional and occupational social categories. Two groups were drawn from among urban farmers who practice vegetable cultivation (one group from vegetable growers on commonly owned land in the inner part of the town and the other group was organized from peri- urban cultivators). Orphan and vulnerable students who practice vegetable farming in their respective school compounds constituted the third group. A group comprised professionals from governmental and non governmental organizations constituted the fourth group. All discussion sessions with each group were moderated by the researcher as per guidelines set for each.

### **D. Case anecdote**

From interviewed households, 8 cases were purposively selected in order to investigate their detailed past and present life experience and support the findings of the study with empirical cases. Thus, 8 cases were used to collect data on the socio-economic benefits that urban farming has provided to them and 2 cases were used to collect data on the constraints of the practice in the town. The stories of each case are narrated here in their own words.

### **E. Observation**

I conducted essentially systematic, but also casual observations so as to explore un noted situations by informants of the study, cross check the theoretical knowledge I had and the information I collected through other sources against the reality on the ground. Thus, it helped me to find out the farming practices, farm land size, water sources of the farming households, housing conditions, major sources of vegetables sold at the *gullit* and other open markets of the town, farm tools and equipments employed by the practitioners and waste dumped in pocket areas of the town etc. Both the inner and pre-urban areas of the town were directly observed in order to set out the comparative advantages and/or opportunities of the two areas.

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## **F. Document review**

It is evident that in Ethiopia urban agriculture is a relatively new topic for research. As a result of this, secondary data on the sector are very limited. However, efforts have been made to collect the necessary data from records, reports, archives, published and unpublished documents from Dessie Town Service Office (municipality), urban agriculture office, kebeles and other governmental and non- governmental organizations. Besides, the available literatures have been surveyed from A.A.U., E.C.A., F.A.O. and C.S.A. libraries and documentation centres.

### **1.5.2. Data Analysis**

Data explored from different sources are thematically processed and organized into different categories in accordance with the specific objectives of the study. Data drawn from census is tabulated and processed manually. In doing so, quantitative descriptions such as percentages and numbers are used against the variables such as age, sex, educational status, place of birth, and current income category and occupation type of the households enumerated. Data extracted through other sources are organized into major and sub- themes. Sustainable Livelihood Framework (SLF) is used to analyze the contexts, assets employed and outcomes gained. Explanatory qualitative discussions are supported by figures, percentages, cases and direct 'voices' of the informants.

## **1.6. Organization of the Thesis**

This thesis is organized in to seven chapters. Chapter one is the introduction to the thesis and provides a background to the study. It also entailed statement of the problem, significance of the study, research methodology and limitation of the study. Chapter two presents survey of related literatures. Among others it includes, contexts for urban agriculture, urban agriculture and the actors involved in it, types of urban agriculture, benefits of urban agriculture, constraints and negative impacts of urban agriculture, perspectives to urban agriculture and the livelihood concept and analytical frame wok of the study.

Chapter three provides an overview of the study area. It describes location and physical characteristics, foundation and development of the town under study and population and socio-economic features. Chapter four examines types of urban agriculture in Dessie town and the

socio-economic profile of the urban farmers engaged in urban agriculture activities. Chapter five discusses the socio-economic benefits that urban farming provided to the households involved. Chapter six spells out the potentials, constraints and problems of urban farming in the town. The final chapter sates conclusion and recommendations.

### 1.8 Limitation and Scope of the Study

It is evident that, urban agriculture is a general concept that encompasses wide varieties of activities. In the area under study, the urban agricultural activities include crop production (different types of cereal crops and vegetables), keeping cattle (dairy cows, pigs, sheep and goats fattening and poultry) and urban greening with ornamental and other plants. In regards to the practitioners, all types of social classes from subsistence poor households to middle and high income categories, and OVC are engaged in it.

In respect to production orientation, it comprised both subsistence farming in the inner part of the town and market oriented peri- urban agriculture in the immediate periphery of the town. However, though attempt was made to address the socio economic profile of all households identified as urban farmers in the inner part of the town, due to time and financial constraints the detailed study is only limited to low income vegetable cultivators. Moreover, though currently Dessie town incorporated six rural kebeles into its administrative structure, this study is also limited to the inner and outskirts of the town.

### 1.9 Ethical Issues

All names used in this thesis are pseudonyms and the photographs inserted in the thesis to support issues under discussions are used with the consent of the of the subjects of the study.

## **CHAPTER TWO**

### **LITERATURE REVIEW AND PERSPECTIVES ON URBAN AGRICULTURE**

Literatures reviewed can be subsumed into four major sections and issues: Theoretical perspectives on urban agriculture, livelihood and sustainable framework, context for urban agriculture and issues related to it.

#### **2.1 Theoretical Perspectives on Urban Agriculture and Sustainable Livelihood Framework**

##### **2.1.1. Theoretical perspectives**

This section seeks to have a close look at the theoretical debate on urban agriculture to provide the conceptual framework of the study. In regards to urban agriculture, literatures provide two main and contrasting theoretical positions namely views accepting UA and views rejecting UA. The economic-development theorists view UA as irrelevant practice and argued against it (Tinker, 1994). While the proponents of the sector, on the other hand, developed their own theoretical premises that explain its relevance (Kekana, 2006).

The proponents consider that urban agriculture is rational both economically and socially. Hence, it should be given space to grow in the modern urban environment (Mbiba, 2002). The exponents of urban agriculture argue about the answer it provides to some of urban socio-economic problems including urban poverty, unemployment malnutrition, food insecurity and environmental degradation (van Veenhuizen, 2006).

According to the proponents of UA theoretical debate, large numbers of households have survived the adverse impacts of economic crisis and formal unemployment being engaged in the practice as their salient livelihood strategy Mabiba, 1998(in Kekana, 2006). Contrasting to the views rejecting UA, they argue that UA is not always an activity taken up by recent migrants (as proposed by modernization theorists), and, is not also subsistence focused Poor's business rather it constitutes all income categories Drakakis-Smith (in Mougeot, 1994).

### 2.1.2. Livelihood and Sustainable Livelihood Framework (Analytical Framework)

On the other hand, views rejecting UA emanate from the proponents of modernization theory and neo-Marxist theory. Modernization theory proponents' argument stems from European concept of "modern city". According to this theory, cities as symbol of development got to be clean and organized in to formal economic system. Thus, the modernists view agriculture in urban setting as a rural related practice, which has little or no relevance to modern urban environment. In so far as urban agriculture is rejected as inappropriate practice in modern urban development (Castillo, 2003).

Besides, in accordance with the supporters of this theory, urban agriculture is a subsistence and rural tradition, practiced by newly arrived migrants, who are new to the urban environment and urban way of life (Kekana, 2006). This theory argues about the damaging effect of urban agriculture on urban environment and proposes its complete abolition (Ibid). It also stipulates that, urban agriculture is a temporary activity. However, this doesn't correlate to the reality in that; urban agriculture has been part of urban function since the first human agglomerations thousands of years ago (Castillo, 2003; Mougeot, 1994; Smith and Memon, 1999).

The neo-Marxist theorists also reject urban agriculture but, from different perspective. In the first place, from neo Marxist view point, cities are characterized as an arena of exploitative economic relation in which few capitalists accumulate capital through the exploitation of the laborers Mibiba, 1998(in Kekana, 2006).The neo-Marxist theory considers urban agriculture as labor exploitative practice in that it makes labor to work two times in the factory and at home. Hence, according to this theory, labor is not required to practice UA if adequately paid at work (Kekana, 2006). Thus, this theory rejects UA and other informal sector backward and labor exploitative (ibid). Of all these perspectives, the theoretical position which suggests the integration of UA with in urban setting so as to harness its multifaceted benefits provides the conceptual frame work for this study.

## 2.1.2. Livelihood and Sustainable Livelihood Framework (Analytical framework)

### What is a livelihood?

The term livelihood has been extensively discussed by scholars of different disciplines, development practitioners and academics. Conceptually however, the term remained vague and elusive partly due to the vagueness of the term itself and partly because of the fact that we are coming across multiple literatures that provide a wide variety of definitions (Ellis, 2000). Some of the literatures surveyed provide the following definitions. In its simplest sense, the term is a means of making a living (Chambers and Conway, 1992). This definition draws the attention of economists and it encompasses what people do in search of income (either in cash or in kind), the mechanisms through which they create access to resources so as to sustain themselves and their families, and the way they structure their everyday lives and plotting their movements (Staples, 2007).

The most popular and widely used definition stems from the work of Chambers and Conway. According to their definition "a livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living" (Chambers and Conway, 1992:7). This definition comprises three pertinent aspects of a livelihood (capabilities, assets and activities) and places emphasis on the relation between assets and options people own in practice to pursue alternative activities that can generate income level required for survival (Ellis, 2000). Another definition of the term emanates from the work of Ellis, 2000. According to his definition, "a livelihood comprises the assets (natural, physical, human, financial, and social capital), the activities and the access to these (mediated by institutions and social relation) that together determine the living gained by the household" (Ellis, 2000:10).

This definition conveys more or less the defining elements employed by other scholars (Scoones, 1998; Chambers and Conway, 1992). But, new elements such as mediating institutions and social relations and the very access people have to the defined assets are embedded in it. Coming to the generalization and conclusion of this topic, one common feature that can be drawn from the above definitions is that, livelihood is about people, their resource and what they do with these resources (Staples, 2007). Livelihoods rotate around resources. However, resources are inseparable from external contexts in which people act i.e., from the

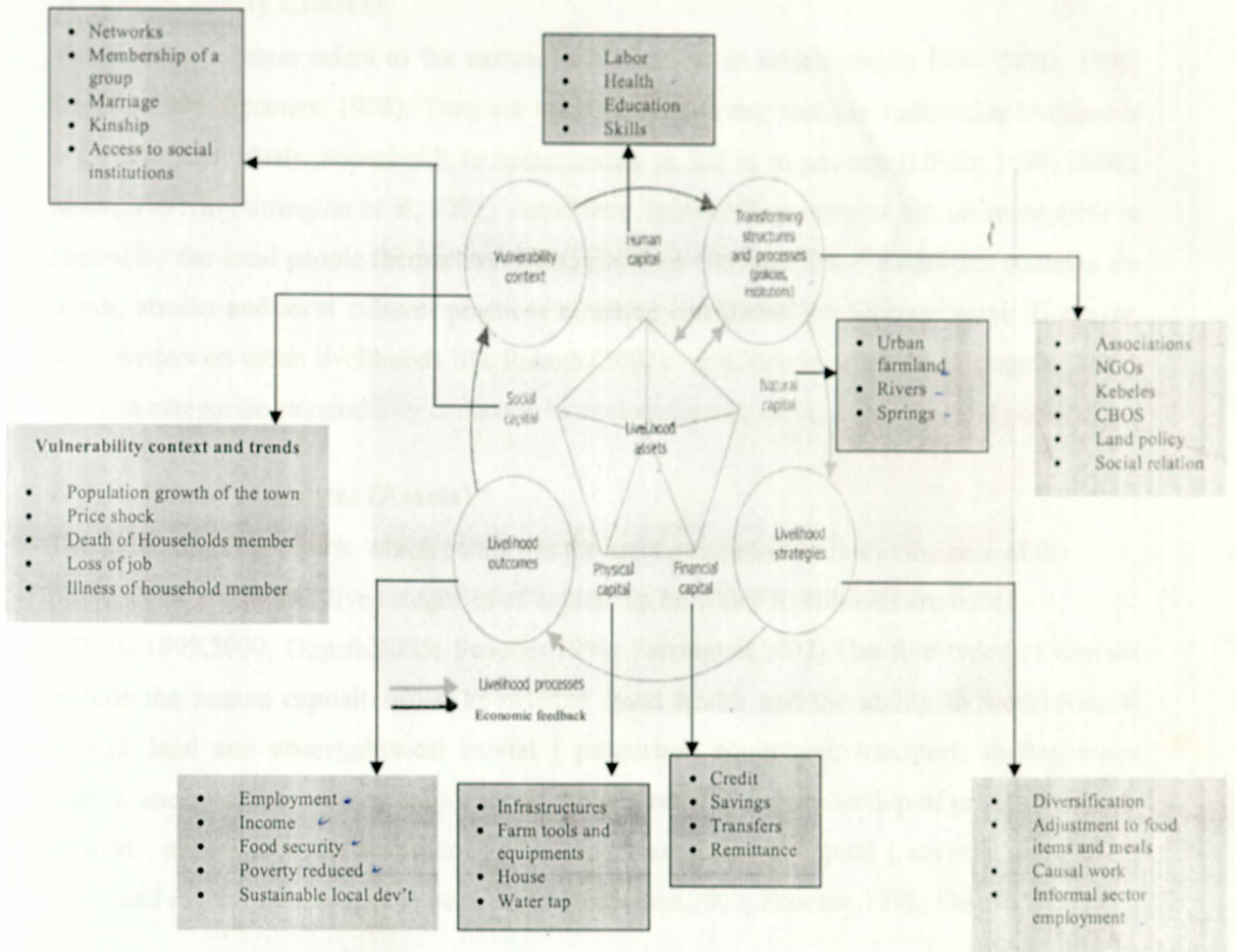
issues and problems of access and changing political, economic and socio-cultural circumstances (Ellis, 2000).

Livelihoods are also about creating and adapting new opportunities. Whilst engaging in livelihood activities, people may cope with or encountered by different risks and uncertainties such as meager resources, epidemics, chaotic markets, increasing foods prices, changing lifecycles and kinship networks etc (DFID, 1999). These challenges and new opportunities determine the social and material resources to be chosen and employed by the people so as to make a living (Parrot et al, 2006). According to Chambers and Conway 1992 (in Scoones, 1998:5), a livelihood is sustainable " when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resources base".

### **Sustainable Livelihood Framework as Analytical Framework of the Study**

Urban agriculture is essentially a response of the urban poor to inadequate, unreliable, and irregular access to food and lack of purchasing power (van Veenhuizen, 2006, Mougeot, 1994, 2000). Low income households adopt UA as their livelihood strategy to improve their food status and diversify their livelihood options. In order to thoroughly understand how the low income households procure food in urban setting and investigate the core resources employed, contexts that compelled them to be engaged in UA; so as explore how transforming structures and processes (government policies and local institutions) affect positively or negatively the livelihoods of farming households, and the main impeding factors, Sustainable Livelihood Framework (SLF) is chosen as analytical model of the study (see Figure below).

Figure 1: Analytical Framework of the Study



Adapted from DFID 2001, Sustainable Livelihoods Guidance Sheet, cited in Rene Van Veenhuizen page, 279.

Sustainable Livelihood Framework allows us to apply explanatory variables and improves our understanding of the livelihoods of urban farming households (what they lack and the access they have to different resources, how they use the resources at their disposal to make a living), by capturing the multiple interactions between the various factors which affect the food producing efforts of the poor (Swift and Hamilton, 2001). The framework comprises five major components: livelihood assets, contexts, transforming structures and processes,

livelihood strategies and livelihood outcomes. The details of each component is presented below.

### **A. Vulnerability Context**

Vulnerability context refers to the external environment in which people live (DFID, 1999; Degefa, 2005; Scoones, 1998). They are unpredictable events that can undermine livelihoods and cause individuals, households or communities to fall in to poverty (DFID, 1999, 2000). Moser 1991(in Farrington et al, 2002) stated that, vulnerability contexts are un susceptible to control by the local people themselves. Ellis,(2000) on the other hand stated that contexts are trends, shocks and local cultural practices affecting livelihoods in different ways .However, other writers on urban livelihoods like Rakodi,(2002); and Meikle, (2002) ( in Degefa, 2008), opted to categorize vulnerability context in to environmental, social, economic and political.

### **B. Livelihood resources (Assets)**

The livelihood framework, which comprises the asset pentagon that lies at the core of the frame work, constitutes five categories of 'capital' up on which livelihoods are built ( DFID,1999,2000; Degefa,2005; Scoones,1998; Farrington,2002).The five types of capitals include the human capital( skills, knowledge, good health and the ability to work),Natural capital( land and water),physical capital ( production equipment, transport, shelter, water supply, energy and communication), social capital ( networks, membership of groups, relations of trust , access to wider institutions of society) and financial capital ( savings, supplies of credit and regular remittances or pensions) ( Farrington,2002; Scoones,1998; Degefa,2005).

### **C. Livelihood Strategies**

A livelihood strategy, as it can be understood from the term itself, refers to the range of activities and choices that people make in order to attain their livelihood goals (DFID, 1999). Livelihood strategies include the way how people mobilize or combine income generating activities; the mechanism in which they use their assets; the type of asset they chose to invest in and also the way they act to preserve the already existing assets and income (Wididia, 2008; DFID, 1999, 2000; Degefa, 2005). Different researches on urban economy indicate that like their rural counter parts, urban poor households have developed different modes of livelihood strategies basically as a response to economic crises and food insecurity problems that came in

to being in the late 1970s in the cities of developing south in general and in Africa in particular (Owusu, 2001; Swift and Hamilton, 2001). For instance, studies carried out in Ghana and Uganda depicted that the urban poor have adopted different livelihood strategies, including direct diversification of income generating activities and informal sector employment, bartering and trading, including between urban and rural areas; urban gardening, hoarding of essential goods etc. (Swift and Hamilton, 2001). Both in rural and urban areas people may diversify their livelihood strategies at every level. For instance, at household level, members of a household may live and work in different places, engaging in various activities, either temporarily or permanently. At the same time, individuals themselves may also take part in different income generating activities so as to achieve different goals (Wadiadi, 2008 ).

#### **D. Transforming Structures and Processes**

In general terms, within the livelihood frame work, transforming structures and process refer to the institutions, organizations, policies, and legislation that mould livelihoods (DFID, 1999). They are imperative and function at all levels from the household to the international arena. They also exit in all spheres from private to public and play a salient role in determining the access people have to different types of capital, livelihood strategies and terms of exchange between different types of capitals and economic and social returns to a given strategy (ibid).

#### **E. Livelihood outcomes**

As can be understood from the term it self, livelihood outcomes are the final result of livelihood strategy employed by an individual or a household (Soones, 2002; Degefa, 2005; DFID, 1999; Farrington et al, 2002).

### **2. 2. Contexts for Urban Agriculture**

The world's population passed 6 billion in 1999(Montgomery et al, 2003: 11). Every year it is increasing by around 85 million and different projections indicate that it is expected to increase to more than 9 billion by 2050 ( Drechsel, 1999:21 ) . The troubling thing is that, almost all of this growth will take place in the poor countries of the world, whose socio-economic conditions are ill equipped to this profound increment of population (Montgomery et al, 2003). Africa's population will also grow in three fold, even under a medium rate of growth (Drechsel et al, 1999). Regionally, Sub-Saharan Africa (SSA) will take the lion share. At 2.6 % (in which

some of the countries in the region exceed this percentage) per year, SSA's population growth is worst in the world (Ellis, 1992). Between early 1990s and 2003-2005 it grew by 2000 million people (FAO, 2008: 12). Such facet of increment in the world's population has an aggregate effect on the demographic shift in the urban population and other interrelated socio-economic problems. In the past couple of decades, the world's population is becoming increasingly urbanized due to natural growth of the urban population and rural-urban migration. In 1950 about 30% of the world's population lived in urban areas (UNDP, 2002), in 2003 it raised to 48 percent and it is projected to exceed the 50 percent mark by 2007 and expected to rise to 61 percent by 2030 ( UNDP, 2004). Africa experienced high urbanization in post colonial period (Drechsel et al, 1999) and urban growth rates will remain high almost 5% on aggregate ( Falola and Salm, 1994). But, in SSA, urbanization and the number of urban population will grow in double between 2000- 2030( Shapouri and Rosen, 2008: 1 and UNDP, 2008 : 7-8 ).

