

**THE CONTRIBUTION OF URBAN AGRICULTURE TO HOUSEHOLD
POVERTY REDUCTION: THE CASE OF MOROGORO
MUNICIPALITY IN TANZANIA**

BY

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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ABSTRACT

This study was carried out to evaluate the contribution of urban agriculture to household poverty alleviation in Morogoro municipality. A survey was conducted covering a sample of 100 households selected using a stratified random sampling procedure. The analytical techniques used were gross margin, Gini coefficient and coefficient of variation. The findings of the study showed that urban agriculture is practiced by people from all social demographic groups. The Gross margin analysis, showed that paddy provided the highest gross margin averaging at Tsh 257 700, followed by maize (Tsh 130 725). The gross margins for other crops were Tsh 51 650 (for beans), Tsh 44 100 (banana), Tsh 55 197.50 (vegetable), Tsh 85 050 (cassava) and Tsh 82 230 (fruits). For livestock, egg production recorded the highest annual gross margin of Tsh 4 110 000, followed by milk (Tsh 2 598 000) and pork (Tsh 1 538 400). Urban agriculture contributed about 13% to total household income with livestock keeping and crop production contributing about 7 % and 6% respectively. The source of household income that contributed greatly to total household income was salaries/wages which contributed about 44% of the household income followed by business, transfer payments and other sources which contributed about 27%, 11 % and 5 % respectively. Three income sources—business, transfer payments and other sources—represented inequality-decreasing sources of income while two sources of income—agricultural and salaries/wages—represented inequality-increasing sources of income. Considering urban agriculture alone, income from livestock enterprise represented an inequality-increasing source of income and crop production represented inequality-decreasing source of income. The study recommends that there is a need of integrating urban agriculture in the urban economy and legitimitise that urban agriculture become an integral part of the urban economy and deliberate actions should be taken to promote it.

DECLARATION

I, Simeon Peter Likenejo Shimbe, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and that it has never been or being currently being submitted for a higher degree award in any other University.

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Date

The above declaration is confirmed

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Date

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Regardless of the fact that this work is a result of contributions from many people, I must declare that I am personally responsible for the final version of this dissertation and the shortcomings therein, if any.

DEDICATION

To all those behind the scene in laying the foundation of my education.

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LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ERP	Economic Recovery Program
ESRF	Economic and Social Research Foundation
GM	Gross margin
HIPC	Highly Indebted Poor Countries
HIV	Human Immunodeficiency Virus
i.e.	That is
MKUKUTA	Mkakati wa Kukuza Uchumi na Kuondoa Umaskini Tanzania
MMC	Morogoro Municipal Council
MLHUD	Ministry of Lands, Housing and Urban Development
NESP	National economic Survival Program
NPES	National Poverty Eradication Strategy
NSGRP	National Strategy for Growth and Reduction of Poverty
PPP	Purchasing Power Parity
PRSP	Poverty Reduction Strategy Paper
RUAF	Research on Urban Agriculture and Forestry
SAPs	Structural Adjustment Programs
SUA	Sokoine University of Agriculture
Tsh	Tanzanian shillings
UA	Urban Agriculture
UNDP	United Nations Development Programme
URT	United Republic of Tanzania
USD	United States Dollar

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information

Urban Agriculture (UA) is practised in varying degrees in both developing and developed countries worldwide and it is not a new or recent invention as agricultural activities within city limits have existed since the first urban populations were established thousands years ago. However, only recently has UA become a systematic focus of research and development as its scale and importance in the urbanising world became increasingly recognised (Sharp and Smith, 2003). Alongside with this recognition is a paradigm shift from viewing 'poverty as a rural phenomenon' to 'poverty as both a rural and urban phenomenon'. Quite often people have in the past associated poverty with rural livelihoods even though the majority of urban populations in many developing countries also live in impoverished conditions with very limited access to basic needs as well as inadequate wage income and increasing human populations. In the meantime, the contribution of UA to urban food security and poverty alleviation has become a subject of attention for policy makers (van Veenhuizen *et al.*, 2001).

Traditionally, agricultural activities have been undertaken in rural areas where until today they continue to dominate the agriculture scene of Tanzania (Mlozi, 1995). UA was an idea prominent in North America in the 1960s. In recent years, however, UA is being practiced in many urban areas in developing countries (Yeung, 1987) and it was adopted by Tanzania as a way to make money and deal with profound food shortages (Mlozi, 1995).

Urban agriculture has expanded enormously over the past two decades and it appears to expand during economic crises, such as those induced by armed conflicts and structural adjustment, highlighting its use as a coping mechanism (Mlozi, 1995). A recent study by the United Nations Development Programme (UNDP) indicates that about 800 million urban residents worldwide are involved in UA and this number is likely to increase in the future (RUAFA, 2007).

For the poor, food security is usually the main motivation for engaging in urban agriculture and for some it is even a survival strategy and for wealthier households, it is an economic imperative (Foeken *et al.*, 2004). Nevertheless, most of the urban farmers sell some of their produce for the primary reason of subsidising their income (Foeken *et al.*, 2004). Although, livestock keeping in towns is less common than crop cultivation, many urbanites keep one or more animals. The most common types of animals are dairy cattle and chickens. The commercial aspect of livestock keeping is generally of more importance than crop cultivation, particularly when it comes to selling of milk, eggs and chickens (Foeken *et al.*, 2004).

1.2 Problem statement and justification

Between independence (1961) and 2002, the population of Tanzania has increased from around nine million people to 34.5 million people (URT, 2003). The urban population has increased faster than the rural population because of high natural population increase, rural-urban migration and boundary extensions. Tanzanian towns are facing major problems mainly springing from their inability to create adequate jobs absorb the

increasing urban populations which is in turn being exacerbated by the snag of shrinking formal sector, housing shortages and delays in the development of social services and physical infrastructure. This situation poses enormous challenges to the urbanites especially the poor. In the mean time, massive retrenchment of workers in the government and parastatals in the 1990s has increased the rates of unemployment and financial insecurity in urban centres (URT, 2000). The introduction of cost sharing in health service and education is another challenge.

As a result of the above challenges, poverty levels in Tanzanian towns are still high and despite the current overall good economic performance, there are only marginal signs of improvements in poverty reduction. In order to cope with economic austerity resulting from these challenges, many urbanites are forced to turn to income generating activities in the informal sector and one of such activity is urban agriculture. In general, urban agriculture is seen as an important economic shock-absorber for many urban dwellers.

There have been several studies on urban agriculture and poverty reduction. These studies include the linkage between poverty and urban agriculture (Drakakis-Smith, *et al.*, 1995; Egziabher, 1994); impact of urban agriculture on household economies (Mlozi, 1996; Mbiba, 1995; May and Rogerson, 1995; Maxwell and Zziwa, 1993) and the impact of urban animal agriculture on poverty alleviation (Mlozi and Hella, 2001). A few of these studies have specifically addressed the contribution UA to household poverty reduction and income inequality. Thus, little is known about its contribution to household poverty reduction among the urbanites. More important is perhaps the paucity of information on whether urban agriculture is an inequality – decreasing or inequality-increasing source of income. This study was an attempt to address this gap. Most striking is the dominance of Dar es Salaam in the studies of urban agriculture in Tanzania. More than 60 % of the available publications in Tanzania deal with this primate city only (Foeken *et al.*, 2004). In order to shift the focus of urban agriculture studies from Dar es Salaam, this study was conducted in Morogoro municipality which was randomly selected.

The contribution of urban agriculture to household income and income inequality was evaluated in this study. The study was motivated not only by recent empirical evidence supporting the hypothesis that inequality is harmful for growth (Partridge, 1997; Collier and Hoeffler, 1998; Deininger and Squire, 1998) but also by the fact that in some developing countries, economic growth was followed by a widening income gap between poor and non-poor, and between skilled and unskilled workers. The persistence of increased inequality has led policymakers to redefine growth strategy which accounts for redistribution. This debate is particularly relevant for most developing countries where agriculture is a mainstay of the majority of citizens both in the rural and urban areas.

1.3 Objectives of the study

1.3.1 General objective

The general objective of this study was to evaluate the contribution of urban agriculture in household poverty reduction in order to obtain information that would enrich understanding thus serving as a basis for decision-making regarding urban agriculture and poverty reduction policies in urban areas.