Unrestrained population growth not only directly increases the demand for food; but also poses series of interrelated problems. Among others, it brings about environmental degradation and marginalization of food production which in turn causes rural-urban migration (Drechsel et al, 1999) ; some call it the migration of poverty to urban areas which they meant a shift in concentration of poverty and food insecurity from rural to urban areas of developing countries (Garrett, 2000; Van Veenhuizen,2006). Fast urbanization with out a corresponding expansion in social services enormously results in urban impoverishment. Here, it would be useful to pin point the concept poverty in general and urban poverty in particular. Conceptually it is hard to define the term urban poverty in a single term which is broad and many sided phenomenon. In any case, the World Development Report, 1990(in Bernstein et al, 1992:16) defined poverty as " the inability to attain a minimal standard of living " measured in terms of basic consumption needs or income required to satisfy them . Urban poverty is multifaceted phenomenon manifested various ways. Comprehensively speaking the urban poor are: "those with out sufficient education, secured employment, sustainable incomes, savings, poor housing, important networks [and who live in poor environmental situation]" (Emebet, 2008:11).

For long it has been believed that poverty is a rural phenomenon. But, recent studies showed that the locus of poverty has shifted to urban areas and poverty in urban areas of developing

countries is growing faster than the rural areas. For instance, World Resource Institute (WRI, 1999) (cited in Mohammed 2002), stated that in 1988 about 25 % of the developing world's absolute poor were living in urban areas. Other surveys conducted by World Bank and IMF in 90 developing countries indicated that between 1993-2000 the growth in urban poverty was 30 percent greater than the rural areas (Shapuri and Rosen, 2008). In mid 1990s data drawn from eight developing countries revealed that 10 million malnourished children are found in urban areas (Garrett, 2000). According to the recent estimate of UN-HABITAT about 840 million people lived in slums in 2005. Of this, about 70 percent are in SSA (UNDP, 2008). The rise in urban poverty owed to plethora of factors. Essentially, cities couldn't cop with such massive urban population growth and they failed to provide sufficient employment, basic services such as access to drinking water, health, education, and manage wastes. (Van Veenhuizen, 2006; UNDP, 2008). Besides, the structural adjustment of 1980s has its own role to exacerbate the situation (Smith, 1998). The interplay between poverty and food security is very clear. They are the highly interwoven issues that reciprocally reinforce one another (Van Veenhuizen, 2006). According to Degefa 2005: 8 "poverty is a driving force for household food insecurity, and, in turn impoverishes a household ". Essentially a household can be considered poor and food insecure " when it has no access to basic livelihood resources, when it is highly vulnerable to external shocks and when the government system excludes it from development and decision making" ( ibid).

In urban areas, the two issues are closely interrelated in that, the ability to purchase of basic needs such as food depends on employment/ income and the health conditions of the urban households (Smith, 1998). For the urban residents, the main sources of food are the market; own production, public or private transfers Ruel et al 1998 (in Swift and Hamilton, 2001). But, the availability and cost of food is affected by house hold purchasing power, the efficiency of marketing and distribution of systems and the extent of urban agriculture practiced and the access that the dwellers have to transfers (Ibid). The process of urbanization impacted the developing country's food production and distribution system both directly and indirectly. Directly it increased the demand for food. Indirectly it reduced the food supply in that, as cities expand, prime agricultural land was converted in to the residential or industrial areas (Drechsel et al, 1999; Garrett, 2000; Smith, 1998). Besides, over the last decades, food

accessibility was threatened by the sharp rise in the price of food. For instance, in Harare, the food price index increased from 10 in 1990 to 280 in 1993 (Smith, 1998). Thus, since food composes substantial part of urban poor household expenditure (60-80%) they are the most vulnerable group (Van Veenhuizen,2006). All these have direct implications for the food security.

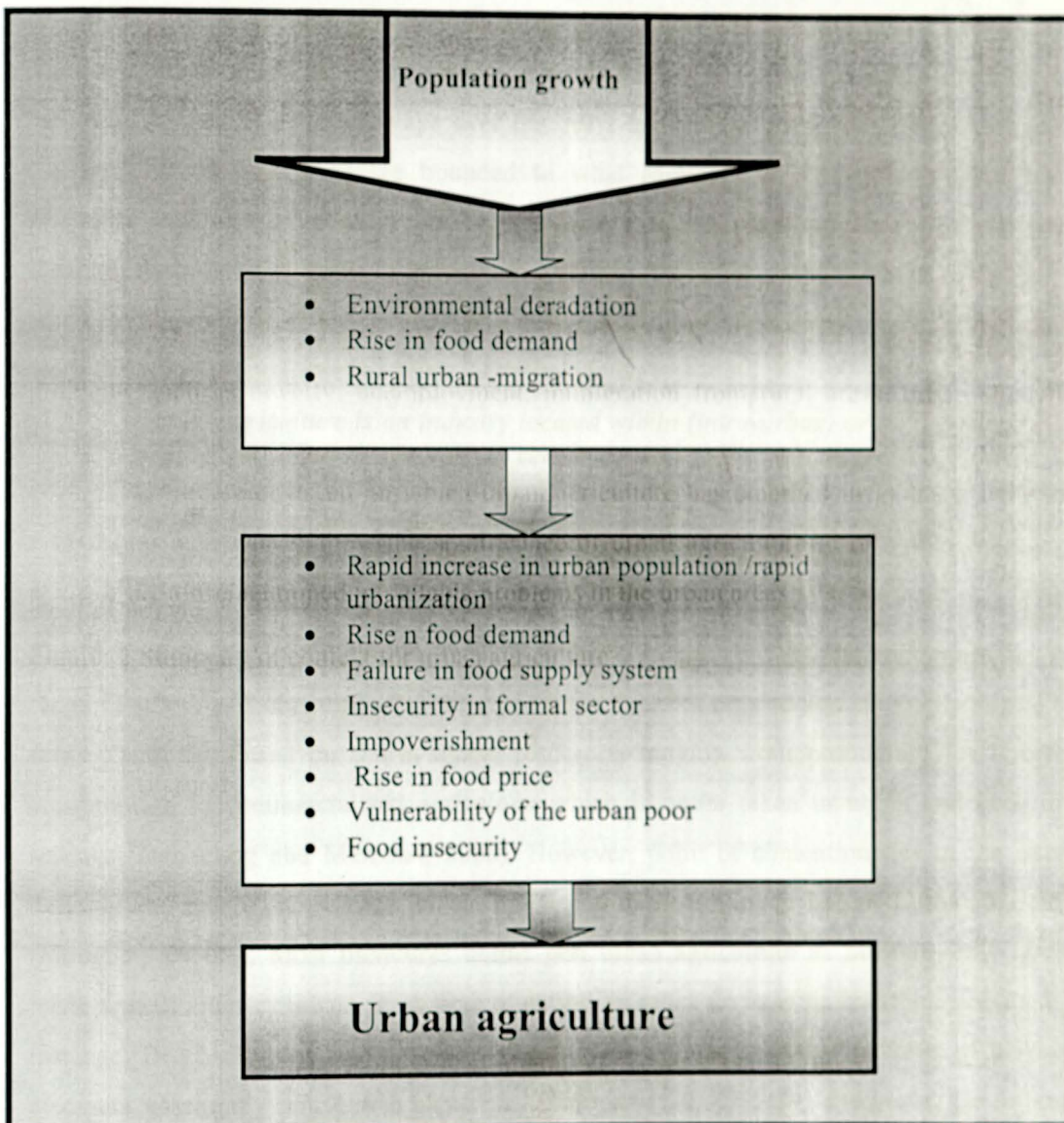
The concept food security or in security has evolved over time and has been defined by different institutions, UN development agencies, and scholars' indifferent ways but, more or less with similar substances. From 1975-1999 about thirty two definitions were given by different organizations and individuals. Form among the list of definitions provided by Maxwell 2001, let us take two of them and examine their implication for food security of urban poor households FAO (1983) defined it: "Ensuring that all people at all times have both physical and economic access to basic food they need" (FAO, 1983). On the other hand World Bank spelled it out: "Access by all people at all times to enough food for an active, healthy life" (World Bank 1986 (Maxwell, 2001:15). One imperative point stands out from these definitions: access to basic/ enough food either physically or economically. But, over the last decades a bundle of sources indicated that urban poor households couldn't have accessed food due to inadequate unreliable and unaffordable food supplies from rural and foreign sources (Mougeot, 2000; Van Veenhuizen, 2006).

Thus, in the 1970s and early 1980s globally induced crises profoundly contributed to the intensification of urban poverty food insecurity. Basically, the increase in urban impoverishment has been due to rapid increase in urban population accompanied by an employment and under employment (Owusu, 2001). As a result many people of the urban residents in south responded to the crisis by being involved in various economic activities in which urban agriculture emerged as a viable strategy stimulated by recognized advantages it provides in terms of food, nutrition, health social and positive environmental impacts (Owusu, 2001; Swift and Hamilton, 2001; Dubbeling and Merzthal ,2006; Mougeot,1994;2000,2006; Van Veenhuizen,2006) ( the summary is provided in the figure 1).

To conclude, as thoroughly overviewed, the population living in cities is growing worldwide. In developing countries the phenomenon is exacerbated by the plethora of interwoven

problems such as poverty, unemployment, immigration from rural areas, urban slum, food insecurity squatter settlement and environmental degradation. So far discussion is to show the socio-economic contexts up on which urban agriculture has emerged in global south and by implication it is also to show the significance of urban agriculture in providing solutions to some of the aforementioned intractable problems in the urban areas.

Figure: 2 Summary of context for urban agriculture.



Source: Own summary

## 2.3 Urban agriculture and its participants

### 2.3.1 What is Urban Agriculture?

Urban agriculture is an old practice i.e., the production of food and fuel in and around cities has been almost as long as long as human settlement themselves (Prain, 2006: 276).

Over the past decades, it has gained worldwide prominence, especially in the developing world because it has become a viable poverty intervention strategy for the urban poor. Hence, it is one of the livelihood strategies that the urban poor use in combination with other strategies. The term urban agriculture bears broad concept and lends it self to multiple of definitions. It has been defined in different ways over the years and across disciplines ( Mougeot, 2000). Most of recent definitions are bounded to what Mougeot 2000:8 calls binding blocks/principles such as the types of economic activities, food and non-food categories of products, location, types of areas, types of production systems, destination of the products (purpose), and the scale of production. The most widely used definition of urban agriculture stems from the work of Mougeot and he defined it in the following way:

*Urban agriculture is an industry located within (intra-urban) or on the fringe ( peri-urban) of town , an urban centre or metropolis, which grows or raises, processes, and distributes a diversity of food and non food products (re) using largely human and material resources , products and services found in and around that urban area , and in turn supplying human and material resources, products and services largely to that urban area (Mougeot,2000:10)*

This definition conveys that urban agriculture is a dynamic concept that encompasses a wide range of activities from cultivating the commonest types of crop to non edible plants and trees raising animals, based on the available resources, ranging from production for household consumption to commercialized agriculture which is under taken in urban and peri- urban settings (Dubbeling and Merzthal, 2006). However, point of contention lies in the issue of defining and making a clear demarcation between the terms urban and peri-urban agriculture (Mougeot, 2000:6). Most literatures define peri urban agriculture as farming activity under taken around cities or towns. Such type of definition relies on location and there are some, for instance, Drechsel, 1999 and others who argue about the distinctive features of peri-urban elements, essentially rural-urban elements. (Drechsel et al, 1999:24). However, the difference can't be easily singled out mainly because, geographically that part of peri-urban areas may include intra-urban spaces (OECD, 1979:10) and economically both are inter dependent in

markets and inputs. For the purpose of this study urban agriculture can be defined as an activity that is concerned with crop cultivation and raising animal in the inner and peri urban areas of Dessie town.

### 2.3.2. Who are the Urban Farmers?

Urban farming is a practice of all income groups ranging from subsistence farmers to investors or to those who practice it as a hobby. Thus, urban farmers are people with different socio-economic backgrounds and they can be:

- Families who are absorbed by the expansion of cities and continue to farm in new environment so as to exploit the comparative advantages (closeness to market, opportunities to collect information and to sell directly to the urban consumers. (Prain and Zeeuw, 2004).
- In some cases, new migrant also practice urban agriculture as temporary survival strategy. These people come to towns or cities with the farming knowledge and skills of original place and adapt themselves to the new urban settings. They depend on their relatives or people of the same origin to have access to land or use free, vacant land (Swift and Hamilton, 2001). Another group of urban farmers are very poor and food-insecure urban households, namely, female headed households, those with children, HIV/AIDS affected households, young un employed people, elderly people with out pension etc. This group is socially marginalized group who practice farming on small private or public or common plots adjacent to their homes (Van Veenhuizen, 2006).
- Low and middle class urban households are other categories who practice UA to complement their income. These people are engaged in agricultural activities mostly on their homesteads and their farming activities include dairy on the bases of zero grazing, poultry units etc. The final group of urban farmers are richer people who invest in UA (Axmite et al, 1994 )

Of all farmers type mentioned above, in most cases low-income earners, basically who grow food for their own household consumption and/or as a means of income generating activity constitute the majority of urban farmers (Jacobi et al, 2000; Mougeot, 2000).

In urban centers, farming is practiced for either subsistence or commercial purposes or both. The main motive behind the urban poor is a survival strategy, securing themselves in food (Obudho and Foeken, 1999). In regards to the gender dimension of the farmers, women, constitute an important part of urban farmers especially in Africa due to two principal reasons (ibid). First, in most part of Africa, traditionally women are responsible for house hold's food provision. Secondly, most of African women attained low level of education than men and it is challenging for them to be employed in formal and skilled based jobs. In recent years in most part of African urban centers, including Ethiopia, it is also common to see women farmers who are living with HIV/AIDS (Mubvami and Mushamba, 2006).

Actors involved in UA can be categorized based on the role they play. According to (Mougeot, 2000:14) they are suppliers of resources, in puts, services and producers, the transporters and the processors, the retailers and the consumers, the promoters and managers.

### 2.3.3 Types of Urban Agriculture

Urban agriculture is an activity that encompasses the production of food and non food plants, tree crops animal rearing in intra urban and peri-urban (outskirts) areas. It is a business that can be practiced by all income groups ranging form subsistence to commercial farming. (Mougeot, 1994; Drechsel et al, 1999).

Urban farming can be categorized in to different typologies on the basis of production areas, product orientations, production systems and type of practice in which the farmers are engaged in (Cabannes and Dubbeling ; Drechsel et al, 1999; Obudho and Foeken, 1999).

**Location Types:** the most widely recognized production areas of UA are urban and per-urban areas. However, varies types of production sites can be identified as common features of most cities or towns (Obudho and Foeken, 1999; Drechsel et al, 1999). Urban agriculture can be practiced on what is known as back yard farming, also known as homestead farming. This type of farming encompasses keeping animals and/or cultivation of crops one's own compound adjacent to respective homes of the cultivators (Mougeot, 2000; Obudho & Foeken, 1999).

Off plot farming or farming on land away from the residence of the farmers constitutes another form of farming type. Here, farming is under taken on land that belong to somebody else or

private land (owned, leased) or land that belong to the public which may include parks, conservation areas, free spaces along roads, streams and semi-public lands (school yards, grounds of schools, hospitals, etc).

This type of farming is typically practiced by low income households and the farmers may adapt shifting cultivation system due to tenure insecurity (ibid). Location wise, farming in peri-urban areas, i.e. farming on areas formerly rural; but became part of urban due to the expansion of towns or cities is also common. These areas are directly influenced by the economic and social activities of cities and are subject to lose their rural character (OECD, 1979; Mougeot, 2000).

**Product Orientations:** urban agriculture in urban areas is practiced either for subsistence or commercial purposes. Subsistence farming is production of food for self consumption or selling of some surplus to get income to be paid for other basic household needs or buying less food to augment the fungible income of the practitioners. Commercial farming is a market oriented type of farming essentially production for market purpose to generate income (Veenhuizen, 2006; Foeken et al, 2004).

**Production systems:** farming systems in urban areas refers to the scale of production (Mougeot, 2000). Different empirical surveys conducted in different cities and towns revealed that the presence of seven categories of urban farmers ranging from low-income survival to agribusiness, encompassing middle-income home gardeners, low-middle and high income entrepreneurs, farmers' associations and co-operatives (Mougeot,1994).

**Activity type:** urban agriculture is a general concept that denotes all types of farming activities in urban or peri-urban areas. However, urban farming can be classified as per the type of crop. (grain, root, vegetable, aromatic and medical herbs, ornamental plants, trees and fruit crops or the type of animals (Poultry, rabbits, goats, sheep, cattle...etc) that the farmers raise (Mougeot, 2000). Urban farmers may specialize in one or in combination of two or more activity types.

## **2.4. Benefits of Urban Agriculture**

In its broader sense, UA encompasses a wide range of activities from production ("traditional"/ improved), to processing, marketing, distribution and consumption. Within this wide range of spectrum, it has a number of interrelated economical, social and environmental benefits.

### **2.4.1. Food Supply**

Food production in urban areas is a response of urban poor to inadequate, unreliable, and irregular access to food and lack of purchasing power (van Veenhuizen, 2006). The available literatures revealed that urban agriculture contributes to food supply at the town level and to households involved (Foeken et al, 2004). Urban food production is conducted for either own consumption or commercial purpose. (Drechsel et al, 1999; Obduho & Foeken, 1999). The aggregate effect of booth type is increase in the supply of food in urban areas and substantially complementing the other sources.

Data drawn from different studies indicate that food produced in urban areas account an important share of food especially the most perishable types, such as vegetables and milk (Foeken, et al, 2004; Mougeot, 1994). In Africa for instance, cities like Dares Salaam produces about 50 to 60 million kg in its inner part and another 25 million kg is produced in its peri-urban areas. The aggregate accounts 90% of leafy vegetables on sale in Dares Salaam's market (Foeken et al, 2004).

Urban framers in Kampala produce about 70 percent of vegetables eaten in the city. (Tinker,1994). Similarly 90 percent of vegetables consumed in Accra are produced by the urban and peri-urban farmers of Accra (Smith, 2001). Bamako is self sufficient in horticulture products. Kampala produces 70 percent of poultry (meat and eggs) are produced in the city. In Lusaka, subsistence food production accounts 33 percent of total consumption by squatters (UNDP, 1996).

Most of urban dwellers in Asian cities strive to produce their own food and play a significant role in urban self sufficiency (Mougeot, 1994; Mlozi, 1997). For instance, in 1960s and 1970s peri urban areas of Beijing has been producing 70 percent of vegetables and milk (Cai, 2006). Singapore produces 25 percent of vegetable, 80 percent of poultry and 15 percent of pork it

consumes Yeung (1985 in Mougeot, 1994; UNDP, 1996). Hong Kong produces 45 percent of vegetables it consumes and in Jakarta 20 percent of food consumed by squatters is self produced (UNDP, 1996). In 1996 Havana's urban agriculture provided city's population with 8500 tones of agricultural produce (Altieri et al, 1999).