1.3.2 Specific objectives

The specific objectives of the study were:

- (i) To evaluate the profitability of urban agriculture as compared to other sources of household income,
- (ii) To evaluate the contribution of income from urban agriculture to total household income,
- (iii) To analyse the effects of urban agriculture on income distribution, and
- (iv) To identify the key problems facing urban farmers.

1.4 Hypotheses

The following hypotheses were put forward for the study:

- (i) Profit margin from urban agriculture is significantly higher than those from other sources of income, and
- (ii) Urban agriculture is an income inequality-decreasing source of income.

1.5 Organisation of the dissertation

This dissertation is organised into five chapters. Chapter one introduces the study while literature pertinent to the study has been reviewed in chapter two. The methodology used is described in the third chapter and the findings of the research are presented and discussed in chapter four. The last chapter gives the major conclusions and recommendations.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Definition of terms and concepts

2.1.1 Urban

Some scholars define urban as a town and a town is a place where people live and work, containing many houses, shops, places of work, places of entertainment, etc. Thus, a town refers to both the built-up agglomeration and the areas for which it provides services and facilities

Drescher and Laquinta (2002) examined some of the definitions of urban and city and argued that the terms have been interchangeably used without regard to their inherent differences. Drescher and Laquinta (2002) argued that whilst all cities are urban areas, not all urban areas are cities and, therefore, conceptualised the term 'urban' as being a subjective statistical concept whose definition is set by a country's government. Thus, governments of small or relatively rural countries may simply declare one or more settlements as urban regardless of size or function.

In many countries, the definition is based on a threshold number of inhabitants. Hence, when the population of a region exceeds a certain threshold number, that region is considered urban. While, for example, a threshold number of inhabitants in a settlement exceeding 5000 is considered urban in Ghana, the threshold number should be more than 10 000 to reach the urban status in Italy and Senegal (Drescher and Lanquinta, 2002). Some governments base their definition on combinations of criteria, such as population density, political functions or predominant activity of the region (Drescher and Laquinta, 2002).

2.1.2 Urban agriculture

Defining urban agriculture (AU) is problematic because of the varying contexts in which it takes place, the resources involved and the people undertaking it. Against such a backdrop, different scholars have defined UA differently. For instance, Tinker (1994) defined UA as the growing of food crops and fruits and the raising of animals, poultry, fish, bees, rabbits, snakes, guinea pigs, or other stock considered edible locally. Smit *et al.* (1996) gave a broad definition of UA as an industry that produces, processes, and markets food and fuel on land and water dispersed throughout the urban and peri-urban area. Yet, Mougeot (1994) defined UA as the production of food and non-food plants and tree crops and animal husbandry (livestock, fowl, fish, and so forth), both within (intra-) and fringing (peri-) built-up urban areas.

In Tanzania, UA is defined as the cultivation of crops, horticulture, floriculture, dairy farming, keeping of pigs, poultry and aquaculture in areas designated as 'urban' by the government of the United Republic of Tanzania under the town and country planning ordinance CAP 378 of 1956 as revised in 1991 (Mlozi and Hella, 2001). While urban agricultural activities do not differ in general from ordinary or rural agricultural activities, the former has very specific limitations and requires adoption to the urban context. The most striking feature of urban agriculture, which distinguishes it from rural agriculture, is that it is integrated into the urban economic and ecological system: urban agriculture is embedded in and interacting with the urban ecosystem (RUAF, 2007).

2.1.3 The concept of poverty

Poverty has been an attractive terminology to many scholars in both developing and developed countries and they have attempted to define it differently using monetary and non-monetary measures of welfare in either absolute or relative terms.

The World Bank (1993) defines absolute poverty as an inability to attain a specified (minimum) standard of living. Minimum standard of living comprises basic needs such as shelter, clothing, food and nutrition, health care, safe drinking water, education and freedom. In addition, income is used as an indicator of measuring poverty. On the other hand, relative poverty focuses on economic well-being of the poor in relation to the total population in the specific location (Semboja, 1994).

2.1.4 Poverty reduction

Bagachwa (1994) and Makombe *et al.* (1999) define poverty reduction as lifting the poor out of poverty. According to Limbu (1995), poverty reduction entails increasing the ability of people to acquire necessities, namely adequate food, adequate and decent clothing and better shelter/housing that include better places to sleep.

2.2 Poverty measurements

There are various ways of measuring poverty. These include poverty line, head count index, poverty gap and Sen Index.

Semboja (1994) defines poverty line as minimum purchasing power parity (PPP) which can enable a person to acquire basic needs in a day. This means that the poor and non-poor are the ones living below and above the poverty line respectively. With reference to poverty line, the World Bank (1993) defines extreme poverty as living on less than US\$ (PPP) 1 per day, and moderate poverty as less than \$2 a day.

The head count ratio index, as defined by Jazairy *et al.* (1992) is the proportion of the population whose income is below the poverty threshold or poverty line. This measure makes no distinction between the poor who may be close to poverty line and those who may have no income at all. This index is very insensitive to a decrease in incomes of poor, to income transfer among the poor and from the poor to the rich and also to the degree of poverty (Jazairy *et al.*, 1992).

According to David (1994), the poverty gap measures the depth of poverty from the poverty line. It is defined as the average gap between the actual income-expenditure of the poor and the poverty threshold. This measurement is insensitive to the income distribution within the group of the poor people (David, 1994).

Sen Index shows proportion (%) of income which can enable the poor to be above poverty line (Semboja, 1994). And one composite index is defined by the simple product of the head count and poverty gap indices, measures incidence and intensity (Kigoda and Mwisombe, 1995).

Of the many ways of measuring poverty, the head count ratio is the most commonly used in large-scale (national/regional) studies, which lack specific details necessary for and relevant to the other indices.

2.3 Poverty reduction, economic growth and income distribution

The term poverty alleviation was first conceived as a procedure or process of transforming the poor from one level to the other across a given threshold of income or consumption (Jazairy *et al.*, 1992). Poverty alleviation strategy is one of the means that were considered for adoption in the new paradigm of sustained development as stipulated in the human development report of the UNDP of 1994. The present new paradigm conceives poverty alleviation as a strategy for achieving sustained increase in productivity and an integration of the poor into the process of growth (Jazairy *et al.*, 1992).

The strategy has initially received global attention in order to replace the failed “trickle-down effect” approach for reducing poverty amongst third world countries (Mtafitikolo, 1994). This was based on the assumption that governments should concentrate on growth policies; and the result of growth would trickle down to the poor through primary and secondary incomes.

According to Limbu (1995), there is a link between poverty, economic growth and income distribution. Absolute poverty can be alleviated if at least two conditions are met. First, if economic growth and /or mean income rise on a sustained basis. Second, if economic growth is neutral with respect to income distribution or reduce income inequality. Generally, poverty cannot be reduced if economic growth does not occur. However, the persistence of poverty of a substantial population can dampen the prospects for economic growth.

Furthermore, it has been reported that the initial distribution of income and wealth can greatly affect the prospects for economic growth and alleviation of mass poverty (Limbu, 1995). There is substantial evidence that a very unequal distribution of income is not conducive for either economic growth or poverty alleviation. Current experience of economic growth has shown that if developing countries put in place incentive structures and complementary investments to ensure that better health and education lead to higher incomes, then the poor will benefit doubly through increased consumption and higher future incomes (Jazairy *et al.*, 1992).

2.4 Strategies and policies for poverty reduction

Poverty is such an important global issue that the world development reports of 1990 and 2000/01 were devoted to poverty through re-examining how policies could help to reduce poverty. The 1990 report urged the industrialized countries to assist the developing countries commitments to reduce poverty. In 1997, the UNDP assembly declared the 1997 to 2006 decade to be the United Nation’s decade for poverty alleviation and every October 17th to be commemorated as an International day for poverty eradication (URT, 2003).

Strategies of poverty alleviation have been attempted and implemented by many organs from the global to the national level. In the early 2000s, the World Bank proposed a three-branched strategy to reduce poverty. The strategies included the provision of opportunities for poor to reduce poverty by increasing their access to material opportunities i.e. jobs, credit, roads, electricity, markets for their produce, schools, water, sanitation and health services; and also enhancing security by reducing vulnerability to economic shocks, natural disasters, ill health, disability and personal violence to enhance poverty reduction (World Bank, 2001).