From these examples it is evident that urban and peri-urban agriculture has important contribution to the supply fresh, and nutritious food (vegetables, fruit, egg, milk poultry) to urban areas and enhances food availability (Egal, 2001). For households involved, urban farming serves as an additional source of food and has a role to play in augmenting their food supply (Foeken et al, 2004). Self produced foods allow households to have direct access to own grown food and to consume greater amount of food, nutritionally richer and a more diversified diet (ibid). For instance, about 77 percent of urban farmers in Kenya produce entirely for their own personal consumption (Smith and Memon, 1994). In Dares Salaam, self produced food account about 20-30 percent of household's food supply Sawio (1993 in Mougeot, 1994).

#### **2.4.2 Food Security and Nutrition**

One of the most important assets of urban of agriculture is its contribution to food security (Van Veenhuizen, 2006). According to (Egal et al, 2001), UPA contributes to the urban food security through increased food availability, stability and to certain extent physical accessibility. Urban farming enhances the food security status of households through the income it generates (Van Veenhuizen, 2006).

Nutrition wise, production and consumption of high nutrient foods which are vital to micro nutrients in healthy and safe manner also enable the low income house holds to improve their dietary status and relieve under nourishment (Nugent, 2000). Households with improved food security and nutrition indirectly mean quality of life and health of individuals and community as a whole (UNDP, 996). It is clear that, the health and wellbeing of individuals depend on the quality, quantity and regularity of their food intake. (Foeken et al 2004). Thus, urban food production increases the opportunity to access locally grown fresh, healthy food for low income people. (Mubvami and Mushamba, 2006). Eating fresh, quality and nutritionally adequate amount of vegetables, fruits eggs, milk and meat etc. directly transcends to physical,

mental, emotional health of individuals in that it makes them healthier, productive and more resistant to diseases(UNDP,1996).

### 2.4.3. Income Generation

Urban farming provides income for house holds' involved in two ways either directly through the sale of produce or indirectly money which is saved by growing vegetables and/or producing milk and eggs (Mougeot, 2000; Obudho & Feeken1999; Foeken et al, 2004). Urban households depend on purchased food and spend about 60-80 percent of their income on food (MaxWell et al, 1998(in Swift and Hamilton, 2001). In 1990s data drawn from 23 metropolitan cites of LDCs indicate that, urban households were spending 50-80% of their average income on food (Mougeot, 1994). Thus, production of own food enables the urban poor households to save money, because less money will be paid for less food to be bought (Foeken et al, 2004).

Different researches conducted in different African countries portrayed that cultivation of crops and keeping animals have paramount importance in enhancing the income of urban farmers. In Africa, Tanzania is typical example of a case in point. Survey conducted in Dar es Salaam, Arusha and Dodoma (Tanzanian cities), home gardeners earned an estimated 20 to 25 percent of their households' monthly income from selling part of their crops. Where as , fore some commercially oriented open space cultivators these figures were 78 percent in Dar es Salaam and 45 percent for Arusha Stevenson et al, 1996 ( in Foeken et al , 2004). In Brazzaville and Bangui survey conducted between 1998 and 1992 revealed that market gardening generated income valued adequate to provide for the basic food requirements and other expenses such as housing, clothing and schooling.

Similarly urban farmers in Kampalla occupying open spaces in low or bottom lands earned an estimated US\$ 400 to US\$ 800 dollar Moustier et al, 2004, (in Moustier and Danso, 2006). Urban home gardeners in Ouagadougou are able to earn about US\$ 4 direct and US\$ 24 indirect per month (ibid). In Addis Ababa, data collected in 1990s depicted that none of the urban farmers had an average monthly income below 125ETB/month and household gardeners were also able to save an average of 10 to20 percent of their income which otherwise would be paid to some other household needs( Axumite et al, 1994). In 1995, a comprehensive

household survey conducted in Russia revealed that urban gardeners in three capital cities earned an average of 12 percent of their income Seeth et al (1998 in Nugent, 2002).

Keeping livestock is also another important source of income for urban households (Foeken, et al 2004). In developing countries including Africa, animals are an important physical and financial capital for many urban and prei-urban households. Animals provide nutritious foods such as milk, eggs, meat. By selling part of or all of these products including off-springs, they can be a regular or periodic source of income (Prain, 2006). For instance, in Kampalla, chicken production provides to households an estimated income that ranges from 19 to 76 percent in which the medium is about 38 percent (idid). In Tanzania, studies conducted in the mid 1990s indicated that " profits gained form milk sales being 3-7 times higher than the annual salary of a senior government official and 7-10 times higher than the annual minimum wage"( Mlozi,1996; Mlozi,1997b ((in Foeken et al, 3004: 22).

Animals are also taken as a form of investments that can be cashed in times of financial crises (Axumite et al, 1994). Besides, animals offer another important physical capital, manure. It is significant either for sell or for improving households' farm land (Prain, 2006).

#### **2.4.4. Employment**

Urban agriculture is a labor intensive activity which drives labor either from members of households engaged in the activity or from hired laborers (Foeken et al, 2004). In most cases, low come subsistence urban farmers rely on the labor derived from their own family members so as to maximize their welfare (Nugent, 2002; Foeken et al, 2004). Through its wide varieties of activities provides employment for households involved and it has also significant employment generating potential (Axumite et al, 1994). For instance, in Addis Ababa survey conducted in 1990s portrayed that households and cooperative producers were able to create full time employment for heads of the households and their spouses and par time job for children and other members of the households (ibid).

In other East African cities too urban agriculture is an important source of direct and indirect employment. In Nakuru, Kenya about 35,000 households are engaged in urban agriculture. Of this figure, UA provided full time employment for about a fifth of them and the other 8500

men are laborers either casually in crop cultivation or permanently in livestock keeping (Foeken, 2006). In Havana about 117,000 fulltime and part time households and 30,000 wage labor employee were employed in UA (Nugent, 2002)

### **2.4.5. Micro-enterprises Development**

As it has been over viewed, UA is an important informal sector that provides food, employment and income for a significant number of urban residents. Urban agriculture also stimulates the development of micro enterprises of different types (Tinker, 1994; Van Veenhuizen, 2006). These include input users, input suppliers and service provider enterprises. Enterprises that utilize agricultural products as their input such as processing, packaging, marketing, milling, drying etc. (Nugent, 2002; Van Veenhuizen, 2006; Mougeot, 2005, 2006). In line with this, studies conducted in different countries portrayed that, guided by urban market demand, various agricultural products processing enterprises have developed in and around cities. In china alone, statistics drawn in 2005 showed that about 940 agrio- processing enterprises have developed in and around its cities (Cai, 2006).

UA as a user of inputs, it attributes to the rise of input delivery enterprises such as chemical fertilizers, compost, seeds, pesticides, fodder, water, tools, water pumps, drip kits, treadle pumps etc.( Moustier and Danso, 2006) . Service delivery enterprises include animal health services, transportation and special labor service such as milking (Nugent, 2002; Mougeot, 2005; Van Veenhuizen, 2006).

### **2.4.6. Social Impact**

In most cases, subsistence farming in urban centers is undertaken by the poorer and marginalized groups of the society ( Smit and Bailkey, 2006). Hence, UA is an important vehicle for poverty alleviation and social integration of disadvantaged groups such as HIV/AIDS affected and infected households, disabled people, female headed households, female headed households with children, destitute women, elderly people without or low pension and youngsters with out job (Gonzalez Novo and Murphy, 2000). In so doing, it enormously contributes to feelings of higher self-esteem and safety among the poor (Mubvami and Mushamba, 2006). As already stated, urban agriculture provides food, nutrition and employment and income for the people most vulnerable to the ever-increasing cost of food and

builds their confidence, enables them to establish social interactions through the process of food production, sale of the produce and or sharing of natural capitals such as land and water (Smit and Bailkey,2006).

Some empirical studies recently conducted in Cape Town, South Africa and Nakuru, Kenya showed the great improvement in the morale and physical health of HIV/AIDS affected individuals (mostly women) who involved themselves in group gardening activities (ibid).

#### **2.4.7. Environmental Benefits**

Urban agriculture provides environmental benefits in a number of ways. Some of the benefits include:

**Waste recycling:** Waste disposal is one of the most serious problems in many cities especially the cities of developing world. Urban farming is a salient tool to reduce problems associated with waste management (Axumite et al,1994; Smith and Memon, 1994; Drechsel, et al 1999; Haight and Boateng, 1999). In low income countries, the amount of waste generated per person ranges from 0.4 to 0.6 kg/day. Of this only 10 percent is inappropriate (plastic and metal) (Drechsel, 1999). In the middle income countries, the amount of waste ranges from 0.5 to 0.9 kg/day Cointreau et al, 1984 (in Drechsel, et al 1999). In most cases, organic waste generated by individuals, households, restaurants and markets constitutes raw kitchen waste generated in the process of food preparation and consumption, food covers, rotten fruit, vegetables leaves crop residues and animal excreta and bones (Haight and Boateng ,1999). Urban farming can turn this waste into resource through compost production. Such process of changing solid waste in to useful resource is instrumental in reducing the public cost of waste management, soil and water pollution and hence providing a better living environment (Van Veenhuizen, 2006; Drechsel, et al 1999; Mougeot, 2006).

This indirectly attributes to the health of urban dwellers by reducing the use of chemical fertilizers and avoiding waste and creating clean and healthy environment (Haight and Boateng, 1999; Mougeot, 2006).

**Greening and ecological impact:** Urban agriculture plays an imperative role in creating healthy, livable and sustainable cities by increasing green spaces and urban forestry (Konijnendisk and Gauthie, 2006). Urban green areas have environmental and ecological values in that they contribute to the improvement of micro-ecology of urban areas by

preventing over heating of urban environment ; reduce storm water run-off, break wind, reduce dust, help with processing waste water and serve as shade ( Van Veenhuizen,2006; Konijnendijk and Gauthie, 2006).

## 2.5. Constraints of Urban Agriculture

Despite the benefits identified so far, the poor can be constrained from doing well with urban farming by plethora of reasons including:

**Lack/limited access to productive resources:** Land is one the most important natural capital for urban farming and its availability, accessibility and sustainability is vital so as to under take urban food production (VanVeenhuizen, 2006; Mougeot, 2000, 2006; Tinker, 1994). To begin with, the quality of the land which the urban farmers do have is often very marginal. Besides, most urban farmers especially subsistence farmers undertake farming on the land that is not owned by them. They often use public open spaces, roadsides, riverbanks, along railways, parks etc. and follow what Mougeot(1994:19) calls" adoptive and mobile land use" system. In such cases, their usufruct is very minimal and eviction is very common. Thus, when the poverty of urban farmers is coupled with tenure insecurity it leads to low investment in land and hence low productivity and deterioration of the soil (Mougeot, 2000, 2006).Because, they fail to improve the soil fertility and also plant quick yielding seasonal crops (ibid).

Water is another vital resource for urban farming. No doubt that urban agriculture will impose new demands for water and could exacerbates the existing demand that stems from other development sectors. Thus, non availability or shortage of water is one of the constraining factors of urban farming. Livingston (in Drechsel,et al 1999; Foeken et al, 2004).

**Absence of legal framework and in adequate support:** In Africa colonial governments typically forbade UA and in most African countries urban farming is illegal (Obudiho and Foeken, 1999:3; Tinker, 1994: xiii). This remained on books and it has its own role to play in generating bias toward the sector (Tinker, 1994; Mougeot, 2000). In most developing countries due to the lack of such kind of historical recognition by city authorities, urban planners, government institutions etc., urban farmers obtain insufficient support services such as extension services, access to credit and infrastructure development ( Mougeot,2000, 2006).

**Knowledge gap:** Urban agriculture is a relatively recent research topic. Though there are emerging researches in the field, still much is not known about it. The actual and potential benefits of urban agriculture is either underestimated or little is known about it by the municipal officials and urban residents in general ( Foeken et al, 2004 ).

**Marketing:** According to Foeken et al 2004, the most common market channels for urban produce are indirect (i.e., to whole sellers and retailers), and at markets either whole sale or retiler market and direct to the consumers. The urban farmers and traders face marketing problems especially in the summer season when the supply is in abundance. Price fluctuation, high competition, perishability and problem related to market place (over crowding of retailer traders) are some of the major challenges ( Foeken et al, 2004).

**Low degree of organization of the producers:** Data drawn from different studies showed that, most urban farmers are not organized in a formal way. This hampers their decision making at different levels and also restricts their ability to improve their production system and marketing opportunities (RAUF, 2006).

## **2.6. Negative Impacts of Urban Agriculture**

In the topics discussed under benefits of urban agriculture, attempts have been made to show the positive health and environmental effects of urban agriculture. This section presents some of the major negative aspects of the sector. The negative impacts of urban agriculture have been thoroughly discussed by the corpus of literature that can be classified in to two major categories: potential health risks and environmental impacts.

### **Potential health risks associated with urban agriculture include:**

**Contamination of crops:** Crops can be contaminated as a result of irrigation with water from polluted and inadequately treated water (Van Veenhizen, 2006). It is evident that waste water use in urban agriculture can have important economic benefits for household and communities through better food and nutrition and hence health. How ever, it may also expose them to some health risks. In urban areas, municipal and industrial waste water are the main sources of chemical pollutants and can cause direct and indirect health impacts (Buecheler, et al, 2006). Among others, direct contact with untreated waste water through flood or furrow irrigation can expose the urban farmers and their families to infectious diseases (ibid). For instance,

according to Ensink et al (2004 in Buecheler et al, 2006), a study conducted in Pakistan showed that high hookworm infections in the urban farmers who use waste water than who do not. Food can also be contaminated due to unhygienic handling during transport, processing and marketing of fresh products (Van Veenhuizen, 2006). Crop contamination may also result from prolonged and extensive use of agronomic chemicals (Mlozi, (1998 in Foeken et al 2004; Veenhuizen, 2006).

According to Yachaschi (1997 in Foeken et al 2004), in three Tanzanian cities, Dae es Salaam, Arusha, and Dodoma there was high use of pesticides by crop cultivators. Some times they spray toxic chemicals on ripe vegetables and harvest crops before the expiry of pesticides' recommended safety period this creates its own health risks to both the producers and consumers Mlozi (1998 in Foeken et al, 2004).

**Heavy metals:** Plants can grow in polluted soils. Soils can be polluted when heavy metals such as copper, lead, nickel, manganese zinc etc. are irrigated with water from streams and waste water contaminated by industry. Besides, the use of contaminated solid wastes and the use of industrial land contaminated by oil and industrial wastes have potential health risks ( Tixier and Bon, 2006: 321).

**Animal health risks:** the practice of raising cattle in towns with out precautions can have potential health risks in many ways (Van Veenhuizen, 2006; Mlozi, 1997; Foeken et al, 2004). On the one hand, domestic animals transmit animal diseases that can afflict humans and transmit to other animals. On the other, different studies suggest that most people in towns and cities dispose of dung by leaving it rot in house compounds or along roadsides and other open spaces. This creates a breeding ground for damaging bacteria and flies ( Foeken et al, 2004; Mlozi, 1997). More over, animal dung is a source of tetanus ( Foeken et al 2004) . According to Shauri, 1989 (in Foeken et al 2004:24), animal excreta attract disease causing vectors such as mosquitoes.

The environmental effect of urban agriculture has to do with both crop production and cattle keeping. Both activities have potential environment pollution and degradation effects. As some studies showed in Tanzania, pesticides used in urban food production process, chemical

fertilizers as well as animal excreta could be washed in to lakes, ponds and etc. by heavy rains (Foeken et al 2004).

## DESCRIPTION OF THE STUDY AREA

Animals also degrade urban soil, destruct ornamental plants, produce odor (Mlozi, 1997; Foeken et al 2004; Moegeot, 2006). Despite these potential health and environmental effects, both crop cultivation and animal keeping is an omnipresent economic activity in the cities and towns of developing world for socio- economic and environmental benefits mentioned so far. The fear of contaminated food and other health risks could be treated if proper precautions are taken. Plus, should not be exaggerated and have to be seen as the rural counter parts (Van Veenhuizen, 2006).

## CHAPTER THREE

### DESCRIPTION OF THE STUDY AREA

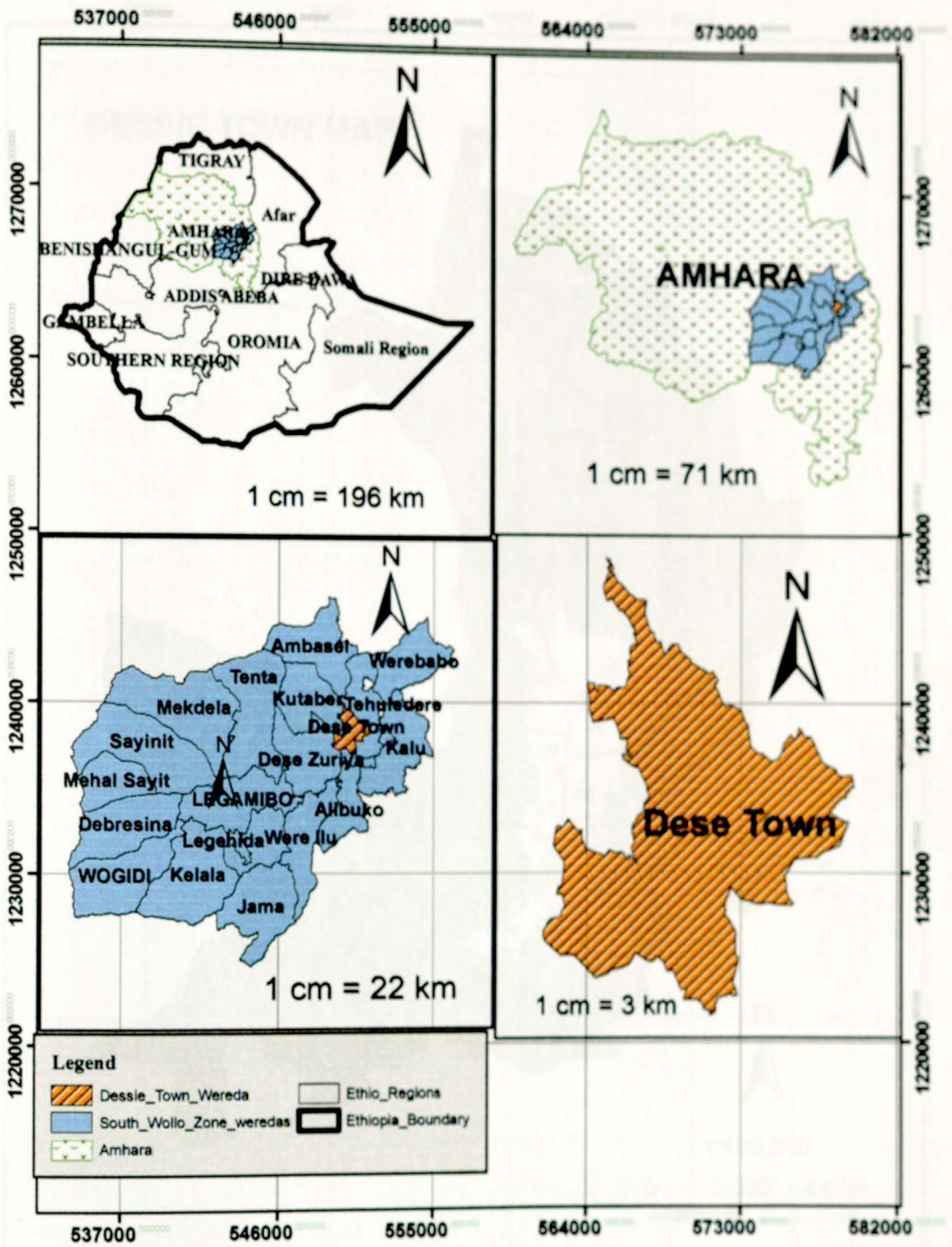
The purpose of this topic is to overview the geographical location, demography, socio-economic and other features of the study area, so as to provide a clear image up on which this study is undertaken.