Based on these strategies, the World Bank (2001) stipulated seven specific objectives to effect poverty reduction by the year 2015. One among these specific objectives is to reduce

by half the proportion of the people living in extreme income of less than USD 1 a day per capita.

2.5 Poverty reduction strategies in Tanzania

Although poverty in Tanzania remains a rural phenomenon (World Bank, 1993; Semboja, 1994), the number of poor in urban areas, mainly the unemployed and those engaged in informal sector is also growing fast (URT, 2000). In both rural and urban areas, the poor typically lack capital and human assets. They are less educated, of ill health and have large families (World Bank, 1993). The vulnerability of the poor is increased by predominance of diseases including the rapid spread of HIV/AIDS (URT, 2000).

The government of Tanzania has been undertaking various initiatives towards poverty reduction and attainment of social and economic development. Since independence in 1961, poverty was declared a national scourge alongside ignorance and diseases. All national development plans were targeting at reduction of poverty and also diseases and ignorance (Mtafitikolo, 1994).

In 1967, Tanzania introduced Arusha declaration, which proclaimed the policy of socialism and self-reliance emphasizing rural development to bridge income gaps between the rural and urban people and reducing income differentials among regions and wage earners (Collier *et al.*, 1986).

From 1981 to 1983, the national economic Survival Program (NESP) and Structural Adjustment Programs (SAPs) were tried as the home-grown economic programmes. The World Bank sponsored SAPs which were adopted in 1986 and implemented in the form of first economic recovery program (ERPI) of 1986/87 and ERP II of 1989/90 to 1991/92 was other efforts of the government to reduce poverty (World Bank, 1998). Further efforts were implied in the Tanzania policy framework paper of 1991/92 to 1993/94 and in the rolling plan and forward budget for 1993/94 to 1995/96.

Recent strategies to reduce poverty are implemented by the government through vision 2025 of 1998. Founded within a broad policy framework, Vision 2025 stipulates the vision, mission, goals and targets to be achieved with respect to economic growth and poverty alleviation by the year 2025. To operationalise Vision 2025, the government formulated the National Poverty Eradication Strategy (NPES) of 1998, which provides overall guidance and framework for coordinating and supervising the implementation of policies and strategies of poverty alleviation. The Poverty Reduction Strategy Paper (PRSP) of 2000 was then formulated as a medium-term strategy of poverty reduction in the context of the enhanced Highly Indebted Poor Countries (HIPC) initiative (URT, 2005).

The National Strategy for Growth and Reduction of Poverty (NSGRP) popularly known by its Kiswahili acronym as 'MKUKUTA' of 2005 is a second national organising framework for putting the focus on poverty reduction high on Tanzania's development agenda. The NSGRP keeps in focus the aspiration of Tanzania Development Vision 2025 for high and shared growth, high quality livelihood, peace, stability and unity, good governance, good education and international competitiveness (URT, 2005). It strives to widen the space for country ownership and effective participation of civil society, facilitate private sector development and build fruitful local and external partnerships. NSGRP picks from the Poverty Reduction Strategy Paper (PRSP) of 2000/01-2002/03 and the one year of PRS Review that revisited the experience that had been gained in poverty reduction (URT, 2005). The overall goal of the NSGRP was to provide a framework to guide

poverty eradication initiatives in order to reduce absolute poverty by the year 2010 and eradicate absolute poverty by the year 2025.

2.6 Benefits of urban agriculture

The rapid urbanisation that is taking place in developing countries goes together with a rapid increase in urban poverty and urban food insecurity. Most cities in developing countries have great difficulties to cope with this development and are unable to create sufficient formal employment opportunities for the poor. They also have increasing problems with the disposal of urban wastes and wastewater and maintaining air and river water quality (RUAF, 2007). Urban agriculture provides a complementary strategy to reduce urban poverty and food insecurity and enhance urban environmental management.

Urban agriculture plays an important role in enhancing urban food security since the costs of supplying and distributing food to urban areas based on rural production and imports continue to increase, and do not satisfy the demand, especially of the poorer sections of the population. Next to food security, urban agriculture contributes to local economic development, poverty alleviation and social inclusion of the urban poor and women in particular, as well as to the greening of the city and the productive reuse of urban wastes (RUAF, 2007).

2.7 Problems of urban agriculture

Although some of the benefits of urban agriculture refer to its good effects on urban ecology, it has negative effects on urban environment leading to serious pollution and it is considered by many, and policy makers in particular, as an environmental hazard. Livestock can cause noxious smells, noise and traffic accidents, and may be a source of zoonotic diseases. Crops are sometimes irrigated with contaminated water, while those cultivated along roadside are prone to air pollution (Foeken *et al.*, 2004). Since urban agriculture tends to be intensive than rural agriculture, the use of agro-chemicals can have a negative impact on the urban environment, causing pollution in not only the plants but also the soil and ground water. The recycling of sewage and urban solid wastes by turning

them into compost is frequently put forward as a kind of panacea for both urban crop production and the improvement of the urban environment (Mlozi, 1995).

In most towns and cities, planting of ornamental plants, which include flowers and trees, has been done for a long time to signify urbanity. However, the presence of livestock in most towns and cities can destroy these ornamental plants as the animals search for food (Foeken *et al.*, 2004).

2.8 Policy and legal settings regarding urban agriculture in Tanzania

Several policies, laws and regulations have been put in place in Tanzania, which can be seen as recognition of urban agriculture, but at the same time as an attempt to control it. For instance, the national agriculture and livestock policy of 1997 observes that agriculture is not a principal function of towns, but when properly organised, it has the potential to provide employment, income and is a complementary source of food supply (URT, 1997). The urban farming regulations of 1992 gives guidelines, among others, on the maximum plot size, the number of cattle, the rearing system for livestock and a prohibition of any farming activity whenever it causes a nuisance.

By-laws regulating both crop cultivation and livestock keeping exist in all Tanzanian towns and municipalities and specific by-laws forbid the planting of crops in designated areas or restrict the planting of certain crops. For instance, crops taller than one metre are forbidden including maize, which is one of the most common crops in Tanzanian towns (Mlozi and Hella, 2001). By-laws concerning keeping of animals include the requirement of obtaining a special permission in writing from a Town, Municipal or City Director. The by-laws allow a maximum of four head of cattle, only to be kept in zero grazing and in specific structures (Mlozi and Hella, 2001).

In the Morogoro Municipal Council (Animal in Urban Areas) by-laws of 1999, animals allowed to be kept are cattle, donkeys, goats, horses, mules, pigs and sheep. In other words, small livestock like improved chickens, local chickens, ducks, rabbits and turkeys, most of which are now raised in urban areas are left out. The same by-law forbids keeping animals outside a building, structure or enclosure. This means that keeping of animals in free range is prohibited. Furthermore, the by-laws do not allow animals to be kept in a building or part of such building that is used for human habitation (MMC, 1999).

In summary, the legal position regarding urban agriculture is somewhat confusing for urban farmers since perceived favourable national policies clash with restrictions imposed by local government by-laws. The situation leaves many farmers unaware of what is permitted and what is not, so they go ahead with what seems to be logical and of benefit to their own household.

2.9 Urban agriculture and poverty reduction

Urban agriculture can contribute to food security and poverty alleviation in developing countries. For the urban poor who have low or irregular income from other sources, raising livestock and growing cash and food crops provide income (Belevi and Baumgartner, 2003). A cow, for example, is able to lower poverty levels in a number of ways. Milk consumption boosts the health of the family while the surplus is sold in local markets to enhance family incomes. A cow also provides farmyard manure which improves soil fertility and boost crop production and thereby improving food security (Mumero, 2005). Another benefit of urban agriculture not widely recorded is the fungible income. 'Fungibility' is the ability to provide for extra income that can be spent on essentials like health care and education (Mlozi, 1995).