#### 3.1. Location and Physical Characteristics

Dessie, the capital of South Wollo Zone in the Amhara National Regional State, (ANRS) is located in the north central part of the country around the eastern margin of the regional state, at about 400kms road distance from Addis Ababa and 575kms from Bahir Dar, Amhara region's capital along the road to Mekele. The inner part of the town is surrounded by *Tossa* Mountain in the West, *Mengesha gorra* in the South and *Azewa gedel* in the East (Abdu, 1992). Astronomically, its approximate geographical co-ordinates are between  $11^{\circ}38$  North longitudes and  $39^{\circ}38$  East longitudes (NUPI, 2000).

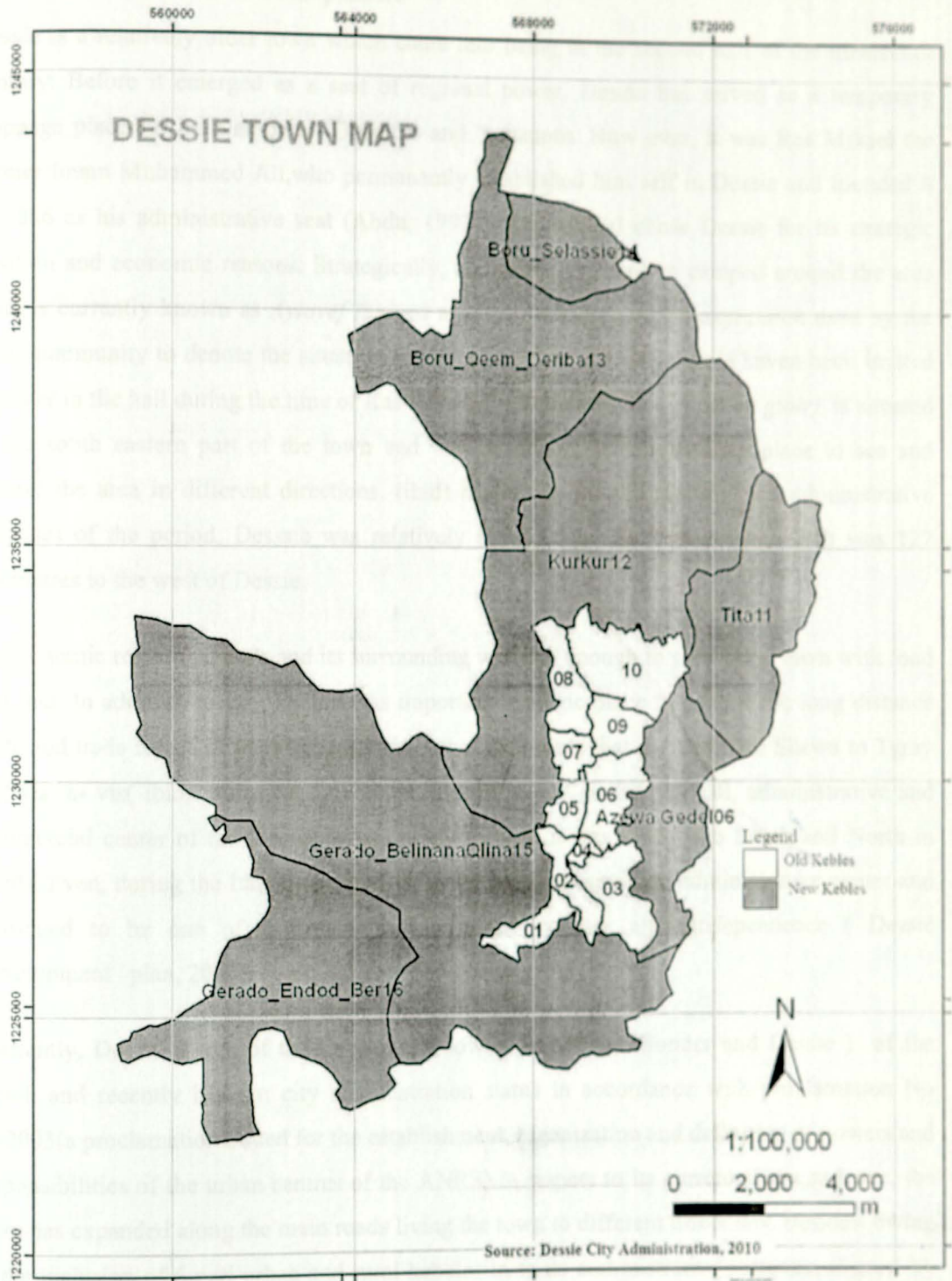
Its topography varies from 2400-2800 meters above sea level which gives an average difference of about 400 meters. The inner part of Dessie is situated beneath Tossa mountain which rises up to 3000 metres and dissected by the chain of mountains. The climatic feature of Dessie is essentially *Dega* climate with an average minimum temperature of  $12-7^{\circ}\text{c}$  and maximum temperature of  $26-27^{\circ}\text{c}$ , and with an annual rainfall of over 1100 mm which makes it preferable and suitable to undertake any development endeavours ( Dessie development plan, 2007).

Figure 3: Location map of Dessie town



Source: CSA, 2007

### 3.2 Foundation and Development



\* See the Appendix for the names of the kebeles respective to each number/s

### 3.2. Foundation and Development

Dessie is a relatively older town which came into being in the second half of the nineteenth century. Before it emerged as a seat of regional power, Dessie has served as a temporary stoppage place for both emperor Theodros and Yohannes. However, it was Ras Mikael the former Imam Muhammed Ali, who permanently established himself in Dessie and founded it in 1886 as his administrative seat (Abdu, 1992). Ras Mikael chose Dessie for its strategic position and economic reasons. Strategically, the first site where he camped around the area what is currently known as *Aytayef* (named after the hall *Aytayef*, an expression used by the local community to denote the situation in which the poor and rich people have been invited together in the hall during the time of Ras Mikael's governance, locally called *gibir*), is situated in the south eastern part of the town and was an important commanding place to see and control the area in different directions. (ibid) Moreover, for the political and administrative purposes of the period, Dessie was relatively central than his former seat which was 127 kilometres to the west of Dessie.

In economic regards, Dessie and its surrounding was rich enough to supply the town with food and fuel. In addition to this, Dessie was an important strategic place to control the long distance trade and trade routes of the area, essentially the trade route that passes from Shewa to Tgray and vis -a- vis (ibid). Since its foundation, Dessie served as the political, administrative and commercial center of the former Wollo province until it was divided into South and North in 1990s. Even, during the Italian occupation, Dessie was an important administrative center and continued to be one of the major towns in the country after independence ( Dessie Development plan, 2007).

Currently, Dessie is one of the three major towns ( Bahirdar, Gonder and Dessie ) of the region and recently has got city administration status in accordance with proclamation No 91/2003 (a proclamation issued for the establishment, organization and definition of powers and responsibilities of the urban centres of the ANRS). In respect to its current shape and size, the town has expanded along the main roads living the town to different directions. Besides, owing to the inclusion of 6 peri urban and rural kebeles into its administrative structure, it grew by 9,629 hectares. Thus, administratively it is structured into 10 urban and 6 rural kebeles and

total area of the town is estimated to be about 16, 829 hectares. Of this 7,200 hectares is urban and 9,629 hectares is rural (Ibid)

### 3.3. Population and Demographic Characteristics

According to Mesfin, 1970 (in Getahun, 2007), nationally Dessie was the fourth and fifth most populous town in 1936 and 1965 with the population of 36,000 and 38,000 respectively. During the period under concern, Dessie didn't show profound progress in population dynamics as compared to the other major towns of the country, in that, its population grew only by 8.3 % .Where as, towns like Gonder, Jimma and Meqele, increased by more than 80% ( Getahun, 2007:41) However, in later times, Dessie exhibited rapid population growth mainly due to rural -urban migration caused by the famine and drought hit the area in the early 1970s and other "push" and "pull" factors such as land degradation and decreasing size of land holding in rural areas and better service and job opportunities in the town( Teshager, 2003; Yohannes, 2003). Accordingly, its population grew to 47,731 and 49,750 in 1970 and 1974 respectively, Seaman 1976(in Teshager, 2003).

The first, the second and the third national census results of Ethiopia put the population of Dessie at 71,537, 97,314 and 151,094 respectively (see Table, 1). In regards to the age characteristics of the town's population, the 1984 census depicted that, the broad age category (0 to 14, 15 to 24, 25 to 59 and 60 and above was 43.5 %, 17.3%, 30.2 % and 8.9 % respectively in which the aggregate dependency ratio was about 52 %. According to the 1994 census, about 33,876 (35 percent of the total population was under the age of fifteen. Where as, economically active part of its population constituted about 56,477 (58 percent of the population) and 60 and above years of age accounted 7 percent (6961) the total population and the dependency ratio was about 42 percent.

Table 1: population trends and size of Dessie town

Years	Population size	Sex composition		Growth rate in %	Population increase in %
		M	F		
1938	36,000				
1965	39,000				8.3
1970	47,731				22.4
1974	49,750				43.8
1984	71,537	31,954	39,583	3.1	38.0
1994	97,314	45337	51977	3.1	55.26
2007	151,094	72,891	78,203	3.4	7.25

Source: Getahun 2007 for 1938 & 1965; Teshager, 2003 for 1970 & 1974; CSA, census reports of 1984, 1994 and 2007

In respect to the ethnic composition of the town's population, the 1984 census result revealed that 91% of the population was Amhara . Afar and Agaw constituted 1% each. Gurage, comprised 0.8 %, Oromo and Mao constituted 0.6 % each. Tgraway comprised about 3.8 %. Tigre and others (including unstated) constituted 1.2% and 2.4 % respectively (CSA, 1984). Where as, the 1994 census result put the Amhara ethnic group's share 93% , Tgraway 4% and Oromo , Tigre and others 1% ( CSA,1994).

### 3.4. Economy

According to the 1994 CSA report, the urbanization level of Dessie town was about 68 percent and, the dwellers of the town are supposed to rely on what the urban economy generates for their livelihoods. Thus, a significant number of its dwellers drive their livelihood from urban based formal sector trade, catering and other services. In this regard, trade, which includes the transaction of highly diversified agricultural and industrial commodities ranging from light consumer goods to higher order/capital goods, is the main employing formal sectors of the town (DTTIO, 2009). Data obtained from Dessie Town Trade and Industry Office depicted that in 2009 about 3500 (117 wholesalers, 1740 retailers, 1437 service renders, 150 industry and 56 agriculture) licensed traders have been engaged in trading activities (ibid).

Besides, informal sector is also another important source of livelihood for about 38.8 percent of the working population of the town (CSA, 2005). Although the researcher of this paper found it difficult to identify the number people employed in the private sector, according to

Dessie Town Capacity Building Office, in 2009 about 2817(M=1758 and 1059 female)people have been employed in different government institutions/ sectors and generate their means of living. In addition to the informal sector substantial number of rural-urban migrants and other section of the society are employed in the formal sector such as daily laborer work, loading unloading of goods, urban farming, lottery selling, begging etc,( Dessie town Development plan, 2007).

### **3.5. Rural-Urban Linkages**

Foregoing studies on rural -urban linkages provide an insight in to the patterns and the relationships that exist between the two spatial areas. For instance, according to Obudho (1996), the linkages between the two areas lie in the transfer of new ideas: information and better farming methods and innovations reach the rural areas through such linkages. Besides, the two areas are interdependent in production, marketing, inputs such as pesticides, improved seeds and different services ( Rondivelli and Evans, 1983).

Based on these theoretical orientations, when the rural -urban linkages of Dessie and its rural environs are examined, there are several ways in which the two areas are inter-linked. According to information obtained from Dessie Town Trade and Industry Office, the most notable are the movement of people, goods, services, inputs and information. In most cases people from rural areas migrate to the town as their short term and long term livelihood strategies and the informal sector (including urban agriculture) of the town provides them employment opportunities. The rural and peri-urban areas are the salient sources of vegetables and other agricultural produces to the residents of the town (one of the imperative elements in urban food security). The residents of the town on the other hand are market for the rural areas. Dessie town is the source of industrial products and different services such as better medical and education services.

The rural people obtain pesticides, improved vegetable seeds, farm tools and equipments from the town .Dessie town is also the source of information on market and new technologies for the residents of the peri-urban and rural areas. Hence, the two areas are highly interrelated.

### 3.6. State of Poverty

As already indicated, in the past three decades Dessie has exhibited fast increase in urban population due to the natural increase and rural-urban migration. Such type of fast urbanization with out corresponding growth in social services has resulted in parallel increase in poverty. Different studies portrayed that poverty is the most serious problem of the town and quite considerable number of its residents are living in a severe condition of poverty ( Yohannes, 2005). For instance, in 1994, a survey conducted on the major cities of the country depicted that the lowest average household income was identified in Dessie (Bigsten ,1995 in Yohannes,2005).The study further revealed that, Desie was home to the second highest proportion of households with an income of 100 birr per month a situation in which the lion share of the house holds' budget( about 72 percent) was allocated for food ( ibid). Poverty in Dessie is grave both in coverage and depth. The situation is manifested in a number of ways including unemployment, housing problems, lack of access to basic health services, urban slum and poor waste disposal etc.( Dessie Development Plan 2007).

According to Mekonnen 1997 (inYohannes, 2005) the poverty level in Dessie sharply increased from 1994 to 1997 due to rural urban migration from drought stricken neighboring woredas. I suggest that in the later times the situation was triggered off by the coming of thousands of deportees from Assab in to the town because of the1990s Ethio-Eritrean border conflict and also due to increase in the number of families affected and infected by pandemic HIV/AIDS. As a result, currently a good number of a working age population is unemployed. Unemployment rate is estimated at 30 percent and about 12,272 people are unemployed. Of this about 3,905(31.8 percent) are male and 8,367 (68.2 percent) are female ( BoWLUD, 2009).

Like any other major towns of the country, housing problem is one of the pervasive problems in Dessie. A significant number of people do not have their own private house. Rather, they live in the houses rented either from Kebeles, Housing Development Corporation or private individuals (Yohannes, 2005). Dessie is also home to different social problems. Among others HIV/AIDS and the rise in the number of OVC are the most acute problems. At the prevalent rate of 9.8% , the number of people living with HIV/AIDS is about 14,807 and the number of people taking ART is estimated at 4,531 (HAPCO,2009). On the other hand, in 2007 the

Amhara National Regional State BoLSA commissioned a consultant group and conducted OVC situations in urban areas of the region including Dessie. According to the baseline survey result the number of Orphan and Vulnerable Children (OVC) in Dessie town was about 8,378(BOLSA, 2007).

### **3.7. Social Institutions**

The society in Dessie like any other society else where in the country, constitutes formal and informal institutions. This section provides an overview of some of the institutions that form the social setup of the town.

#### **3.7.1. Formal Institutions**

##### **Religion**

Orthodox Christianity and Islam are the two major religions practiced in Dessie town. Christianity was introduced in to Wollo in about ninth century. Where as Islam was introduced in to area between Twelfth - Thirteen century ( Abdu, 1997). The 1984 census results on the population distribution of the two religions shows that 63.8% were Orthodox Christian and 35.8% were Muslim (CSA, 1984). Like wise, the 1994 census result portrayed about 61 % were Orthodox Christian and about 39 % were Muslims (SCA, 1994). In addition to the Orthodox Christians, the followers of Protestant and Catholic religions constitute the other Christian communities in Dessie. The other popular practice related to the belief systems of the people (mostly to the Muslims), is *Duaa*. *Duaa* is a ceremonial act conducted by a reasonable number of prayers to praise Allah or God and in need of something good to the practitioners or to the wellbeing of the community as a whole.

##### **Education and Health**

According to data obtained from Dessie Town Education Office (2009), currently there are about 111 (71 government and 40 private) educational institutions in the town. Of these, 30 government Amarach Basic Education (ABE), 27 kindergarten ( 9 government and 18 private), 36 primary schools( 25 government and 11 private ), 9 secondary schools( 4 government and 5 private), 7 technical schools ( 1 government and 6 private ) 1 government college and one University constitute the numerical distribution and ownership distribution of the institutions.

In addition to the formal education, there are also informal educational services in the town such as basic adult education and religious and literacy education at religious institutions. In respect to the health institutions of the town, data obtained from Dessie Town Health Office (2009) depicted that there are about 50 health institutions of different type. Five hospitals( two-public and three private),three public owned clinics, twenty-nine privately owned clinics, seven privately owned pharmacies and six privately owned drug stores are among the very health institutions that currently provide health services to Dessie and its environs.

### 3.7.2. Informal Institutions

The residents of Dessie town organize themselves in different forms of voluntary social organizations such as *Mahiber*, *Iddir(Kire)* and *Iqub* so as to strengthen their social welfare, mutual cooperation and religious affinity. Of these organizations, *Iddir* is the most widely practiced social imperative that embraced the vast majority of the residents and provides social insurance to the members. In accordance with the information obtained from Dessie Town Culture, Tourism, Social Affairs Office, based on the nomenclatures given by the community, four types of *Idirs/kires* can be distinguished in Dessie town. *Yeafer iddir/ Kire*, *Yesefer Iddir*, *Yemishishit Iddir* and *Yesetoch Iddir* are the four *Iddirs* in which the communities of the town organize themselves to get primarily burial services and other social services.

*Yeafer Kire* also known as *Wanaw Kire /iddir* comprises relatively a larger number of members than *Yesefer Iddir*. As the name designates, *Yesefer Iddir* is established by people living in the same vicinity and the number of members is lower than the former one. *Yemishishit Iddir* is organized by the neighborhoods and such type of *iddir* are established so as to share the condolence of a household in mourning for three successive days .The members join a household in mourning during night time and are supposed to contribute fixed amount of *injera* and the ingredients for *wat* are bought from shops. *Yesetoch iddir* as the name indicates it is exclusively established by women. In Dessie town there are about 160 *Kires/ Iddirs* and the residents of the town are members of at least one *iddir*. Membership is open to any one regardless of economic status, religion, sex and ethnicity. However, in recent years a purely Islamic religion based (excluding Christians) *iddirs* have appeared in the town. At the town level, there is an executive committee to mobilize the whole *iddirs* operating in the town (Ibid).

## CHAPTER FOUR

### TYPES OF URBAN AGRICULTURE AND PROFILE OF THE PRACTITIONERS

#### 4.1. Types of Urban Agriculture in Dessie Town

Results obtained from different sources of the study revealed that urban agriculture is an important source of livelihood for a good number of low income households. Keeping livestock and crop cultivation have long been practiced in open areas of the town. The practice gained momentum in the past few years as a response to the rise in unemployment, food insecurity and decline in purchasing power.