Studies so far have revealed that urban agriculture contributes to household food and nutritional security, the creation of informal employment, income diversification through sales of surplus produce or savings on food expenditures, and more broadly promotes urban food supply systems and, at least in potential, environmental sustainability (Mougeot 2000; Foeken *et al.*, 2004). It is widely recognised that the urban poor could benefit from farming in town because of the relatively low investments needed to start the activity. There are indications that in nutritional terms, the poor who practice urban farming are better off than the poor who do not (Mwangi, 1995; Mwangi and Foeken, 2006). However, as some studies done in Kenya and Tanzania have shown, it is exactly the poor who are under-represented among the urban farmers; no access to land being the major obstacle. And if they do have access to land, they face other constraints (lack of capital being the main one), which causes them to perform worse than the non-poor urban farmers (Flynn, 2005).

2.10 Constraints facing urban farmers

Urban farmers face constraints such as irregular rainfall, drought, flooding, water-lodging, poor soils, pests and diseases and destruction of crops by animals, all which are the same as the problems faced by rural farmers (Flynn, 2005). Other problems, however, are more specifically related to the urban context and confront in particular those who practise off-plot crop production and free grazing. Examples of these problems include uncertainty regarding land tenure, theft of crops and animals, a lack of capital and inputs, the threat of eviction and the possible destruction of crops (Foeken *et al.*, 2004).

A number of solutions to these constraints have been tried in Tanzania and other countries including provision of subsidies to agricultural inputs so that their prices go down thereby making them affordable to farmers. This increases the use of inputs which may lead to increased agricultural production. According to Mbilinyi (2004) one way of rising agricultural productivity is switching over from “traditional” to “modern” agriculture involving the use of high-yielding varieties of seeds, organic manure, chemical fertilizers, insecticides, better implements animal power. Another solution to these constraints is provision of credits to farmers. According to Helleiner (2005), it is totally unrealistic to expect farmers to have enough savings of their own to finance capital investments in agriculture. They have, therefore, to be enabled to make these investments by giving them access to the necessary credit facilities.

2.11 Measurements of income inequality

Several different inequality measures have been proposed in the literature. The question has always been which one of these measures should be chosen for decomposition? According to Foster (1985), the chosen measure should have five basic properties: (1) Pigou-Dalton transfer sensitivity; (2) symmetry; (3) mean independence; (4) population homogeneity and (5) decomposability. Pigou-Dalton transfer sensitivity requires that the measure of inequality increases whenever income is transferred from one person to someone richer. Symmetry holds if the measure of inequality remains unchanged when individuals switch places in the income order. Mean independence holds if a proportionate change in all incomes leaves the measure of inequality unchanged. Population homogeneity holds if increasing (or decreasing) the population size across all income levels has no effect on the measured level of inequality. The property of decomposability allows inequality to be partitioned either over sub-populations or over sources. It is the latter type of decomposition that is the subject of this study.

Ideally, an inequality measure can be regarded as source decomposable if total inequality can be broken down into a weighted sum of inequality by various income sources (such as agricultural and livestock income). However, since activities that influence a particular source of income are likely to have an impact on other activities from that total income is comprised; any inequality measure that is source decomposable must address the problem of covariance among the income sources.

The measures of income inequality available include *Theil's* entropy index T , *Theil's* second measure L , the Coefficient of variation and the *Gini* coefficient. These measures are used as decomposition techniques to pinpoint the contribution of different sources of income to total income inequality. The two *Theil* measures, however, are not decomposable when sources of income are overlapping and not disjoint (Adams, 1994). A typical example of income decomposition is that used by Adams (1994) who examines the impact of non-farm income on inequality in rural Pakistan by using *Gini* coefficient and coefficient of variation. Adams (1994) decomposes total rural income among five sources:

non-farm, agricultural, livestock, rental and transfer. This analysis shows that non-farm income represents an inequality-decreasing source of income.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Conceptual framework

In this study, it is conceptualised that in the current economic climate and with a few alternative ways to increase income, urban agriculture can enable urban dwellers to provide for their basic needs. Urban agriculture also diversifies and increases income, enabling the household to purchase food, pay school fees, build or renovate their house(s), save for future use, expand their agriculture or invest in other economic activities. Moreover, urban agriculture provides employment for the enterprise owners, hired labourers and people in other economic sectors linked to farming sector. All these lead to household poverty reduction. The conceptual framework is diagrammatically summarised in Figure 1 below.

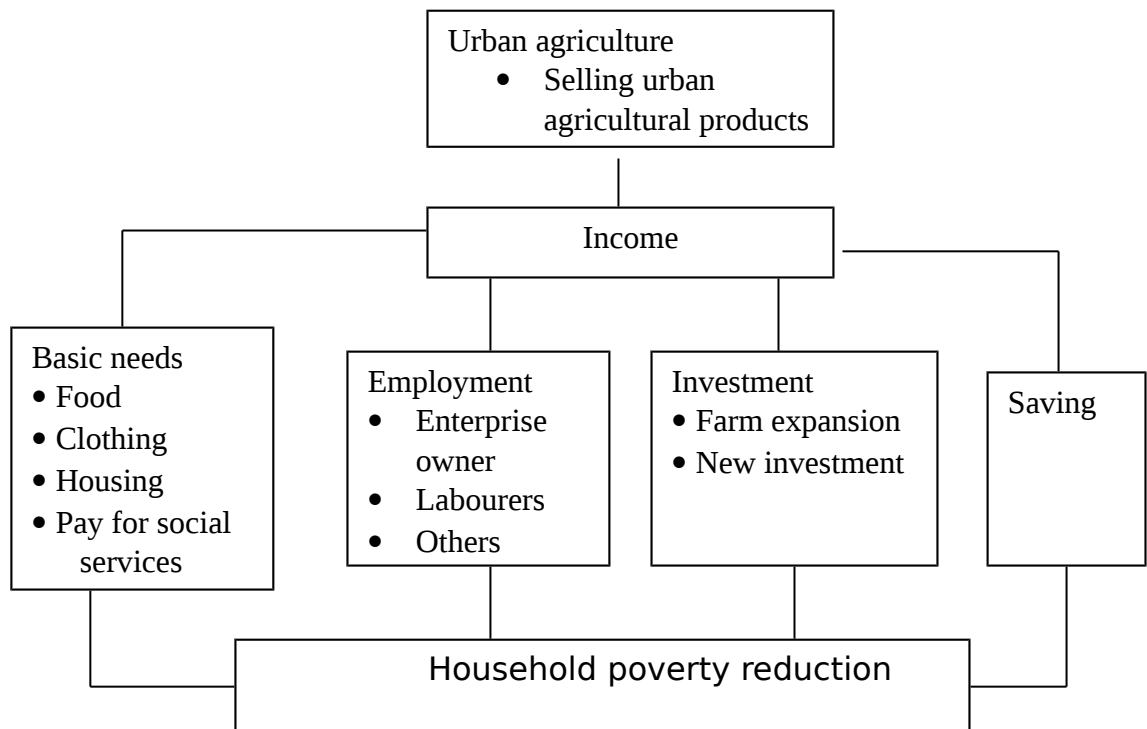


Figure 1: Conceptual framework for the study

3.2 Description of the study area

Morogoro town is the capital of Morogoro region with a total land area of 260 square kilometres which is 0.4% of the more than 73 000 square kilometres of Morogoro region as a whole. It is the fifth largest town in Tanzania (URT, 2002).

3.2.1 Location, climate and topography

Morogoro town is of the coast but it is not on the coast. It is located about 200 kilometres west of the Indian Ocean. In fact it is so close that this ocean influences the town's climate. The town lies on the slopes of the Uluguru Mountains, which stretch as from the east to west and located on the south of the town. The town is on an altitude of about 500 – 600

metres above sea level and has a bimodal climate, with rain falling between November and May, including a relatively dry period in January and February. Generally, the annual total rainfall varies between 600 mm and 1800 mm, with the neighbouring Uluguru Mountains experiencing heavy rains (2,800 mm). However, the rains vary in their amount, duration and intensity. The average daily temperature is 11°C with a daily temperature range of about 11°C. The highest temperatures occur in November and December, during which the mean maximum temperatures is 33°C. The minimum temperatures are in August and September in which they drop down to 16°C. The mean relative humidity in the municipality is about 66% and it drops down to as far as 37%.

Morogoro urban is a well-watered municipality with two rivers-Ngerengere and Mkundi flowing through it. These two rivers form the main source of piped water in the town (URT, 2002).

3.2.2 Ethnicity and administration

To a large extent, Morogoro urban is culturally coastal (URT, 2002). Despite this ethnicity, the municipality is mixed and urbanised, dominated by the Waluguru. Other groups include Wapogolo, Wandamba, Wabena, Wakwere and others from all over the country. Administratively, the municipality has one division which is further divided into 19 wards and 275 *mitaas* or administrative streets.

3.2.3 Economic activities

The economy of the municipality rests on two pillars. The first is administrative services offered by the government offices and non-government offices, institutions, schools, hospitals etc. The second is the industrial and trading sector. The industrial sector comprises large and small scale industries and the trading sector includes, among others, agro based commerce and freight distribution and related transportation services. There are other businesses in the town which provide goods and services. They include shop owners, hoteliers, small workshops, professionals, barbers, vegetable sellers, *daladala* (minibus) operators, taxi drivers, private hospital owners, carpenters, masons, secretarial bureau owners, advocates, accountants, academicians, building and civil contractors.

Morogoro town serves as a hub for two major road and railway networks to the country's hinterlands (southern highlands, central and western parts of the country) to metropolis Dar es Salaam.

3.2.4 Farming in Morogoro municipality

According to a socio-economic survey conducted by the ministry of lands, housing and urban development in 1993 about 75% of the sampled households in the municipality had farms (MLHUD, 1997). Of those farms 88% were less than three square kilometre size and 33% were less than five kilometres from the house of residence of the owner while 13% were between five and ten kilometres.

The survey further revealed that the crops were grown for food and cash and included maize which was grown by (57%), rice (27%) and a range of other crops (17%) such as cassava, banana, beans and vegetables. Livestock keeping is very common in the town. Animals kept include improved dairy cattle, chickens, pigs, goats and other small animals like rabbits, pigeons and turkeys. Apart from households, livestock is kept by various

institutions such as schools, colleges, prisons and religious institutions for various reasons including research, teaching, and income generations and for offsetting feeding costs for students.

3.3 Research design

The research design for this study was cross sectional. This is a kind of research design in which the data are collected at a single point in time from a sample to represent a large population. The design is suitable in descriptive study and for determination of relationship between and among variables. It is also economical in terms of time and financial resources (Babbie, 1993).

3.4 Data sources and instrument for data collection

Primary data was collected through interview using structured questionnaire with both open ended and close ended questions. Prior to the actual survey, the questionnaire was pre-tested under field conditions. Secondary data was collected from different sources including books, research reports and journals.

3.5 Sampling procedure

All households practicing urban agriculture in the study area constituted a sampling frame for the study. A list of these farmers was obtained from Morogoro municipal offices. A combination of proportionate stratified sampling and random sampling techniques was used to choose the households from three distinct housing density strata, namely high, medium and low densities. The total sample size was 100 households. The housing density criterion is thought to be important in relation to urban agriculture. First, it is a socio-economic variable in the sense that to some extent it can be considered an indication of household welfare level and, secondly, it is a geographical variable indicating the amount of space available for urban agriculture (Foeken *et al.*, 2004).

3.6 Data processing and analysis

Data from the primary source was verified, coded and analysed using Statistical Package for Social Sciences (SPSS 15.0 for windows) computer software.

3.6.1 Evaluation of the contribution of urban agriculture to total household income

Income from urban agriculture for each household was expressed as percentage of the total household income. The average percentage for all responds was taken to be the proportion by which income from urban agriculture contributes to urban household total income in the study area.

3.6.2 Analysis of income inequality

In analysing income inequality, the total household income was decomposed to pinpoint the effect of income from urban agriculture to the total income inequality based on two inequality measures: the Coefficient of variation and the Gini coefficient. The decomposition corresponding to the *coefficient of variation* was expressed as follows:

$$\sum w_i c_i = 1; w_i = \mu_i / \mu, c_i = \rho_i \frac{[\delta_i / \mu_i]}{[\delta / \mu]} \dots \dots \dots (1)$$

Where;

$w_i c_i$ = factor inequality weight of the i-th source in overall inequality
 μ_i and μ = the mean income from the i-th source and from all sources respectively.
 C_i = the relative concentration coefficient of i-th source in overall inequality
 ρ_i = the correlation coefficient between the i-th source and total income
 δ_i = the covariance involving the i-th income source.

The decomposition corresponding to Gini coefficient was expressed using the following equation:

$$\sum w_i g_i = 1; w_i = \mu_i / \mu; g_i = R_i (G_i / G), R_i = \frac{\text{cov}(y_i, r)}{\text{cov}(y_i, r_i)} \dots \dots \dots (2)$$

Where;

$w_i g_i$ = the factor inequality weight of the i-th source in overall inequality:
 g_i = the relative concentration coefficient of the i-th source in overall inequality
 G_i = the Gini coefficient of the i-th source of income
 Y_i = series of income from the i-th source
 R_i = Series corresponding ranks
 G = total income *Gini* coefficient and
 R = Correlation ratio

In analysing whether an income source is inequality-increasing or inequality-decreasing, it was assumed that the additional increments of that income source are distributed in the same way as the original units. An income source is inequality-increasing or inequality-decreasing according to whether c_i (or g_i) is greater than or less than unity (Adams, 1994).

3.6.3 Evaluation of profitability of urban agriculture

The gross margin (GM) analysis was used to estimate profit for urban agriculture. The average annual GM was determined and a comparison with income from other sources was made. GM was calculated using the following formula:

$$GM = \sum P_y Y - \sum P_x X \dots \dots \dots (3)$$

Where;

P_y = Price of urban agricultural products
 P_x = Price of inputs used in urban agriculture per unit
 Y and X = Quantities of output and inputs respectively
 \sum = Summation of

In calculating gross margin, a clear distinction between variable and fixed costs was made. Variable costs are costs that increase or decrease as output changes. Common examples of variable costs in crop production include seeds, fertilizers and pesticides. The most important fixed costs in agricultural production are owned land, family labour, farm buildings and farm machinery and implements. The gross margin of farm activity is the difference between the gross income earned and the variable costs incurred (Makeham and Malcolm, 1986). Gross margin analysis is thereby a simple, but in many cases, a sufficiently powerful tool for economic analysis of introduced technologies (Makeham and Malcolm, 1986). It was found useful to compare the gross margin of selected crops so as to establish the relative economic profitability of urban agriculture.

3.6.3.1 Advantages and limitations of gross margin

According to Ferris and Malcolm (2000), gross margin analysis has the following

limitations:

- (i) Gross margin is not a profit figure. Fixed costs have to be covered by the gross margin before arriving at a profit figure.
- (ii) Gross margin can vary widely from one year to the next. This is due to differences in market prices, weather condition and efficiency. Gross margin can also differ considerably from farm to farm. This can result from differences in performance levels or differences in the overall system of production or method of record keeping.
- (iii) Comparison of average gross margins can be useful, but it should be done over a number of years. However, GM gives the starting point in the assessment of profitability of a farm enterprise.

3.6.4 Identification of constraints facing urban agriculture

Descriptive statistics were used to analyse the constraints facing urban agriculture in the study area. Percentages were used to express the proportion of the respondents facing a particular constraint.

3.7 Limitations of the data

- (i) Using cross-sectional data limits observation over time. This makes it difficult for the study to account for changes due to time difference.
- (ii) Prices and costs involved have been limited by the availability of household data. Thus, the results of this research should be taken with caution because most of the farmers do not keep records regarding production and the data provided are based on farmer memory and some respondents didn't remember the actual quantities of products they had produced and they, for example, said to 'estimate..., we got... (amount)'. So, the results are estimates, but of course they were given by respondents themselves. However, figures are proximate indications of the actual situation in Morogoro municipality.
- (iii) A case study approach as used by this study limits observation to only one location. Hence, the conclusion reached may not hold for other similar farming activity elsewhere.

However, in spite of the above limitations, it is expected that the data collected was reliable and adequate to address the objectives set forth for the study.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

This chapter presents the results and discussion on aspects investigated in the study. The aspects presented in the chapter include respondents' socio-demographic characteristics, agricultural activities practiced by the respondents, constraints facing urban farmers, reasons for engaging in urban agriculture, relative profitability of the farm enterprises, income from other sources and decomposition of income inequality.