Urban agriculture in Dessie town is facilitated by government and non-government agencies and associations. Urban Agriculture Office of the town coordinates the overall urban agriculture related activities and provides technical support and supervision to the actors involved in the practice. NGOs and associations established by PLWAHS notably are playing an important role in variety of ways such as provision of farm tools and equipments, technical support, seed and seedlings to the poorest farming households. Urban households and co-operatives of the town mobilize, capitalize and convert their resources to one another so as to attain desirable outcomes which are in most cases, improvement in income status, employment and food security.

##### 4.1.1. Livestock Keeping

Keeping livestock is the most common practice of the town and the majority keeps animals as an important source of income, fuel and as a form of saving. The census result shows that about 71% of the households keep livestock and of the total 16% combine livestock production and vegetable cultivation. As can be observed from the Table 2, the most common types of animals kept in the town include dairy cattle, chickens, sheep, goats and pigs.

Table 2 Livestock Population by breed type and Share (%)

Animals & breed type	Dairy cattle				Sheep	Goat	Chickens				Pigs
	Local	Foreign	Cross breed	Total	Local	Local	Local	Foreign	cross breed	Total	notated
Number	131	338	382	851	2206	350	1377	4138	315	5830	78
percent	15	40	45	100	100	100	24	71	5	100	---

Source: Own field work

Data drawn from the census showed that except for the pigs (which are only found in 5 Kebele centers), all type of live stocks have been kept in all Kebele centers though the number varied partly due to the availability of open spaces and partly due to the number of people involved in the practice. In line with this, the inner most part of the town like Kebele 04 and 05 where housing density is high, households used to keep smaller animals in higher number than dairy cattle. Data obtained from the responses of interviewed households revealed that households keep from 1 to 8 heads of cattle and most of them used to keep their livestock on zero-grazing system. Open spaces adjacent to their home, separately built shads and shelters and in some cases on reserved areas for one or other purposes are some of the common places where the urban farmers used to keep their livestock.

However, as identified by field observation, there have been also "street sheep and goats" in different corners of the town. Findings on the ownership type further revealed that 78% of the total chickens kept in the town were owned by low income households. The remaining 22 % were owned by middle income and Abune Petros Orphanage Center (16% and 6% respectively). Of the total dairy cattle kept in the town only 15 % were owned by low income households. Whereas, about 89% of the sheep and 44% of the goats kept in the town were owned by the low income households. About 36 % of the pigs kept in the town were owned by South Wollo Zone Jail Administration. The rest (64%) were owned by low income and middle income households 27% and 37% respectively. As it can be observed in the table above,

foreign breed chickens and hybrid and foreign breed dairy cattle respectively out numbered the local breeds.

As to the result obtained from key informants interviews this happened due to the economic return that the urban farmers could get from the foreign and hybrid breed than the local one. Households were interviewed about their milk production and marketing situation. The result obtained indicated that, a household with one cow, yielding an average of 10 liters of milk a day and if sold at local market price 6 ETB for a littler, that household would earn 60 ETB gross incomes. Similar economic advantages were reasoned out for egg-laying chickens.

#### **4.1.2 Vegetable Farming in Dessie Town**

This sub section is about vegetable cultivation in Dessie town and focuses on features of vegetable farming, namely, the actors involved, location types and production orientations, farming practices and assets employed and views of the community on vegetable farming. Data drawn from census result but essentially data obtained from interviewed informants, case studies and in some cases results obtained from direct personal observation and focus group discussions are used to support issues raised under each topic.

##### **A. Actors Involved and Contexts for Urban Farming**

Un like livestock raising, in which households with different income groups have been more or less represented, vegetable production was practiced by low income households especially those infected and affected by HIV/AIDS, unemployed youth and OVS. The census data revealed that about 298 (29%) of urban households have been engaged in vegetable production in the inner city of the town alone. Of this 133(13%) are purely vegetable cultivators and 165(16%) were mixed farmers.

According to the information obtained from Dessie Town Urban Agriculture Office, about 198 households were also engaged in vegetable farming activities in the peri- urban areas of the town. In regards to the gender dimension of the practitioners, in vegetable production activities of the town women are over-represented than their male counterparts.

Results gained from census portrayed that of the total vegetable cultivators about 66% of the enumerated households in the inner part of the city are women. Two reasons might have

attributed to this. First, women constitute 65% of the total people living with HIV/AIDS (DTHAPCO, 2009). Second, result obtained from focus group discussions revealed that women of the town have a traditional culture of cultivating vegetables for own consumption and to sell some part of surplus to cover miscellaneous household expenses.

The reasons for the engagement of the residents of Dessie in urban farming activities are consistent with the information in the literatures. According to Jacob et al (2000, 8-9), urban poor opt to farm in towns due to:

- Inadequate, unreliable and irregular access to food supplies, due to either a lack of availability or a lack of purchasing power;
- Inadequate access to formal employment opportunities, due to deteriorating national economies in developing countries. Besides those some other sections of the society also will be involved in UA so as to have, clean and green habitat

Like wise, results gained from interviewed informants showed that the urban farmers of Dessie town were engaged in food procuring activities due to plethora of reasons including lack of access to adequate and quality food due to some of the aforementioned causes and some other shocks such as death of household member, economic hardships and loss of job of household member which in one way or the other negatively impacted the food security status of the households. Hence, most of the urban farmers of the town have been engaged in the practice so as to produce food for home consumption and improve their income status. For unemployed youth involved in the practice it is the source of full time and part time employment.

As to the data drawn from interviewed informants and triangulated by case studies, for the people who are living with HIV/AIDS vegetable farming is an imperative source of food and nutrition. In Dessie town, about 454 (133 male and 321 female) Orphan and Vulnerable Students were engaged in vegetable production. In accordance with data drawn from key informants and interviewed students the production system, number of students involved and product orientations varied from one school to another. In some cases, OVS are supported by other students of a given school and the sale of the produce is centrally managed by the adhoc committee of that school.

Hence, the income gained is used for uniform, food, stationary and other expenses of orphan and vulnerable students of that school. Tigil Frie primary school is a typical example for a case in point. When it comes to Abune Petros Orphanage Center, vegetables have been produced by entire students for food self reliance. In secondary schools such as Hotie and Kidame Gebeya, the whole activity is run by individual students and the income is also used accordingly. Generally, OVS have been engaged in vegetable production activities for food self reliance, generate income to live on and/or to be used for schooling cost and other expenses.

Vegetable farming households were farther asked why they chose to be engaged in vegetable farming than animal raising. According to the results gained from interviewed informants the single most important reason identified by the majority of the informants was that it requires them relatively low start up capital and inputs than animal keeping. Some of the informants agree on this but additionally argued that the NGOs working in the town are interested in vegetable farming than animal raising. Where as, according to data obtained from focus group discussions, the NGO's support was limited to some of the practitioners and the first reason seems more probable.

## **B. Location Types and Production Orientations**

### **Location Types**

Data obtained from Dessie Town Urban Agriculture Office portrayed that a total of 150 hectares is being cultivated both in the inner and around the immediate peripheries of the town. Of this, about 15 hectares is in the inner part of the town and the remaining 135 hectare is attributed to the outskirts of the town. Vegetable production areas of Dessie town can be categorized into two basic types: urban and peri-urban. Within the urban or inner part of the town various types of production sites have been identified. The two most common typologies are back yard or homestead and open space farming.

Results obtained from the census data show that 73 % of the enumerated households cultivate vegetables in their own compound on open spaces adjacent to their home and these groups form the biggest section of the vegetable producers. Data drawn from interviewed informants also supports this scene. Of the interviewed households most of them practice homestead

farming. Households who have been farming on vacant spaces around river banks constituted the other category of the interviewed households and fall in the second category. Few households who have been cultivating vegetables on open spaces in un built areas of the town constitutes the smallest group.

In the case of Dessie vegetables have been also grown on open spaces found in government and non government school compounds and other institutions. Here, the predominant practitioners were orphan and vulnerable students. Students whose eligibility is proven by certain adhoc committee of a given school are allowed to produce vegetables in accordance with the common understanding established between local NGOs (to provide technical support, seed, seedlings and cover the irrigation water cost) working in the area and that school. Students are provided farming plots temporarily until they finish the education level they are supposed to attend at that school.

Information obtained from interviewed informants and direct observations show that off plot (open space cultivators) farmers undertake their farming activities on a relatively spacious farmland than the homestead farmers. Farming activities undertaken in the peri- urban areas of the town, where the cultivators have relative advantages in some resources (land and water) constitute another salient component of vegetable production site.

In respect to the plot size, most of the vegetable cultivators didn't know the size of their farmland. However, the plot size of households varies from one to the other in accordance with location type and in accordance with the data obtained from key informant interviews and triangulated by direct observations, in the inner part of the town, the land size of homestead cultivators ranged from  $8m^2$  to  $250m^2$ . Where as farm plots in open spaces and river bank areas ranged from  $200m^2$  to  $1700m^2$ . Land cultivated in school compounds and other institutions ranged from  $500m^2$  to 2 acres. In peri-urban areas where un built areas were relatively available, wider areas have been observed being cultivated by commercial oriented cultivators.

### **Major vegetables grown and Production orientations**

The most common types of vegetables grown in the inner and peri-urban areas of the town include Swiss chard, lettuce, cabbage, carrot cauliflower beet root, tomato, Potato, garlic and

onion. Almost all of the informants agree on the growing demand for their produce. This may be due to the expansion of private and public colleges, catering services, hotels etc.

Data obtained from interviewed informants and direct observations showed that Swiss chard was the most widely cultivated vegetable in the inner part of the town. Most of the informants reasoned out that it grows quickly and can be effectively harvested from it as many times as possible in a year's time. Besides it can be easily grown by using different grow bags.

Although most of the vegetable growers are reported to be subsistence producers, there are variations across households based on the land size, technology, labor and other inputs employed. In the inner part of the town, most of the vegetable cultivators have managed to produce adequate surplus on small, but intensively cultivated plots( back yard, open spaces in and along river banks) to sell. Peri-urban farming, in the peri-urban areas of the town, has more or less rural characteristics. However, here, cultivators have a strong attachment to the urban market of the area. They are market oriented and they essentially produce for commercial purpose.

Figure 4: partial view of vegetables harvested for sale in PUA of the town

4A

4B



Photo: Getu Bekele

## C. Farming practice and Assets Employed

### Farming practice

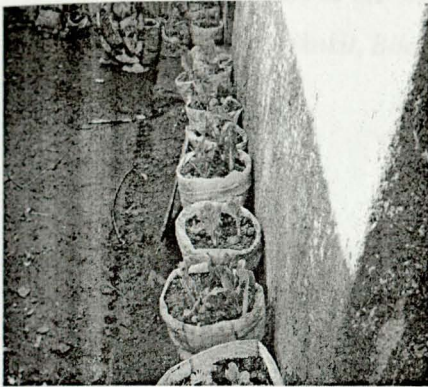
In Dessie town, vegetable farming practices can be characterized into two basic types: improved and "traditional". Urban farmers who belong to the first category under take their farming activities in an intensive plot and container gardening with micro irrigation system. According to the direct observations result, some of the plot gardeners have prepared the beds properly in an improved way and the distance between rows and plants were well kept. Besides, open space farmers, Orphan and Vulnerable Students (OVS) and households who have relatively sizable amount of land employ drip kits of different size as a micro-irrigation scheme. Information obtained from Key informant's interviews revealed that drip kit irrigation system was unfamiliar to the area. It was introduced in the past five years by NGOs working in the area.

In the inner part of the town, as it can be observed from the figures below, some households have also been found producing vegetables using different types of containers or grow bags. Sacs, plastics and pots and even festal have been the most common type of containers or grow bags used for growing vegetables. Key informants and containers gardeners justified some of the benefits that container gardening offers such as mobility, affordability (most of the containers were used up utensils or locally produced materials), best looking, and lesser space for placing containers, free from weed etc. Here, it is worth mentioning that it is the homestead cultivators with small plots who used to employ grow bags or containers.

"Traditional" or the usual way farming system is widely practiced both in the urban and peri urban areas of the town. Households of this group use traditional irrigation system such as cannels or ditches. According to direct observations result cultivation was undertaken in the usual way with out beds and the supposed distance between plants were not kept

Figure 5: vegetables grown by different grow bags

5A



5B



5C

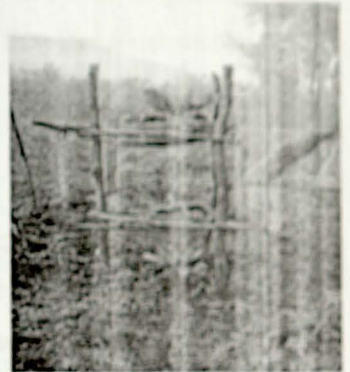


Photo: Getu Bekele

### Main assets employed

Assets here refer to the livelihood resources or capitals that have been used by the vegetable producers of the Dessie town (either from their own source or from any other source) in their vegetable production activities. The details of each are presented here under.

### Natural capital

Natural capital essentially involves the water (river, spring, and wells and tap water) and urban farm land resources. Findings on the land ownership type of the vegetable growers show three types of ownership categories: privately owned, public owned but cultivated commonly and temporarily leased. Of the interviewed informants most of them have been cultivating on their own private land. Some other households have been producing on public land owned in common. Very few households have been also using land temporarily leased from the service office (municipality) of the town.

In Dessie town, different types of water sources have been identified being used by the vegetable growers. As noted earlier, since most of the vegetable cultivators were homestead cultivators; tap water was the main sources of water for vegetable cultivation. According to

information obtained from key informants, this had its own impact in intensifying the competition with the other sectors and to some extent negatively impacting the water supply system of the town. In addition to tap water, both in the inner and prei- urban areas of the town substantial number of households have been observed cultivating vegetables using rivers and springs. In the inner part of the town Borkena River is the most widely used river for growing vegetables. Besides, *Shikokit, Bilen and, Huluko* springs have also been the other water sources of the cultivators.

### **Human capital**

As it is noted in the other section, this encompasses the labor, farming knowledge and skills and the health status of the households engaged in vegetable cultivation and the way these resources are deployed. According to the arguments of some scholars such as Flyun, 2001( in Foaken et al, 2004), the labor for urban agriculture is derived from a household members and the single most important factor for this is that low income households couldn't hire labor and hence rely on their own.

According to data obtained from key informant interviews, this correlates to Dessie's context in that since almost all of the vegetable growers were low income subsistence farmers; they essentially relied on labor derived from their household members. Hence, most of them employed labor derived from their own and their family members. However, some of the informants noted that they hire from 1-2 laborers occasionally during some critical times such as site clearing and land preparation. This is true especially for physically incapable women and men living with HIV/AIDS.

In respect to farming knowledge and skills, information obtained from the interviewed informants, portrayed that large number of the informants have background knowledge and skills of farming which they developed it in rural areas where they grew up. Some of the informants joined the practice being trained by the local NGOs working in the area. This suggests that households with rural background are involved in the practice to make use their rural knowledge.

### **Social capital**

Contextually it includes the access to and membership that farming households had in social networks, groups and associations so as to get other pertinent assets to be used in their farming activities and to build the sense psycho-social well being of the practitioners. In line with this the informants of the study were asked about the social asset type they deployed to promote their farming activities. Result obtained show that most of the informants have been the member of three associations established by Peoples living with HIV/AIDS and have obtained technical support, seeds and seedlings and farm tools from their respective associations. Moreover, most of the interviewed informants were the members of saving syndicates established by small related farming groups.

### **Financial capital**

Informants were asked about the financial sources (own, remittance, loans/ credit etc) they used to run their farming activities. The result obtained revealed that majority of the informants used their own financial source; the rest used seed money obtained from credit institutions, NGOs and their household members.

### **Physical capital**

Findings on the physical capital sources showed that of the interviewed informants some of them gained farm tools such as hoe and water cane from NGOs working in the area. Others employed their own sources and that of their neighbors.

### **D. Views of the Residents of Town on Vegetable Farming**

In Dessie town, currently, urban agriculture is the source of food, income and employment for substantial number of households, cooperatives and OVS. Despite these significant contributions of urban agriculture in general and vegetable farming in particular, it is yet overlooked by good number of the residents. Efforts have been paid to explore the emic, views of the residents of the town about urban food production through the subjects of the study and focus group discussions. Most of my informants agreed that they have come across both encouraging and discouraging types of attitudes with respect to their engagement in urban food

production activities. Below are some of the expressions or sayings used by the local community so as to under estimate the practice and the practitioners.

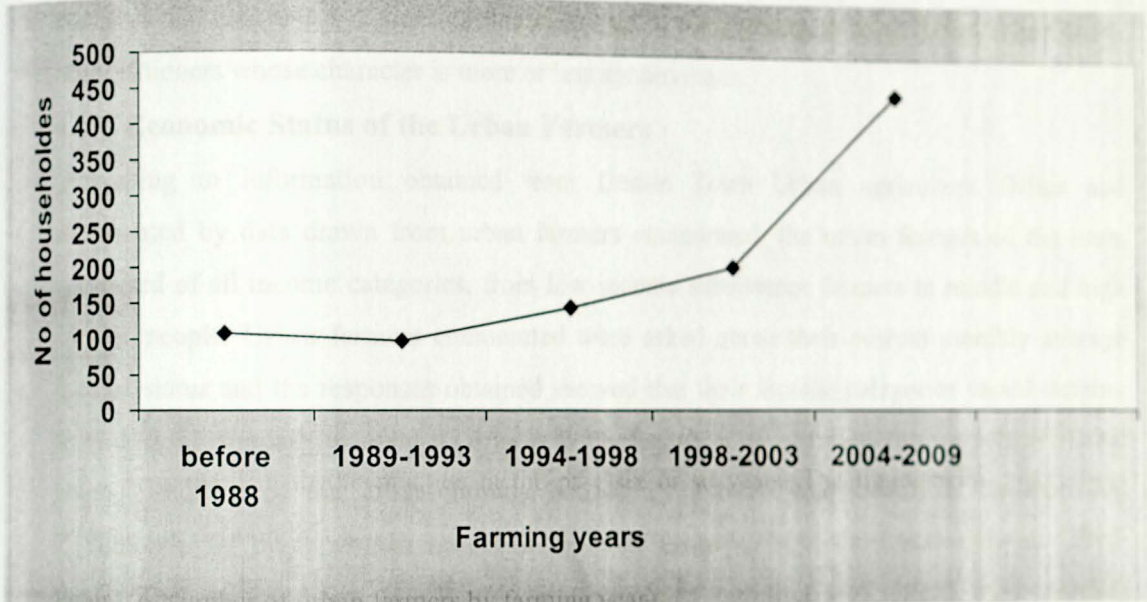
Result obtained from interviewed informants revealed that urban food production is considered as a rural culture and practice by some sections of the society. For instance, one of my interviewee has informed me that some of her friends and relatives whom they knew very well about her rural background, intended to discourage the practice in urban areas by saying “ግብርና ካማረሽ ለምን አገርሽ አትመለሻም” literally mean if you want to farm why don't you go back to your rural locality. Another similar type expression has been identified how the urban dwellers of the town disregard farming in the town. “ገበሬነቷ አለቃት ብሎ ትቆጥራለች” literally means, she is digging here in town because yet she didn't get rid off her rural farming culture. Another vegetable cultivator who born and grew up in the down town of Dessie was nicked by his friends “Geberew” literally means, the “farmer”. Some other expressions have been also used to express their feeling about the worthlessness of vegetable farming in the following words: የእሷ አንሶ ልጆቿን ታደክማለች” literarily mean she is wasting her labor and that of her children in something which is worthless. Other group of cultivators also shared with me what they were satirically commented by some of their friends in the following words: “እናንተ የልማት ጀግና ለመሆን ነው””? Literaly mean do want to be the development prize winners? All these sayings of the community seem normal especially when they are in English version. But, all have their own negative and discouraging implicit messages to the practitioners. No matter how these expressions where found there in place, I couldn't find out any one who stopped farming being discouraged or influenced by these sayings. It should also come no surprise if some sections of the society didn't recognize the benefits of urban food production because much has not been done so far to aware the community about the benefits it renders.