4.2 Households' socio-demographic characteristics

The ages, gender, levels of education, marital and occupational statuses of household heads were studied and the results are presented in Tables 1- 4.

4.2.1 Ages of heads of households

The age range of heads of households was between 18 years to a maximum of 75 years. Nine percent of the heads of households were between the age of 18 and 35 years, 39 % were between 36 and 45 years, 41.0 % were between 46 and 60 years; and 11% were above 60 years (Table 1). The results show that no body among the heads of households was of the age below 18. This may be explained by the fact that the sample consisted of household heads only, who under normal circumstances are adults above 18 years of age.

Table 1: Ages of heads of households (n=100)

Age groups	Frequency	Percent
18-35	9	9.0
36-45	39	39.0
46-60	41	41.0
>60	11	11.0
Total	100	100.0

4.2.2 Marital status of the heads of households

As shown in Table 2, about 89.0% of the heads of households were married, 5.0% were single, 4.0 divorced and 2.0% separated. The divorce rate of 4.0 % implies that this society is composed of stable families. A stable family can concentrate more on production than an unstable one and this may influence agricultural production.

Table 2: Marital status of the heads of households (n=100)

Marital status	Frequency	Percent
Single	5	5.0
Married	89	89.0
Separated	2.0	2.0
Divorced	4	4.0
Total	100	100.0

4.2.3 Sex of the heads of households

The majority of the heads of households were males (90%) and only 10% were females (Table 3). This shows that most of the households in the study area are headed by males.

Table 3: Sex of the heads of households (n=100)

Sex	Frequency	Percent
Male	90	90.0
Female	10	10.0
Total	100	100.0

4.2.4 Education levels of the heads of households

Table 4 shows that 43% of the urban farmers who were interviewed had higher education that ranges from advanced diploma to doctorate degree, 25% had diploma education and 12% had post-secondary certificate. Eleven and nine percent had secondary and primary education respectively. The higher number of heads of households with higher education who were engaged in urban agriculture can be attributed to the fact that most of the agricultural enterprises such as dairy and poultry enterprises require capital. Many of the persons with higher education were employed and received a relatively high income from employment that enabled them to afford the capital for starting farming enterprises.

Table 4: Education levels of the heads of households (n=100)

Education level	Frequency	Percent
Primary	9	9.0
Secondary	11	11.0
Post-secondary certificate	12	12.0
Diploma	25	25.0
Higher education*	43	43.0
Total	100	100.0

*Higher education includes advanced diploma, bachelor's degree and postgraduate diploma/degree.

4.2.5 Occupational status of the heads of households

The heads of households were asked to tell whether they have formal employment or not. As per the results in Table 5, 57% had permanent employment in either public or private sector, 20% had self-employment that included business, provision of services such as catering, health, and transport services. Others were self-employed engaging themselves in vocational activities such as carpentry, tailoring and masonry. Five percent had no formal employment, which means that they depended on urban agriculture only to sustain their livelihood. Three percent had temporary employment and 12% were retired employees in either public or private sector. Three percent of the respondents could not clearly state whether they are employed or not.

According to the findings, it is clear that urban agriculture is practiced by people from all socio-demographic groups. However, the majority of urban farmers in the study area were those with permanent employment. Again, the reason for this may be the fact that a more paying agricultural activity is capital intensive. It is easier for people with permanent formal or self-employment to raise start up capital from their employment income than those without employment.

Table 5: Occupational status of the heads of households (n=100)

Employment status	Frequency	Percent
Permanently employed	57	57.0
Temporarily employed	3	3.0
Unemployed	5	5.0
Self employed	20	20.0
Retired employee	12	12.0
Other	3	3.0
Total	100	100.0

4.2.6 Ethnicity of the heads of households

The heads of households were asked to state their places of origin or ethnicity in order to establish if there was any relationship between engagement in urban farming and ethnicity. The results showed that there were 16 ethnic groups engaged in urban farming in Morogoro municipality. Only 13% of the heads of households were natives of Morogoro region comprising of Luguru, Pogoro, Sagara and Kaguru tribes while 87% hailed from outside the region.

Of the heads of households who came outside the region, 19% were the Chagga from Kilimanjaro region, 13% were Nyakyusa from Mbeya region, 10% were Sukuma from Shinyanga and Mwanza regions and 9% were Hehe from Iringa Region. Others were Kurya (7%) from Mara region, Meru (6%) from Arusha region, Pare (6%) from Kilimanjaro region, Haya (5%) from Kagera region. In addition, there were Ngoni from Ruvuma region and Jaluo from Mara region each with 4%, Gogo from Dodoma region and Nyamwezi from Tabora region (with 2% each).

Further analysis showed that most of the Chagga were involved in dairy cattle and chicken

keeping under intensive system and most of the Sukuma, Hehe and Nyakyusa were involved in crop production especially cereals (maize and paddy). These findings showed a relationship between agricultural activity practised and ethnicity. The Chagga were attracted in dairy cattle and chicken keeping under intensive system, probably, because they practise the same in their places of origin. Likewise, the Sukuma, Hehe and Nyakyusa featured prominently in crop production especially cereals, probably, because the crops are staple food in their places origin. Furthermore, the Nyakusa and Hehe came from among the four leading regions in maize production in Tanzania. The enterprise-ethnicity relationship found out here suggests that status quo is one of the motives in choosing a particular type of agricultural activity to engage in as farmers in the study area preferred to maintain what is commonly practised in their places of origin. Profit was therefore not an important consideration in urban agriculture.

Table 6: Ethnicity of heads of households (n=100)

Ethnic group	Frequency	Percent
Chagga	19	19.0
Nyakyusa	13	13.0
Sukuma	10	10.0
Hehe	9	9.0
Kurya	7	7.0
Meru	6	6.0
Pare	6	6.0
Haya	5	5.0
Ngoni	4	4.0
Jaluo	4	4.0
Luguru	4	4.0
Pogoro	4	4.0
Kaguru	3	3.0
Sagara	2	2.0
Gogo	2	2.0
Nyamwezi	2	2.0
Total	100	100.0

4.3 Agricultural activities practiced in the study area

Table 7 shows that 29% of the respondents practice both crop production and animal keeping while 22% and 49% practice only livestock keeping and crop production respectively.

Table 7: Agricultural activities practiced in the study area (n=100)

Activity	Frequency	Percent
Crop production only	49	49.0
Animal keeping only	22	22.0
Crop production & animal keeping	29	29.0

The study further revealed that in the category of crop production, maize is grown by many respondents (29 %) followed by vegetables (19 %). Other crops grown were bananas (12 %), fruits (9 %), beans (7 %), cassava (13 %) and paddy (12 %). As it can be observed from the list of crops, all the common crops grown in the study area were food crops which may mean that they were all consumed by the household. In spite of this fact, part of the crops produced by a household was sold.

Table 8: Common crops grown in the study area

Crop type	Maize	Banana	Vegetables	Fruits	Cassava	Beans	Paddy
Number of farmers	30	12	19	9	13	7	12
Percent *	29.41	11.76	18.63	8.82	12.75	6.86	12.76

*Weighted percentages.

Of the livestock keepers, most of them kept dairy cattle (45 %) followed by poultry (36 %). About 13 % and 7 % kept pigs and goats respectively. Discussions with the livestock keepers revealed that, in most cases, goats were kept for household consumption especially during festivals and social functions such as religious festivals while cattle, chicken and pigs were kept for both household consumption and commercial purposes.

Table 9: Common livestock types kept in the study area

Livestock type	Frequency	Percent*
Dairy cattle	29	45.3
Poultry	23	35.9
Pigs	8	12.5
Goats	4	6.3

*Weighted percentages.

4.4 Reasons for engaging in urban agriculture

The study found out that the urban farmers engage themselves in urban agriculture for a variety of reasons. The most important reasons identified were to get food for home consumption (44 %), to get income (37 %) and to diversify income (30%). About 2 % said they did agriculture as a hobby and about 1 % engaged in agriculture because of tradition.

Table 10: Reasons for engaging in urban agriculture (n=100)

Reason	Frequency	Percent*
To get food	81	44.3
To get income	68	37.2
To diversify income	30	16.4
Hobby	3	1.6
Tradition	1	0.5

*Weighted percentages

4.5 Relative profitability of the farm enterprises

Gross margin analyses were performed for each crop grown and animal enterprise in order to assess the relative profitability of the farm enterprises. As it was stated earlier, crops grown and livestock kept by the respondents were meant for home consumption and for sale. In cases where agricultural products were consumed at home, revenues of a particular crop accrued to the farmer were calculated in terms of the relief the farmer gets by consuming the produce instead of using his other income to buy the produce. However, crop production involves a number of costs. Table 11 summarises the different variable production costs per crop (the average for all farmers) incurred in crop production per cropping season. The average cost per crop was obtained by calculating the cost for each item for all the households producing the crop. The total cost obtained was then divided by the total number of households.

4.5.1 Gross margins in crop production

Table 11 gives the Gross Margin for each crop per growing season based on the 2006/07 cropping season. The gross margins were calculated by deducting total variable costs from total revenues per each respondent in 2006/07 growing season.

As shown in the table, paddy producers earned the highest gross margin (Tsh 257 700) followed by maize (Tsh 130 725). The two cereals have the highest gross margins because of the high prices that they fetch in the market thus bringing higher revenues than other crops. Prices for these crops are high due to the fact that they are staple foods for the majority of the residents in the study area. The gross margins of other crops are beans (Tsh 51 650.00), banana (Tsh 44 100.00), vegetables (Tsh 55 197.50) cassava (Tsh 85 050.00) and fruits (Tsh 82 230.00). These results show that, in general, crop production in terms of quantity produced is low in the study area which results into low revenues from urban agriculture. Low crop production is, probably, due to, among other things, small sizes of the farms and high production costs.

Several studies have looked into farm size in relation to productivity and challenged the traditional claim that “small is beautiful” which is based on empirical observation that small farms present higher land productivity than large farms. Fan and Chan (2005) and Hazel (2005) have reported that there is a positive relationship between farm size and productivity. They have also shown that positive relationship exists between farm size and labour productivity and therefore income. Based on these findings, the problem of low production may partly be solved by increasing the farm size.

Table 11: Summary of gross margins per farmer per growing season

Cost item	Maize	Beans	Banana	Vegetables	Cassava	Fruits	Paddy
Average Total	12.29	2.50	31.80	650.65	10.00	4.7	9.32
Output*							
Average Price(Tsh)	22 500	50 000	4 500	150	12 000	21 400	40 000
Average Total revenue (Tsh)	2765	25125000	143 100	97 597.50	120 000	100 580	372 800
Average Variable Costs							
Land preparation	28 200	8 250	50 600	20 000	15 000	-	31 000
Planting	15 800	10 500	24 100	5 000	5 500	-	22 500
Weeding	18 900	9 500	9 800	-	11 250	11 350	42 800
Fertiliser	65 000	24 000	4 000	3 000	-	-	15 500
Other costs	17 900	11 100	10 500	14 400	3 200	7 000	3 300
Total costs (Tsh)	145 800	73 350	99 000	42 400	34 950	18 350	115 100
Gross Margins (GM)	130 725	51 650	44 100	55 197.50	85 050	82 230	257 700
GM for all crops							706 652.50

* The Measurement units used are as follows:

- *Bag*- a unit measure for rice, beans and maize, which is equivalent to 100 kg
- *Bunch*- a unit measure for banana, which is equivalent to 20 kg
- *Fungu* – a unit measure for vegetables and some fruits
- *Tenga*- a unit measure for fruits which is equivalent to 20 kg

4.5.2 Gross margins for livestock enterprises

The monthly gross margins were calculated for the main livestock types kept in Morogoro municipality, that is, dairy cattle, chickens (layers) and pigs and summarised in Table 12.

Table 12: Gross margins for livestock enterprises

Item	Milk (litres)	Eggs (trays)	Pork (kg)
Total output	560	120	80
Price (Tsh)	450	4500	2500
Total revenue (Tsh)	252000	540000	200000
Average Variable Costs per household in Tshs			
Feeds	15450	135500	45200
Minerals	4100	22500	4700
Drugs	7200	10300	6100

Veterinary services	5600	10500	6300
Labour	22700	18700	9500
Total variable costs	35500	197500	71800
Gross margin per month (Tsh)	216500	342500	128200
Gross margin per year (Tsh)	2598000	4110000	1538400
Total gross margins for all types of livestock (Tsh)			824400

4.6 Income from other sources

The major sources of income other than agriculture were identified and the respondents were asked to state the amount they earned per month from each source and the average income from each source was computed and presented in Table 13 below.

In this study, salaries/wages was considered to include income from both public and private sectors excluding self employment. Business as a source of income was considered to encompass all benefits accruing from different types of business owned by the household including rent received from ownership of assets such as houses, machinery and land. Transfer payments include pensions and other retirement benefits given to senior citizens by the government and social security funds. All other incomes which do not fall under urban agriculture and any of the above categories were grouped under other sources of income. As shown in Table 13, salaries/wages constituted the highest share (Tsh 322 000 per month) followed by business (Tsh 255 000 per month), transfer payments (Tsh 100 000 per month) and finally other sources (Tsh 45 000 per month).

Table 13: Income from other sources

Source of income	Amount earned per month (Tsh)	Amount earned per year (Tsh)
Salaries/wages	322 000	5 064 000
Business	255 000	3 060 000
Transfer payments	100 000	1 200 000
Other sources	45 000	540 000
Total	722 000	8 664 000

4.7 Contributions of different sources of income to total household income

Table 14 summarises the contributions of various sources of household income. In this Table, urban agriculture income for the sampled households was considered to include the income earned from all major types of crops grown and livestock kept.

The contribution of urban agriculture to household income was about 13% rankings third in terms of its contribution to the total household income. The source of income that contributed greatly was salaries/wages which contributed about 44 % of the household income followed by business which contributed about 27 %. Transfer payments and other sources of income contributed about 11 % and 5 % respectively. This empirical evidence leads to rejection of the hypothesis that profit margins from urban agriculture were significantly higher than those from other sources of income. The profit margins from urban agriculture were only higher than from transfer payments and other sources but less

than incomes from salaries/wages and business.

Table 14: Household income per source

Source of income	Average amount earned per year (Tsh)	Percentage contribution to total income
Urban agriculture	1 531 052.50	13.4
Salaries/wages	5 064 00	44.4
Business	3 060 00	26.9
Transfer payments	1 200 00	10.5
Other	540 00	4.7
Total	11 395 052.50	100.0

4.8 Contribution of different agricultural activities to total household income

Table 15 presents the contribution of various agricultural activities to total household income. As shown in this table, livestock keeping was the most important contributor to total household income as compared to crop production. While livestock keeping contributed about 7 %, crop production contributed about 6 %.

Table 15: Contribution of livestock and crop enterprises

Agricultural activity	Amount earned per year (Tsh)	Percentage contribution to total income
Livestock keeping	824 400.00	7.2
Crop production	706 652.50	6.2
Total	1 531 052.50	13.4

4.9 Decomposition of overall income inequality

The decomposition of coefficient of variation and Gini coefficient was used to assess the effect of various sources of income on overall income inequality. Table 18 reports the decomposition results for the five sources of income with respect to the distinction between inequality-increasing and inequality-decreasing sources of income. Both decompositions agree that three income sources—business, transfer payments and other sources—represent inequality-decreasing sources of income. This means that *ceteris paribus*, additional increments of incomes earned from business, transfer payments and other sources of income will reduce the overall income inequality. Both decompositions also agree that two sources of income, agricultural income and salaries/wages represent inequality-increasing sources of income. This means that *ceteris paribus*, additional increments of agricultural income and salaries/wages will increase overall income inequality. These results may be attributed to scarcity of land in the study area. Land scarcity might have pushed the poor households into non-farm income generating activities (business and other sources) leaving the majority of richer households to engage in agriculture, because they can afford to own land. On the other hand, richer households depend on non-farm income from business and/or salaried employment and thus more income from agriculture tends to increase income inequality. Under this setting, Adams (1994) argued that engagement of the poor in non-farm income generating activities may be expected to have a favourable impact on equity. These findings agree in part with that of

Benjamin *et al.* (2005) who found out that non-agricultural income was an important source of income inequality in China.