### 4.1 3. Urban Farming Trends of the Town

As already mentioned earlier, urban farming is a long established practice in the town. However, in order to examine the general trend of the sector, the urban farmers were asked about the time when they started farming and the number of years they have been engaged so far. According to the findings, some of the farmers have been found farming since the imperial times and still continued to drive their source of livelihood from it. Most the urban farmers

however entered in to the practice in the past six or so years. The figure below provides a summary of data on this.

Figure: 6 Number of urban farmers by farming year.



Source: Own fieldwork

As it can be understood from the figure, about 46 % (476) of the enumerated households have entered in to the urban farming activities between the years 2004 and 2009. Whereas, 20% (202) of the households have joined the practice 12 year ago (between the years 1998 and 2003). The general trend shows that in Dessie town urban farming has been accentuated in the past 15 years and highly escalated in the past 10 years due to a plethora of reasons mentioned earlier (failure in the formal sector, shocks of different types and vulnerability to food insecurity of the urban dwellers). Hence, it is needless to say that UA gained ground as an imperative source of food and income for low income households of the town.

## **4.2. Socio-Economic Profile of the Urban Farmers**

As mentioned earlier, the urban farmers of the town include individuals, co-operatives, organized unemployed youth and Orphan and Vulnerable Students. However, this sub-topic describes and analyzes 1030 households identified through census so as to focus on one group of practitioners whose character is more or less synonymous.

### **4.2.1. Economic Status of the Urban Farmers**

According to information obtained from Dessie Town Urban agriculture Office and triangulated by data drawn from urban farmers enumerated, the urban farmers of the town composed of all income categories, from low-income subsistence farmers to middle and high income people. Urban farmers enumerated were asked about their current monthly average income status and the responses obtained showed that their income categories varied ranging from 120 ETB/month to 5000 ETB/month. The information obtained further portrayed that about 214(21%) of the urban farming households' income was identified less than 200 ETB/month. Of these women headed households formed 9% of the households identified. About 28% of the urban farmers fall in the income category that ranged from 200-500 ETB/month, and only 2% households were identified whose average monthly income was 3000 and above ETB/ month. Thus, in accordance with this preliminary data about 71 % of the enumerated households constituted the low income group and in the case of Dessie town the results on the income group show that low income earners were disproportionately represented than the other income groups.

Enumerated households were also asked about their housing status and expenditure priorities. Findings on the housing status of the households, revealed that about 771(75 %) of the households live in their own house and the remaining 259 households (25 %) live in rented house. As to the data obtained from interviewed informants and triangulated by case studies households allocate lion share of their income (up to 80%) for food. This implies that food constituted the largest portion of their expense and exactly correlates to van Veenhuizen's, 2006 argument which says that, for urban poor household's food composes a substantial part of their income (60-80 percent).

#### 4.2.2. Place of Birth

Table 3: Distribution of the Urban Farmers by place of Birth

Place of birth	Number (M+F)	%
Desse Town	458(285+173)	44
Dessie Town rural kebeles *	52( 31+21)	5
South Wollo Zone	334(218+116)	32
Outside South Wollo, in Amhara of the region	144(85+59)	14.8
Outside Amhara region	42(17+25)	4.2
Total	1030	100

\* Formerly part of Dessie Zuria but currently incorporated in to administrative structure of Dessie town

Source: Own field work

As it can be observed from the table, results on place of birth show that those who were born outside Dessie but currently engaged in urban farming activities exceed by 12% those who were born in Dessie town. It appears that, 32% of the urban farmers were born in the rural Woredas of South Wollo Zone. About 14.8% of the urban farmers came from North Wollo, some from North *Shoa* and a very few number of practitioners hailed from *Seqotta*. Data obtained further portrayed that about 98 % of the total households who traced their place of origin outside Dessie were rural residents.

A salient point that can also be singled out from the above table is that urban farming is related to farming experience. Rural- urban migrants have come to the town with skills and customs of rural life. Thus, the urban farmers with farming skills and culture used to farm in the town to make use their rural knowledge so as to improve food and income status. Urban farmers were also asked for how long they have been living in the town.

The result obtained depicted that only 2% of all enumerated farmers lived in the town less than 6 years. This implies that, in the case of Dessie unlike the theoretical discourse of modernists, vast majority of the urban farmers were not recent migrants who carried out farming for

transitional purpose. Rather, as noted earlier, most of the practitioners entered into the practice due to socio-economic uncertainties that resulted from shocks of different types.

### 4.2.3. Demographic Features of the Urban Farmers

#### A. Distribution of the urban farmers by Kebeles

As indicated in the table below, the urban farmers have been distributed across the ten Kebele centers with varying number. Kebele centers such as 06, 08, 09 and 10 relatively comprised a larger number of farmers than the rest. This is because these kebeles are larger in size and at same time two of them (08 and 10) are situated around the expansion areas of the town and relatively four of them have open spaces that can be used for urban farming activities. Besides, according to the 2007 Dessie town's development plan socio-economic analysis, kebele 09 was one of the kebeles where most of the destitute households were found and it seems that the rise in the number of practitioners in this kebele stemmed from this scene.

Table 4: Distribution of the Urban Farmers by Kebele

Kebele	M	F	Total	%
01	57	32	89	9
02	52	42	94	9
03	70	31	101	10
04	29	28	57	5
05	41	31	72	7
06	63	48	111	11
07	48	38	86	8
08	80	45	125	12
09	97	68	165	16
10	99	31	130	13
<b>Total</b>	<b>636</b>	<b>394</b>	<b>1030</b>	<b>100</b>

Source: Own field work

The aggregate result indicates that male headed households constituted 62% of the total households and female headed households formed 38% of all farmers and it seems contrary to

what literatures say on gender representation. However, when it comes to the activity type as noted earlier, female headed households (about 66%) were engaged in urban crop cultivation than male headed households.

## B. Age and sex distribution

Table 5: Distribution of the Urban Farmers by, Age and Sex

Male (N=636)			Female (N=394)		
Age group	Number	%	Age group	Number	%
Under 20	2	0.3	under 20	1	0.2
20-30	68	10.7	20-30	57	14
31-40	168	26	31-40	102	26.8
41-50	165	26	41-50	106	26.8
51-60	120	19	51- 60	80	20
61+	113	18	60+	48	12.2

Source: Own field work

As can be observed from the table above, data obtained suggests that urban agriculture is an economic activity that can be undertaken by all age groups. Lower number of household heads has been found under the age of 20 in both sexes (0.3% of male headed households and 0.2% of female headed households). It may be noted that, a good number farmers were found in the age group 61 and above. In both sexes high number of urban farmers is represented in the middle age group.

### 4.2.4. Education Status

In livelihood frame work, education is one of the elements that compose human capital. Within this context, effort was made to examine the educational status of the urban farmers enumerated in this study. The result obtained shows the following major features as indicated in the table below.

Table 6: Education Level, Number, Sex and Percentage Distribution of the urban farmer

Education level attained	Male ( N=636)		Female( N=394)		Total(F+M)	
	Number	%	Number	%	Number	%
Illiterate	75	12.3	96	24	171	17
Only reading and writing	119	19	129	33	248	24
1-4	54	9	29	7	83	8
5-8	135	2	72	18	207	20
9-12	200	31	57	14.4	257	25
10(12)+1	11	1.7	4	1	15	1.5
Diploma	34	5	7	1.6	41	4
First degree and above	8	1	0	0	8	0.8

Source: Own field work

The above table portrayed that urban farmers without formal education in both sexes formed about 41% of all urban farmers. When it comes to high school and above education levels, the male headed households comprised higher proportion than female headed households. This phenomenon coincides with the argument raised by Foecken et al, 2004:2. According to their argument, "women [...] often have lower educational level than men" and this compels them to be engaged a multitude of in informal sectors such as urban agriculture.

The study further disclosed that, from among urban farmers of the town (especially male headed households) practitioners who have higher levels of education and some professionals of the sector (though the comparative advantages are not addressed in this study) have been found being engaged in urban agricultural activities of the town. This suggests that, urban

farming is an activity that could be undertaken by households with different income and education status for one or other reason. For the poor and marginalized section of the society it is a source livelihood for food, income and employment.

#### 4.2.6. Occupational Composition/Livelihood Sources/

As noted earlier, low income households of the town adopted UA to enhance their food security and income status. In line with this, findings on occupational category of the enumerated households show that some households entirely derive their livelihoods from UA. Vast majority of the practitioners however, have had some other sources of income and adopted it to diversify their income sources. As it can be seen from the table below, households from various types of occupation have joined the practice including business men (from small traders to the bigger one), government and private employee, self employed, unemployed laborers and others. Here, the occupational category referred to as others (Table 7) includes retiree and households who were dependent on the subsidy of their children).

Table 7: Distribution of farming households by occupation type

Occupational type	Number	%
Only UA	93	9
Business men including small traders	340	33
Government and private sectors employee	243	23
Self employed	65	6
Regularly unemployed laborers	150	15
Others	139	14
<b>Total</b>	<b>1030</b>	<b>100</b>

Source: Own field work

## CHAPTER FIVE

### BENEFITS OF VEGETABLE FARMING IN DESSIE TOWN

#### 5.1 Vegetable Production as a Source of Food and Diversified Diet

In Dessie town, in accordance with the information obtained from key informant interviews, one of the salient contributions of urban and peri-urban vegetable production is that it enabled the practitioners to have a direct access to relatively cheaper, fresh and wider varieties of vegetables. Results obtained from interviewed informants also support this claim and vegetable growers consume more vegetables as much as they can now than before they were not engaged in vegetable production activities. Most of interviewed informants consume vegetables three days a week; some others consume vegetables 4 days a week and very few of them consume vegetables 2 days a week. This shows that production of nutrient rich food remarkably increased their vegetable intake both in terms of quality and quantity which otherwise were not consumed, or consumed in smaller quantities.

Informants were further asked about the vegetable type they most regularly ate. Results obtained show that Swiss card, lettuce, cabbage tomato and potato are most regularly eaten vegetables by the majority of the interviewed informants. Eating such types of fresh vegetables is instrumental to make up an important component of diversified diets and has a role to play in increasing the dietary quality of the households involved. Besides, direct access to food and greater dietary diversity had direct effect on the nutritional status and hence health and physical wellbeing of the practitioners; particularly that of women headed households, people living with HIV/AIDS. Case study presented below bears witness to this.

#### Case 1 Zehara Ahmed

Zehara, 36 years of age, a mother of four and tested positive for HIV/AIDS in 2004 is residing in Dessie town Kebele 08 in a house rented from kebele for 12ETB and fifty cents /month.

Zehara narrated the benefits she gained as follows:

*I am cultivating vegetables in my own compound which is about 8 m<sup>2</sup> and with grow bags around my veranda. Besides, I used to farm also on neighborhoods open back yard spaces that belong to private individuals. Authentically speaking, the dietary status of my family is highly improved as compared to the time when I was not*

*involved in urban farming. Formerly there were days when I and my children drank a glass of soup and went to bed. Now thanks for my urban farming we feed three times a day and regularly "injera" which is of course prepared from a mixture of millet, wheat and "faffa" flour with "Shiro wat" and vegetables. Minimally we have vegetables on our dish three times a week. Out of the sales of vegetables I used to buy 225 kg of wheat, 50kg of "faffa" flour and 30kg of millet every three month and other ingredients on monthly basis.*

Zehara's case indicates that improved food intake and subsequent enhancement in the dietary status (eating as much vegetables together with other food stuffs) implies the contribution it has to the improvement of the dietary and hence nutritional status of house holds involved in vegetable farming.

## **5.2. Food Self Reliance and Increased Food Security Status**

Food self sufficiency here referees to the self sufficiency in vegetable crops produced in the urban and peri-urban areas of the town. According to data obtained from Dessie town Urban Agriculture Office, (2009) about 20% of leafy vegetables such as Swiss chard, lettuce and cabbages consumed in the town are produced in the inner part of the town and the remaining 80% is grown in the peri-urban areas of the town. Likewise, about 80% of carrot and 40 % of tomato are among the dominant root vegetables grown in the peri-urban areas of the town. Other vegetables are also produced in lesser proportions both in the inner and outer parts of the town in lesser proportions.

This has its own par amount role in minimizing the food -insecurity of the low income households of the town in that it creates physical access and food availability to them. For the households involved, urban vegetable production enabled them to improve their food security status essentially through the direct and indirect income it provided. It is evident that urban residents of the town in general are dependent on staple food purchased from local markets. The income gained from the vegetable sales or/and savings on purchased foods increased cash required for buying staple foods for family members.

As noted earlier, most of the food insecure low income households of the town tend to be involved in multiples of coping strategies including urban food production. Hence, informants of the study were asked how their engagement in urban vegetable production improved their food security status. Findings on some of the food security indicators show that most of the

informants have been able to eat three times a day (though the regular food for break fast is bread and tea) now than before they were engaged in urban food production; the time when they used to eat one or two meals a day and some of them and their children went to bed with empty stomachs.

On the other hand, results obtained from interviewed informants and case studies show that almost all of them have been running short of food every month. However, their involvement in urban food production practice helped them to relieve the problem in that though the quality and quantity of food eaten varied from one to the other based on their income category, most of them have reduced the number of months they have been lacking food. Some of the households have gone further and managed to have something to eat all year round. Below case supports this discussion.

### **Case 2 Qes Demeke Abebe**

Qes Demeke, born about 42 years ago (in what is currently known as Siemen Wollo Zone around the town of *Lalibela*), a father of three is currently residing in Dessie town Kebele 06. According to Demeke before he was engaged in vegetable farming he was highly vulnerable to food insecurity and he narrated his current status in the following way:

*My son! I couldn't make a living with 350 ETB/month which I earn from the church. The cost of living is getting worse and worse from time to time. Hunger is ignominious and cruel; it makes you feel shame and inferior. Thus, I began to farm so as to subsidize my income and hence 'rescue' my family from hunger. I am carrying on my farming activities around the area known as "Yelagnaw Borkena Dilidy" (the upper Borkena bridge), which is 15 minutes walking from my home situated adjacent to Borkena River. Authentically speaking, formerly, my family has been seriously suffering from food shortage. We have been running out of food every 15 days of a month. We used to manage the situation by eating more cabbage/spinach/ with some ingera. Thanks to God my income is getting increased now and relatively the problem is eased up. Now I am in a position to buy adequate food and feed my family all year round. God willing I will continue to hold it up.*

## **5.3 Urban Farming as a Source of Income and Employment**

### **5.3.1 Income Creation**

As noted earlier, one of the notable benefits of urban food production is its role in creating income for households involved in it. In Dessie town, data obtained from interviewed

households depicted that vegetable farming has served as a significant source of income in two ways; direct income from the sales of vegetables and indirectly by reducing expenditure on food and allowing other purchases (fungible income). Though most of the households did not have regular recording habit about the quantity of vegetables produced, consumed and sold, results obtained from interviewed informants and case studies revealed that they were able to augment income that was vital to make a living.

As it is mentioned earlier, the income varied widely depending on the size of the garden, the regular supply of water, the amount labor and time spent on cultivation and hence subsequent harvesting frequencies and duration. As mentioned earlier, market oriented farmers in the peri-urban areas of the town used to make more money than the inner one. Average estimated income gained from vegetable sales ranged from 160ETB/month to 1201ETB/ month and above.

Table 8 provides summary of income gained by 30 interviewed households.

Table 8: Monthly income of 30 informants

Income /month ETB	Number of households	Percent
160-300	17	57
301-600	7	23
601-900	3	10
901-1200	2	7
above 1201	1	3
<b>Total</b>	<b>30</b>	<b>100</b>

Source: Own field work

As can be observed from the table 57 % of the interviewed informants fall in the income category that ranged from 160-300/monthETB. About 83% of income earners within this category are backyard or homestead cultivators and 40ETB/week is the minimum income. Two (from open space and peri-urban cultivators) are identified whose income was 1000/monthETB. One peri-urban vegetable grower has been reported whose income is more than 1201/ month

ETB. This partly suggests the relative advantage that cultivators on spacious land have against the small plot cultivators.

The following two cases show the role that urban vegetable farming has in creating income for the households involved.

#### **Case 4. Halima Mohammad**

Halima, 52 years of age, a mother six is residing in Dessie town Kebele 01.

*I was born to a peasant family and I am accustomed to using land for agricultural purpose. My father thought me how to grow Vegetables. I kept that tradition here and currently vegetable farming constitute substantial part of my income. Hence, as much as I can I don't let my land lie fallow. Here in Dessie town, I have been cultivating for the last 22 years together with tea and bread trading. I used to produce Swiss chard and cabbage all year round and other vegetables such as onion in 6 months time. From cabbage alone on average I used to make 80 ETB every other week which is pertinent to cover my household expenses and it greatly helped me to bring up all my children by subsidizing and diversifying my income.*

Halima's case demonstrates how the income from the sales of vegetables supports the livelihoods of low income households.

#### **Case 3. Jemal Yimer**

Jemal, a young man, born 25 years ago to a peasant family resides in Kebele 15 around the outskirts of Dessie town. Jemal is the highest earner among the vegetable cultivators and explained his success as follows:

*I pioneered vegetable farming in September 2008 and currently vegetable farming is the sole source of my livelihood. I earn adequate income to live on. During the first harvest [in 2008] alone, at a local market wholesale price, 30 ETB for 25 kg of sac, I have gained 9850 ETB net income/6months. In 2009, from one harvest alone, I was successful to make about 12, 8 50 ETB/6months. Out of the sales of vegetable produce, in 2009 I bought 250 m<sup>2</sup> of urban land for 12,000 ETB and have constructed four roomed dwelling house on it [the successful way of changing financial capital to physical capital]. I have also one mobile phone bought for 1350 ETB and other durable items such as transistor Radio, Tape recorder and other household utensils.*

Informants were further asked about other income indicators such as saving status and income invested in durable household items or farm tools. Results obtained from

interviewed informants revealed that most of them have saved money that ranged 500 ETB- 2500 ETB. Very few of the informants have saved money that ranged from 2600-3000 ETB. There were also some who have not yet started to save. As noted above, urban crop cultivation was instrumental to allow other purchases including household durable items and farm tools. Data gained from interviewed informants was triangulated by personal observations and findings on this show that some of the successful cultivators have been able to buy durable items such as TV, Transistor radio, mobile phone and buffet as well as farm tools such as hose, watering can, hoe and etc.

### **5.3.2 Employment Creation**

So far studies portrayed that, urban agriculture as an input taker and supplier sector plays a significant role in generating employment through a net work of interdependent activities connected to it. In Dessie town, the informal food production activities have rendered full time and part time employment advantages to the households involved in it. Findings on the labor deployment of the practitioners depicted that, some of the interviewed households have been entirely relied on urban farming as their sole source of livelihood. Most of interviewed households however, practice vegetable cultivation with multitude of formal and informal livelihood activities.

Thus, the employment creation of the sector varied as per the time and labor invested in it. However, data drawn from interviewed informants and case studies demonstrated that, most of the households who were engaged in urban farming activities as a survival or coping strategies or for some other reasons, eventually found themselves in a better circumstances in that it offered them fulltime and part time employment opportunities to themselves and that of their family members. In Dessie town, data obtained from key informant interviews portrayed that in addition to individual households' vegetable farming is a source fulltime and part time employment for two organized youth cultivators and four cooperative members.

### **5.4. Social Benefits**

Results on the social contribution of urban farming revealed that it has served as a salient vehicle to enhance the social interaction and integration of marginalized and disadvantaged

groups of the practitioners; in that it built their general feeling of pride, confidence and self reliance through the process of food production, sale of their produce and gifts. According to most of my informants, their increased sense of self esteem and respect essentially stemmed from their engagement in urban farming which in turn made them productive members of the their community, and enabled them to make available vegetables needed by the community . Moreover, they had now also some thing to exchange or offer others. For some households, seeing their vegetables every other morning provided them internal satisfaction and prospect.

Particularly information obtained form HIV positive practitioners their engagement in urban food production was worth important in that, it up held their sense of belonging to the community and with their fellow gardeners. Vegetable farming was also their source of integration and interaction because they had something value to give. Indirectly, this had par-amount significance to their health and physical well being. Income from vegetable sales was directly changed into social capital or /and other capital in multiple ways. Data drawn from interviewed informants depicted that almost all subjects of the study have been actively participating in informal institutions such as iddir, (it enabled them to pay all the necessary contributions confidently). Besides, as noted earlier, vegetable farming has enhanced their saving habit and enabled most of them to be the member of saving groups. Few households have also been identified being stimulated to pursue their education. For instance, Zehara (case one), had no formal education. However, motivated by her current socio-economic status, she has now started to attend her grade one night school education at Kidame Gebeya primary school so as to enhance her knowledge.

The socio-economic wellbeing of women indirectly had a role to play in enhancing the gender equity of the practitioners and enlightening others. Income gained from vegetable sales also enabled 70% of the informants to invest in their children (schooling cost) so as to have their children educated. A number of examples can be cited in this regard. Especially for some HIV positive households the ability to cover schooling cost on their own meant, circumventing stigma and discrimination that may encounter their children at schools from their schoolmates. In line with, one of the HIV positive mothers informed me what her daughter always insists her saying "mama! Let we not have what to eat please don't collect exempting letter from your

association". This clearly shows how the income from vegetable is important for social integration of some households.

The following case provides evidence about the integrating role of UA

#### **Case 5. Tesfaye Mulatu**

Tesfaye, born 26 years ago, head of seven household members resides in Dessie town Kebele 06. Tesfaye explained how urban vegetable farming helped him to come out of social torment he was in as follows:

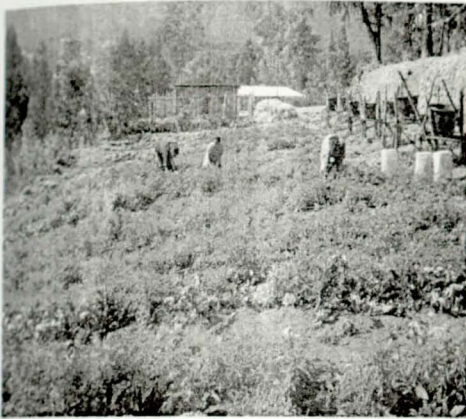
*In 2005 I got tested and identified positive for HIV/AIDS. Thus, fearing the stigma and discrimination of the time, I used to spend most of the time in my house. Even I didn't tell to my mother. When ever my friends asked me about my being in the house, I responded as I was on leave. But, in reality I had lost my job and I had no any income to live on. So as to sustain my self and my family I joined the very association in which I am still the member [Addis Hihot Ke Vayiresu Gar Yeminoru Wegenoch Mahiber]. Facilitated by this association I began to produce vegetables in my back yard (about 4m<sup>2</sup>) and using grow bags. I also endured to raise poultry in my compound for year or so. Understanding the benefits, in 2006 I leased 200 m<sup>2</sup> of farmland adjacent to Borkena River and extended my farming activity. Through the process of vegetable production and sale and gifts of the produce, I have established client ship with different households (including neighbors). Besides, I actively exchange experience and farm skills with fellow gardeners. I also actively participate in two Idirs and regularly pay the expected contributions. All these promoted my confidence and social interaction with the community.*

In Dessie town, the other imperative social contribution of urban farming is its role in mitigating the vulnerability of orphan students and reducing drop outs. As already stated, a good number of Orphan and Vulnerable Students are engaged in vegetable farming activities.

The figures below show the practitioners at two schools

Figure 7: partial view of students producing vegetables

6A



6B

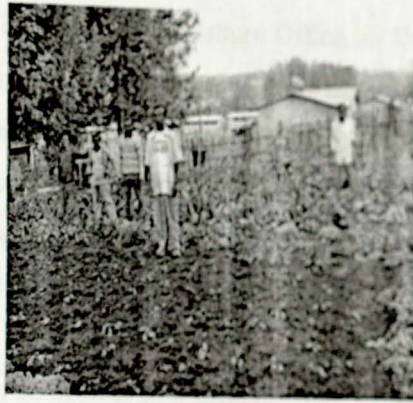


Photo: Getu Bekele

Data drawn from key informants and interviewed students portrayed that, it (their engagement in vegetable production), enabled them to attend their education regularly and for some others it is the source of their food, house rent, schooling cost, clothing etc. The following case supports a case in point.

#### Case 6. Abebe Ketema

Abebe, an orphan, who is at his 17 years of age and grade 11 student at Hotie preparatory school in Dessie town. He is one of the vegetable cultivators in the school compounds and he explained the benefits he enjoyed as follows:

*In 2005, when I was 12, I lost both of my parents. By that time I was a grade 7 student. I quarreled with the rest of my relatives there because they were not willing to send me school; rather they wanted me to get married. In so far as, in 2006, I came here [Dessie] so as to pursue my education. But, I didn't find things as easy as I thought. I had no one to support me here. So as to pursue my education and feed my self, I started to work as a daily laborer and shoe shiner. This helped me to continue my education at Gerado primary school. Three years ago I came to this school and since then I have been involved in vegetable farming. In this compass [Hotie preparatory school] I have about 60m<sup>2</sup> of farmland and on average I used to make 80 ETB every other week. With this I cover all my expenses. It greatly helped me to attend my education regularly.*

## 5.5. Environmental Benefits

### 5.5.1. Waste Reusing

According to data obtained from Dessie Town Urban Agriculture Office, in Dessie town the practice of reusing of different types of organic wastes is not something new. The residents of the town have traditional way of using different wastes. In line with this, results obtained from interviewed informants and cross-checked by personal observations showed that most of them have been using various types of organic wastes such as animal manure, ash and other types of household wastes in their back yard gardens so as to keep or improve the fertility of soils. This directly contributed in reducing the amount of waste disposed off and indirectly contributed to the urban waste management system and environmental enhancement of the town.

### 5.5.2. Greening up Effect

Data drawn from interviewed informants and direct observations revealed that, about 40 % of them have been cultivating vegetables on land that was otherwise idle or /and waste dumps. It is evident that, this has its own positive greening effect in that through the process of vegetable cultivation practitioners have cleared the sites and then changed it into green productive areas. In addition to individual cultivators, organized youth vegetable cultivators near by *Irobit* Bridge and at the backside of *Mintwab* hall are typical examples for a case in point. Thus, growing vegetables by clearing wastes not only virtually contributed in reducing the waste stock of the town and increasing green areas of the town but also it turned idle land in to productive resource.

## CHAPTER SIX

### OPPORTUNITIES, CONSTRAINTS AND CHALLENGES OF URBAN AGRICULTURE IN DESSIE TOWN

#### 6.1 OPPORTUNITIES

In accordance with data drawn from key informant interviews, focus group discussions and reviewed documents, Dessie town is potentially convenient for urban farming from different perspectives. Some of the potential resources of the town include the following:

##### 6.1.1. Suitable Agroecology

Climatic condition of the town, (sufficient amount of rainfall which is over 1100 mm annually and its moderate temperature which is essentially Dega climate) is favorable to undertake urban food production.

##### 6.1.2 Market Opportunity

Ever increasing population of the town, its strategic position and the emergence of new government and private education institutions including Wollo University, expansion of hotels and catering services are the potential sources of market.

##### 6.1.3. Potential of Linking Compositing and Urban Farming of the Town

Results gained from direct observation and focus group discussions depicted that large part of the waste disposed in the town is organic. Thus, through compositing this huge resource can be converted into imperative farm input and the waste management problems of the town could be circumvented. It could also be the potential source of employment.

##### 6.1.4. Ground and Surface Water Potentials

Situational analysis conducted in the 2007's annual development plan of the town spelled out that, Dessie and its environs is endowed with ground and surface water resources. Especially in the peri-urban areas of the town, both types of resources are available and can be exploited to the maximum limit through appropriate technologies so as to scale up the practice and capitalize the benefits it provides.

### **6.1.5. Official Recognition**

It is evident that for years urban agriculture has been over looked by the urban residents of the town in general and by the government officials of the town at all levels in particular. Currently urban agriculture is on the agenda as viable source of food, employment and income. Thus, though proper emphasis has not been yet put in place to the extent what it deserves, positive outlooks are gaining ground through time. This can be taken as a potential asset so as to up hold the sector.

### **6.1.6. Facilitating Agencies**

In addition to the urban agriculture office of the town, there are about 3 associations established by people who are living with HIV/ AIDS, two NGOs (local and international) are in place to promote urban food production. They have a role to play in facilitating the maximum exploitation of the potentials of the town so as to capitalize the socio-economic contribution of urban agriculture to urban farmers who are currently engaged in it and to those who may potentially be involved in it.

## **6.2. Constraints and Challenges**

Urban farming activities of the town have been constrained by the challenges enlisted in this sub-section. I have subsumed some of the major constraints of the practice into three main categories: Resource constraints, institutional constraints and social constraint. The details of each category are presented as follows.

### **6.2.1. Resource Constraints**

#### **A. Land**

It is evident that land is one of the key natural resources up on which the residents of the town are undertaking their farming activities so as to maximize their livelihood sources. However, major constraints have been found inline with it. Lack of land or /and limited access to urban farm land and insecure tenure system.

## **Lack of access to urban farmland**

Data drawn from key informants portrayed that most of homestead producers with small plots had high demand to expand their farming activities. But, they lacked access to urban farmland partly owed to the lack of the resource itself and partly due to other priorities as well as less attention given to urban food production activities by the municipality (currently known as service office) of the town.

It is obvious that, vacant spaces around the outskirts of the town could have been the major sources of land for UA. But, due to pressing demand for housing land, the town had expanded in the past two decades horizontally and most of open spaces are lost away. One of my informants, named Belete supported the scene as follows:

*Before the mid 1980s the former Dessie was only confined to the present inner most Kebeles (01, 02, 03, 04, 05, partly 06 and, 07,) of the town. Parts of the current kebele 06, 07, ,08, 09 and 10 were almost rural [prei- urban] and sparsely inhabited and were the main production centers of cereal crops such as wheat , barley and other leguminous plants such as peas and beans.*

To my mind, as noted earlier, the situation in Dessie exactly correlates to what Drechsel (1999:21) argued on the effect of fast urbanization over food supply system. According to his argument "population pressure not only directly increases the demand for food in directly reduces its supply through building development". Hence, lack of access to urban farmland is one restrictive factor to maximize the benefits of the practitioners. Data obtained from interviewed informants, showed that, some households with inadequate plot size or /and those who had lacked access to urban farm land tend to exploit every possible means such as *iqul* (a kind of dealing made between an owner of a land and the cultivator to share either the produce or the income gained from the sales of the produce equally) to have land to produce on.

The following case supports so far discussions.

### **Case 7 Belaynesh Adem**

Belaynesh, who is 36 and a mother of five, is residing in Dessie town Kebele 07 in old one roomed house rented from private individual. She narrated some of her challenges as follows:

*Though I have no my own land, I am engaged in vegetable farming for my own consumption and to sale some part of the surplus. The main challenge here is that, I have no permanent dwelling place and hence permanent cultivation site. When ever house renters tend to increase rent I used to change to the cheaper one because I have to minimize my expenses so as to feed my children and cover other household expenses. Because of this I had no permanent cultivation site. In this compound there is no backyard land to grow vegetables. So I kept intact with my former renters and currently I am cultivating vegetables on the backyard plot found in the compound of my former renters, which is the other side of this bloc .They are very good people they support me part of the water cost and finally we share the produce equally.*

Here, it is worth mentioning that, had Belaynesh owned her own land, it is beyond doubt that her income would have been more than what she may have earned under the circumstance she noted above. Hence this case ear markedly shows that how lack of access to farm lands negatively impacts the benefits of the practitioners.

### **Insecure land tenure system**

Another crucial constraint of food procuring activities of the town is insecure land tenure system. The urban vegetable cultivators of the town operate under different sets of tenure system. Privately owned (owner occupancy) temporarily leased, and public owned. As noted earlier, backyard cultivators constituted the largest proportion and most of the households in these groups have been cultivating on privately owned land and they are relatively secured than the rest.

Results obtained from interviewed informants and case studies revealed that those who undertake their farming activities on public owned communal gardens and some individual growers looked in secured and had a grave concern over the government reclaiming the land at any point in time. It is evident that this situation has its own adverse effect. When ever farmers feel in secure they refrain to invest their resources into their farmland. The available literatures also support this argument. For instance, Mogeout (2006:53) stated that "people are unlikely to invest time and scarce resources into UA if they are afraid that they will be evicted from their land [...]." According to data drawn from focus group discussions gardeners on commonly owned land (11 members) in Kebele 09 were highly hesitant to invest into their land due to the claim raised between the two bordering Kebeles( 06 and 09) over their farm land.

Data obtained from case studies show that in Dessie town tenure insecurity has caused eviction of some households from their farm land due to the reclaim made for other priorities. The below case corroborates a case in point.

#### **Case 8 Seada Mohammad**

Seada, 28 years of age is currently living in Dessie town Kebele 03. According to Seada, she has been evicted from her farm land few months earlier than I met her, and she explained the reason as follows:

*I was engaged in vegetable farming since 2006. For the last four years I have been cultivating vegetables on the open space (about 28m<sup>2</sup>) found in Dessie Town Finance Office compound. It was my imperative source of food and income. But, in early Sept 2009 (about four months ago), the officials of the office told me to stop farming. They reasoned out that the land was needed for some other priorities. Currently, I am doing at most in looking for other farm land. I will continue to farm as soon as I succeed to get land to farm on.*

The arguments of some scholars support the fate what Seada has encountered. For instance, Mubvami et al, (2003 in Foeken, 2005) argued that land is one of the basic resources for urban farming, its availability, suitability, accessibility and the type of ownership are the imperative elements so as to maximize the benefits of households engaged in it.

This argument suggests that, the combination of all elements are equally important. As Seada's case clearly shows, to have access to a given piece of land alone is not enough to make sure the sustainability of UA. Rather, the type of ownership is equally important.

#### **B. Water constraint**

As already stated, in Dessie town, vegetable cultivators have been using water from different sources and tap water users constituted the largest proportion. However, in accordance with data obtained from key informant interviews and triangulated by direct observations some of the vegetable cultivators have been identified growing vegetables where there was no water near by their farm land. Group cultivators on commonly owned land in Kebele 09 are typical examples for a case in point; where the cultivators were forced to transport water from far off sources. It is evident that this had its own impeding effect on the effective investment in labor and time.

Besides, some of the tap water users have been reported being constrained by their inability to regularly supply water to their farm land partly due to the shortage of water supply and partly fearing high service charge. As it is well known regular supply of water matters the harvest rate and the amount of produce from a given plot. Both ways illustrate the constraining impact of water on the households' effort to procure food.

### **C. Farm inputs constraints**

#### **Agrochemical shortage**

The available literatures widely discuss about the environmental and health effects of excessive use of pesticides. But this study came up with opposite to this.

Data drawn from interviewed informants revealed that vegetable farmers of the town rarely use pesticides and even a good number of them have been facing redundant crop loss due to non-availability of bacterial toxin (BT) and fungicide.

#### **Farm tools shortage**

For urban gardeners farm tools such as hoe, hose, and watering can are crucial to effectively invest time and labor into their farm land. As mentioned earlier, some of the households got the necessary farm tools from non-governmental organizations operating in the area. Some 20 % of them were also successful to buy their own. However, results obtained from interviewed households showed that most of the vegetable growers didn't have the entire farm tools enlisted above. Data obtained from focus group participants also supports this scene. Thus, some of the most poorer and destitute women used to undertake their farming activities by borrowing some of the necessary farm tools from those who "have". This had its own hampering effect on the desperate efforts of the poor in limiting their efficient use of labor and time.

#### **High cost of inorganic fertilizer**

Another constraint identified in this study was that high cost of inorganic fertilizer. Results obtained from Key informant interviews supported by informants of the study portrayed that subsistence homestead farmers used to cultivate vegetables using household organic waste and

animal excreta than inorganic fertilizer. In prei-urban areas, where farming is undertaken relatively on wider farm land, and production is essentially for commercial purpose, households employ inorganic fertilizer and it is one of their vital inputs. Hence, interviewed informants complained about the sky rocketing price of inorganic fertilizer and its subsequent effect on rising their capital input.

### **Access to credit service**

According to Ellis (2000), access to credit service is one of the elements that constitute the financial capital of farming households. The subjects of the study were asked whether they have access to credit or not. Results gained showed that, most of them didn't have access to credit for one or other reason. Informants had their own incredulity and threat to complain about the system. Some of them reasoned out high interest rate. But, one major reason identified by most of interviewed informants, and focus group discussions was that the group collateral system followed by the financial institutions operating in the area. The arguments obtained from interviewed informants and FGDs are summarized below:

*There are credit institutions in this town. But, almost all of them have more or less one and the same type of credit system: group collateral. You see, we all are not industrious. Some of us want to work hard so as to come out of the poverty we are in. There are also some who want to "benefit" at the expense of others. So it is hard to take risk in such condition.*

## **6.2.2 Institutional Constraints**

### **A. Non-existence of policy framework**

As already said, in the past few years urban agriculture has grabbed the attention of policy makers and political figures top to down. But, clearly stated policy guidelines on urban agriculture have not yet been developed. This has its own constraining effect on the development of the sector. In this study, data drawn from key informants' interview revealed that failure in zoning of land for urban agriculture, land use patterns and resource allocations to the sector etc. had its own negative repercussions on the sustainability and expansion of the sector.

## **B. Low attention given to the sector**

Though it has been said that positive out looks toward the sector have gained ground in the area, data drawn from interviewed households and case studies showed that due to long established lack of recognition, it has not yet obtained the actual recognition what it deserves. Thus, most of the practitioners of the town rarely benefited from support services such as extension and training which are salient to acquaint themselves with new knowledge, skills and technologies so as to intensify their activities and maximize their benefits.

## **C. Research/knowledge gap**

Urban agriculture is a relatively new research topic. As a result much has not been done so far to support the practice with empirical research focusing on its socio-economic and environmental contributions and its major impediments. Besides, data obtained from interviewed informants and focus group discussions showed that urban farming has long been considered as a rural practice and the socio-economic importance of home gardens, the small areas cultivated around home is often underestimated by the urban dwellers in general and the urban farmers themselves and decision makers at all levels in particular. Such lack of awareness about the vital contribution of the practice especially for poor families' had direct and indirect constraining impact on the expansion and the sustainability of the sector.

### **6. 2.3. Social Constraint**

#### **Crop theft**

One of the social constraints identified in this study was that the theft of crops. Some of the cultivators who grew vegetables far from their dwelling house were exposed to redundant robbery. In this regard, one of my informants named Tesfaye expressed me the challenges faced as follows:

*My farm land is situated about 20 minutes walking from my house. I was purloined many times. I appealed to the Kebele officials time and again. But, they wanted me to bring the thieves caught handed, which is of course beyond my capacity. I couldn't also afford to secure it.*

Tesfaye's case illustrates the challenges of vegetable growers who had been affected similarly.

#### 6.2.4. Irrigating With Waste Water as a Potential Source of Health Risk

In the inner part of the town, the river bank of *Borkena*, which crosses the town from north to south tip, is the main source of water for a number of households and cooperatives engaged in urban farming activities. It allowed low income households to grow vegetables and provided them food and income. However, direct observations and focus group discussions showed that, *Borkena* River is everything for the town.

The area around its bank is waste dumping site for many. Its water body provides car and cloth washing services. Generally its very location (lowest elevation), makes it the receiver of every sewage water, discharges that are produced from different sources. It is there fore, highly exposed to pollution and parasites and pathogens of different types. Thus, it would potentially infect those who are exposed through irrigation or consume row vegetables grown with it.

Figure 8: partial view of vegetables grown with waste water



Photo: Getu Bekele

Besides, interviewed cultivators didn't know much about the impact. This further poses a potential health risk both to the producers and consumers. Some of focus group participants

(who were drawn from government and non government organizations) expressed their grave concern saying :

*"Why these people are allowed infecting themselves and others. Why measures are not taken up to banning them."*

So it is worth mentioning that, this is one of the challenging issues to be investigated by further studies.

# CHAPTER SEVEN

## CONCLUSION AND RECOMMENDATIONS

### 7.1 Conclusion

The purpose of this study was to investigate the role that urban agriculture has in enhancing the livelihoods of low income households who have been engaged in food procuring activities. Hence, based on the specific objectives set for this study efforts have been made to explore the socio-economic characteristics of the urban farmers, the benefits that the sector provided, and the major impeding factors of the practice. Thus, the out come of the study revealed the following major findings.

First, this study portrayed that relatively a good number of low income households, cooperatives, unemployed youth and Orphan and Vulnerable Children (OVS) have been engaged in the two most widely practiced activities, animal raising and crop cultivation activities.

Second, the findings of study further depicted that low income substance households were disproportionately represented in vegetable production than animal raising. Besides, about 80% of leafy vegetables are grown in the peri-urban areas of the town.

Third, the study found out that urban food production is pertinent coping strategy for low income households in that, it allowed them to have a direct access to own grown fresh, nutritious, healthier food which immensely improved their food in take habit and hence their dietary and nutrition status. It has also a role to play in enhancing the vegetable supply both at the town and household level.

Fourth, this study also found out that urban farming has contributed to the improvement of food security status of households engaged in the activity through the income it generates and by creating physical accessibility and food availability. Households were found having food to eat all year round now than before they were engaged in urban farming activities.

Fifth, it is worth mentioning that, the study also found out that urban agriculture has created fulltime (of course for some) and part time job opportunities for household heads engaged in it and their family members. Besides, the outcome of the study revealed that almost all households were able to generate substantial amount of income from vegetable sales, though it varied depending on the size of the plot, the regular supply of water, labor and other inputs invested in it. The study further revealed that, urban food production has a pivotal role to play in reducing the food expenses of farming households and indirectly enabled, those households engaged in it, to drive indirect (fungible) income that allowed them other purchases.

Sixth, the outcome of the study also shows another salient role it played in integrating socially marginalized, poorer sections of the society. Particularly its social inclusion has been important for poorer women living with HIV/AIDS, destitute men and women headed households, by providing food, employment and upholding their self reliance, neighborhood contact and gifts through the process of food production and marketing. It also promoted the gender equity of women headed households by improving their socio-economic status. In doing so, it has a role to build confidence and self esteem of these households. Needless to say that for orphan and vulnerable students who were engaged in urban farming, the outcome of the study indicates that it is a vital source of their social wellbeing in that it enabled them to attend their education in a stabilized manner, provided them food and income to be used for their schooling costs which positively impacted in reducing dropouts.

Seventh, in Dessie town, food production in the inner part of the town indirectly contributed in increasing the green areas of the town through the use of former waste dumps and idle land for vegetable cultivation. Generally, urban farming has attributed to the aforementioned positive impacts on the socio-economic improvements of the households engaged in it and also played a role in aesthetic and environmental enhancement of the town.

Eighth, A new commence shown by GOs and NGOs working in the town to jointly mobilize resources to the benefit of the poorer households and Orphan and Vulnerable Students (OVS); the adoption of vegetable growers of the town to new technologies (grow bags/ containers, drip kits etc) are also another imperative findings of this study.

However, urban farming activities of the town were not without challenges or problems. Farming households were impeded by multiple of constraints and some of the major constraints that negatively impacted the potential benefits of the households include: lack of access to basic resources such as urban farmland and insecure land tenure system.

High cost as well as irregular supply or/and non-availability of some important farm inputs such as pesticides, inorganic fertilizers were also the other constraining factors of the activity. Lack of or/and limited access to basic extension services such as follow up, training and technical advice and lack of access to credit service were also the impediments of the practice found out in the study. It is evident that, urban agriculture has secured the positive outlook of the political figures and authorities of the area top to down. However, the gap in policy and subsequent failure in integrating urban agriculture in to the urban development strategies of the town, such as land-use zoning had directly or indirectly impeded the expansion and sustainability of the sector.

Furthermore, despite its multifaceted benefits, partly due to the lack of awareness and partly due to lack of promotion about the sector and research gaps, it is yet over looked by the community in general and by the town planners, others stakeholders of the town in particular.

Irrigating with water which is potentially exposed to pollution is one major challenge found out in this study. In conclusion, despite these impediments the findings of the study correlate to the proponents of pro-urban agriculture theorists in that urban farming as an important informal urban function has made an important contribution in enhancing the livelihoods of low income households engaged in it.

## **7.2 Recommendations**

It is evident that, urban agriculture has grabbed the attention of many. But, in order to maximize the existing and potential socio-economic, aesthetic and environmental benefits of urban agriculture of the town, particularly the benefits of the low income households, who are currently engaged in it and for those who wish to be involved, the following recommendations are suggested so as to ameliorate the major impediments of the sector found out in this study.

Land is one of the basic resources for urban agriculture, hence, its availability, accessibility and suitability and sustainability are the crucial aspects that need especial attention. Thus, urban agriculture of the town has to be considered as a permanent urban function and treated as such in the town's land in management /planning system. This suggests that creation of an enabling policy environment, i.e. integration of UA agriculture in to urban land use and planning system, issuance of policies, rules and regulations that facilitate and support urban agriculture activities in the town.

In order to enhance the access to vacant open spaces and security of urban agriculture land use in the town, the urban Service Office of Dessie Town is required to make an inventory of available cultivable vacant land that can be allocated for urban agriculture on the basis of short term and long term (land that is unsuitable for construction and other purposes as well as based on the positive or negative environmental effects) use of right.

Besides, initiating owners of open vacant Land (be it governmental and non governmental organizations) to give the land to organized cultivators on the basis of short, medium or long term use of right.

Currently, there is little or no adequate composting process. In order to mitigate the waste management cost of the town as well as alleviate the problems associated with high cost of inorganic fertilizer and environmental degradation (pollution), integration of composting with UA needs a great attention. Thus, Urban Agriculture Office of Dessie Town together with other stakeholders is required aggressively facilitate and aware the cultivators to change organic waste it into productive resource.

If more productivity and economic viability of the urban farming households are to be seen improving, the access to credit, agrochemicals, improved seeds, extension services such as consistent follow up and technical advice are very imperative. Thus, governmental and non governmental agencies working on urban agriculture and related activities are required to go about it.

There is no doubt that this research would serve as a spring board for other researchers. So, further comprehensive research need to be made so as to set out the untouched parts of this study (benefits of livestock raising, nutritional contribution of vegetable intake, crop disease etc) and bridge the research gaps that hampered the practice in place.

Much is not done to aware the residents of the town about the existing and potential benefits of UA. Thus, the Urban Agriculture Office of Dessie Town and other stakeholders are required to conduct awareness raising activities through vegetable faire trade day, experience sharing etc.

A good number of households have been found cultivating vegetables by using river bodies which are potentially exposed to pollution. Efforts need to be made to draw mechanisms either to reallocate these group of growers to other safer site (which of course would be challenging) or to make them grow plants and vegetables that have no immediate health risks to themselves and the consumers.

Urban farmers in general those who cultivate vegetables in former waste dumps in particular should be trained focusing on basic self protection skills from potential health risks.

Infrastructural facilities, (the road around *Segno Gebeya should be upgraded*); marketing, stocking facilities need to be improved for the benefits of producers, whole sellers and retailers.

Last, but not least, farming tools and equipments should be also provided for the poorer households at reasonable long term payment deal.

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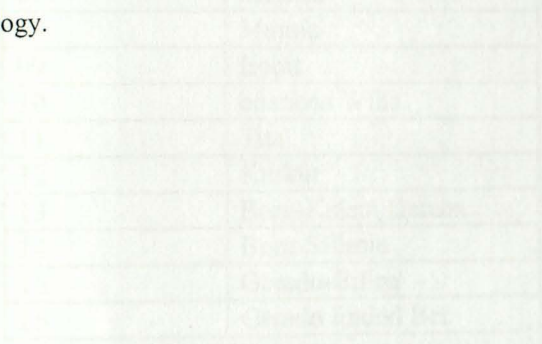
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## Appendix 1

### Names of kebeles Respective to Number/s

Number/s	Name of Kebeles
01	Segno Gebeya
02	Salayish
03	Arada
04	Piassa
05	Agergizat
06	Hotie
07	Melaku
08	Mumie
09	Irobit
10	boanboa Wiha
11	Tita
12	Kurkur
13	Boru-Kelem Dereba
14	Boru-Sillasie
15	Gerado-Billen
16	Gerado Endod Ber

Appendix 2

A woman producing cabbage around river banks (partial view)



An example of homesteaded cultivators (partial view)



Photo: Getu Bekele

**An example of open space cultivators (partial view)**



**An example of group cultivators planting seedlings on open space commonly owned public land (partial view)**



Photo: Getu Bekele

An example of peri-urban vegetable farm land



An example of carrot harvested in peri-urban area and on process for sale



Source: Getu Bekele

Leafy vegetable sellers at *gullit* (partial view)



Photo: Getu Bekele

## APPENDIX 3

### Check List Used to enumerate and Extract the Socio-Economic Profile of the Urban Farmers

#### 1. Personal Data

- 1.1 Sex
- 1.2 Age
- 1.3 Education status
- 1.4 Marital status
- 1.5 Place of birth
- 1.6 Ethnicity
- 1.7 Residential area
- 1.8 Farming place
- 1.9 Number of household members M----- F----- Total-----
- 1.10 Respondent's relationship with the household

#### 2. Economic statuses

- 2.1 What is your current occupation Orientation?
- 2.2 How much is your current household's monthly income in ETB?
- 2.3 How much is your estimated monthly expenditure on food?
- 2.4 Do you live in your own private house or rented house?
- 2.5 If rented, is it from kebele or housing agencies? How much do you pay for it month per in ETB?

#### 3 Urban Agriculture Related Issues

- 3.1 Are you involved in crop production or animal husbandry? Or both?
- 3.2 Where do you grow or raise animals? Whose land is it?
- 3.3 When did you start the practice?
- 3.4 For how long have you been engaged in urban farming activities?
- 3.5 What type of animals do you rear? Why? How many are they?
- 3.6 What is the objective of animal raising or crop production?
- 3.7 What are the main constraints that encountered you so far?
- 3.8 What suggestions would you like to give for the enhancement of you activities?

## Check list for in -depth interviews

Date -----

**Informant's pseudo name**  
-----

### 1. Personal Information ( data)

- 1.1 Sex
- 1.2 Age
- 1.3 Education status
- 1.4 Marital status
- 1.5 Religion
- 1.6 Place of birth
- 1.7 Ethnicity
- 1.8 Residential area
- 1.9 Farming place
- 1.10 Number of the household members M \_\_\_\_\_ F \_\_\_\_\_ T \_\_\_\_\_
- 1.11 Informant's relationship with the household

### 2. General questions assessing the economic status

- 2.1. The type of economic activities your household members involved in?
- 2.2. Which type of economic activity is the main source of income for the household?
- 2.3. How much is the current average monthly income of your household?
- 2.4. Do you live in your own house or rented house?
- 2.5. How is the status of your house?
- 2.6. Do you have private toilet and kitchen?

- 2.7. Do you have your own household furniture and durable goods? What are they?  
When did you buy each good?
- 2.8. Do have saving habit?
- 2.9. Which institution is your favourite institution for saving?
- 2.10. How much birr do you currently save per month?
- 2.11. Out side your family, is there any one whom you support financially or in any other form? If yes, is it casually or regularly?

### **3. Questions related to vegetable farming activities**

- 3.1. When did you start to farm? Why?
- 3.2. For how long have you been farming?
- 3.3 Where do you under take your farming activities?
- 3.5 Do you know your plot size?
- 3.6 How urban farming is viewed the community here around?
- 3.7 Are there any social / cultural segregation between farming and non- farming social groups? Have you ever come across such kind of experience?
- 3.8 How do you explain your income before and after you are being involved in vegetable production?
- In terms of:
- Direct income
  - Indirect income
  - Material asset
- 3.9 Is the income you generate from urban agriculture sufficient enough to pursue your livelihood and your family?
- 3.10. Are you full time or par time practitioner?
- 3.11. Are there other members of your family employed in urban agriculture?
- 3.13. How many times do you harvest produce in a year?
- 3.14 What general benefits have you got after you have been involved in farming activities?

#### **4. Questions assessing food security and nutritional values**

- 4.1. How many times you and your family members feed per day?
- 4.2. What are the food items consumed by you and other family members?
- 4.3. How do you get the food that is consumed by your household?
- 4.4. Is there sufficient food for the house hold for a year?
- 4.5. Have you received grain or other financial support from any of your relatives or friends?
- 4.6. How do you account your die try status before and after you have grown your own vegetables or rearing animals?
- 4.7. What nutritional benefits have you got from farming?
- 4.8. How do you evaluate your feeding trend and the implication it has for your health?

#### **5. Questions assessing the household's expenditure**

- 5.1 How much is the average monthly expenditure of the household?
- 5.2 What are the main monthly expenditure items of your household?
- 5.3 Do you set priorities in expenditure? What is your first priority?
- 5.4 What takes the lion share of your expenditure? Could you tell me from the highest to the lowest?
- 7.5 How do you express your expenditure trend before and after you have been engaged in urban agriculture?

#### **6. Questions assessing the household's assets**

- 6.1 Did you have the knowledge and skills of farming before you have been involved? in farming activities?
- 6.2 Where do you currently practice your farming activities?
- 6.3 Do you have your own land for your agricultural activities?
- 6.4 What is the source of water for your vegetables?
- 6.5 Where are your families in which you are born in to?
- 6.6 Did you have the opportunity to participate in formal and informal associations or organizations?

6.7 How do explain you social position before and after you have been involved in urban farming?

What is the source of finance for your farming activities?

6.8. Do you have accesses to credit and other services?

(Extension, training, technical and advice)?

6.9 What is the source of labour for your production activities?

6. 10 What are the inputs you are using for your farming activities? Where do get them?

6.11. What are the tools and equipments you use in your farming activities? Where do get them?

6.12 How was your social interaction with your family, neighbours and the community? in general before you have been involved in farming activities?

6.13. Would you tell me the total money that you have saved so far?

## **7. Questions assessing marketing situation**

7.1 Do you have surplus to sale?

7.2 Where do you sale it?

7.3 How many times do you take your produce to the market?

7.4 W hat are the problems in regards to marketing of your produce?

## **8 Questions assessing opportunities and constraints**

8.1 What are opportunities that favoured your farming activities?

8.2 What are the main challenges that encountered you so far?

8.3 What suggestions would you give so as to enhance urban agriculture in Dessie town general and your production activities in particular?

8.4 Do you have any further expectations from government and non government organizations?

## **Appendix 5**

### **Check list for key informant interview**

1. The name of your organization or office
2. What is your responsibility in the organization/ office/ ?
3. What are the duties and responsibilities of your organization in line with urban agricultural activities of the town?
4. Do the practitioners have the culture of using farm inputs?
5. Who are the most dominant social categories involved in urban farming activities? What are the major inputs employed by the cultivators?
6. What are the actual benefits that urban farming provides to the households involved?
7. What are the roles that your organization plays in promoting the sector and supporting the urban households?
8. What are the major constraints that impede the urban farming activities of the town?
9. What recommendations would you like to provide so as to capitalize the potential benefits of the practice?

## Appendix 6

### Guideline for FGDs Participants of Farming Households

- 1 What are the objectives of your engagement in vegetable cultivation?
- 2 What is the tenure type of your farm land?
- 3 Where do you sell your produce?
- 4 Do have access to credit and other services?
- 5 What supports have you got from NGOs and GOs operating in the area?
- 6 What advantages have you got from your engagement in the practice?
- 7 What are the major constraints that encountered you so far?
- 8 What suggestions would you like to provide for the enhancement of your activities?

## Appendix 7

### **Guideline for FGDs Participants Drawn from GOs and NGOs**

- 1 Who are the most dominant social categories involved the urban food production activities?
- 2 What factors do you think compelled the urban households to decide to farm in the town?
- 3 What are socio-economic advantages that urban food production rendered to households involved? What other related advantages have you observed?
- 4 What are the potentials of the area for urban agricultural activities?
- 5 Are there any problems that you know line with the crop cultivation activities of the town ?
- 6 What are the main constraining factors of urban vegetable activities of the town ?
- 7 What recommendations would you like to suggest scaling up the activity and maximizing the benefits of the poor?

## Appendix 8

### **Guideline for orphan an vulnerable students**

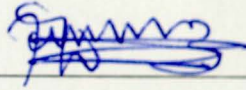
1. Why you are engaged in vegetable production?
2. When did you start to produce vegetables?
3. Who recruited you to be involved in the practice?
4. What are the modalities (arrangements) you are producing vegetables?
5. What is our production orientation?
6. What support have you got from NGOs and GOs?
7. What benefits have you got from the practice?
8. What are the major constraints that faced you so far?
9. What suggestions would you like to provide for the enhancement of your benefit?

## DECLARATION

This thesis is my original work, has not been presented for a degree in any other university and that all source of materials used for the thesis have been duly acknowledged.

Name Getu Bekele

Signature \_\_\_\_\_



Date \_\_\_\_\_

July 2020

This thesis has been submitted for examination with my approval as University advisor.

Name Gebre Yntiso (PH.D)

Signature \_\_\_\_\_

Date \_\_\_\_\_

Signature