Salaries/wages represented an inequality-increasing source of income probably because it had higher entry costs especially the high paying employment that requires higher education. This made it to be accessible to richer households who can afford the cost of education. These results are comparable with that of Adams (1994) which show that agricultural and non-farm government employment represent an inequality-increasing source of income in rural Pakistan.

Table 16: Relative concentration coefficients of source of income in overall income inequality

Sources of income	UA	Salaries/wages	Business	Transfer payment	Other
Average annual income	1 531 052.50	5 064 000	3 060 000	1 200 000	540 000
Correlation coefficient					
Between total income and source incomes (ρ)	0.62**	0.57**	0.55**	0.42 **	0.24**
Relative coefficient (c)	1.83	1.40	0.56	0.42	0.24
Relative coefficient (g)	1.57	1.28	0.41	0.52	0.2

**Significant at the 0.05 level.

4.10 Decomposition of income inequality by type of agricultural income

The relative concentration coefficients for urban agricultural income based on the decomposition of the coefficient of variation and the Gini coefficient are presented in Table 17. Both decompositions agree that livestock keeping represented an inequality-increasing source of income, which means that *ceteris paribus*, additional increments of income from livestock keeping will increase income inequality. On the other hand, the decompositions agree that crop production represented inequality-decreasing source of income. This means that, *ceteris paribus*, additional increments of income from crop production will reduce income inequality. These results may be explained by the fact that livestock keeping is a capital-intensive venture in the form of initial capital and input cost as opposed to crop production. This makes livestock keeping to be practiced mostly by richer households as a result income from this source tends to increase inequality.

Table 17: Relative concentration coefficients of income in agricultural income inequality

Sources of income	Crop production	Livestock keeping
Average annual income	706 652.50	824 400
Correlation coefficient between total		

agricultural income and source incomes (ρ)	0.71**	0.35**
Relative coefficient (c)	1.15	0.83
Relative coefficient (g)	1.31	0.65

**Significant at the 0.05 level.

4.11 Constraints facing urban crop producers

The respondents were asked to mention the major constraints they encountered in crop production. The main problem mentioned by the respondents was poor weather condition which was mentioned by about 82 % followed by lack of capital (27 %). Through discussion with the respondents, they said lack of capital made them unable to meet costs of inputs. In addition, lack of capital hindered them to expand their farm enterprises. Other constraints included pests and diseases (20 %), poor seed germination (10.2 %), theft of crops especially green maize (10.2 %), high transport costs (8 %), high inputs costs (6 %), lack of inputs (4 %), labour shortage (4 %), low soil fertility (4 %) and lack of water for irrigation (2 %). However, about 21 % said they were facing no any constraints.

Table 18: Constraints facing urban crop producers (n=49)

Constraints	Frequency	Percent*
Poor weather condition	40	81.6
Lack of capital	14	28.6
Pests and diseases	10	20.4
Poor seed germination	5	10.2
Theft	5	10.2
High transport costs	4	8.2
High input costs	3	6.1
Lack of inputs	2	4.1
Labour shortage	2	4.1
Low soil fertility	2	4.1
Lack of irrigation water	2	4.1
No constraints	11	22.5
Total	>49	>100

*The frequency and percentage of respondents exceed 49 and 100% respectively because the respondents mentioned more than one constraint.

4.12 Constraints facing urban livestock farmers

A number of problems facing livestock keepers were mentioned, some of which were similar to those facing crop producers. The main one was diseases which were mentioned by about 59 % of the households. Other problems included shortage of feeds (35 %), high cost of inputs (20 %), low prices of livestock products (18 %), lack of capital (10 %), death and poisoning of livestock (10 %), theft of livestock (10 %), lack of enough space (8 %), infertility of livestock (6 %) and predators (6 %).

Table 19: Constraints facing urban livestock farmers

Constraints	Frequency	Percent*
Diseases	30	58.8
Shortage of feeds	18	35.3
High inputs cost	10	19.6
Low prices of livestock products	9	17.7
Lack of capital	5	9.8
Death and poisoning	5	9.8
Theft	5	9.8
Lack of space	4	7.8
Infertility	3	5.9
Predators	3	5.9
Total	>51	>100

*The frequency and percentage of respondents exceed 51 and 100% respectively because the respondents mentioned more than one constraint.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Overview

This study sought to empirically evaluate the contribution of urban agriculture to household poverty reduction in Morogoro urban. Based on the findings presented and discussed in chapter four, a number of conclusions and recommendations can be drawn. This chapter briefly highlights these conclusions and recommendations.

5.2 Conclusions

Urban agriculture is practiced by people from all social demographic groups which include rich, poor, employee in the formal and private sector, self employed, youth, middle-ages and senior citizens. The majority of urban farmers had permanent employment in either public or private sector and in other income generating activities other than agriculture. Only 7% of the heads of households in the study area depended only on urban agriculture to earn a living the implication of which is that urban agriculture was not the main occupation for most of the urbanites but they practised it, for various reasons, in addition to their main occupation. The most important reasons for engaging in urban agriculture included getting income, food and income diversification. A few farmers were engaged in urban agriculture for no reason other than hobby or tradition.

There were about 16 ethnic groups engaged in urban farming in Morogoro municipality. Only 13% of the households were native of Morogoro region comprising of Luguru, Pogoro, Sagara and Kaguru tribes while 87% hailed from outside the region. There was a relationship between agricultural activity practised and ethnicity suggesting that status quo was one of the motives in choosing a particular type of agricultural activity to engage in. Profit was possibly not an important consideration in choosing a particular type of agricultural activity to engage in.

Both animal and crop production were practised in the study area. Some of the households practised both animal production and livestock keeping while others practiced either livestock keeping or crop production only. The common crops grown were maize, vegetables, bananas, fruits, beans, cassava and paddy .The most common livestock kept were cattle and poultry (especially chicken) followed by pigs and a few kept goats. In most cases, goats were kept for household consumption especially during festivals and social functions such as religious festivals while cattle, chickens and pigs were kept for both household consumption and commercial purposes.

The farmers in the study area faced a number of problems in their production activities. The main problems faced crop farmers were poor weather condition, lack of capital which made them unable to meet costs of inputs thereby hindering expansion of farm enterprises. Other constraints included pests and diseases, poor seed germination, theft of crops especially green maize, high transport costs, high inputs costs, lack of inputs, labour shortage, low soil fertility and lack of irrigation water. However, about 22 % of the households faced no any problem in their farm enterprise. On the case of livestock farmers, the main problem faced them was diseases which affected about 59 % of the households. Other problems were shortage of feeds, high cost of inputs, low market prices of livestock products, lack of capital, death and poisoning of livestock, theft of livestock, lack of

enough space, infertility of livestock and invasion by predators.

Comparison of gross margins for various crops showed that paddy has the highest gross margin of Tsh 257 700 followed by maize (Tsh 130 725). The gross margins for other crops amounted to Tsh 51 650 for beans, Tsh 44 100 for banana, Tsh 55 197.50 for vegetables, Tsh 85 050 for cassava and Tsh 82 230 for fruits. Therefore, it was more profitable to invest in paddy production and maize and less profitable to invest in cassava and fruit production. For livestock, egg production had the highest gross margin per annum of Tsh 4 110 000 followed by milk (Tsh 2 598 000) and pork (Tsh 1 538 400). So, chicken production was the most profitable enterprise compared to other livestock enterprises and pork production was the least profitable.

The contribution of urban agriculture to total household income was only about 13 %, ranking third in terms of its contribution to the total household income. Livestock keeping had great contribution to total household income as compared to crop production. While livestock keeping contributed about 7 % to total household income, crop production contributed about 6 %. The source of income that contributed greatly to total household income was salaries/wages which contributed about 44 % of the household income followed by business (27 %). Transfer payments and other sources of income contributed about 11 % and 5 % respectively.

Three income sources—business, transfer payments and other sources—represented inequality-decreasing sources of income. On the other hand, two sources of income—agricultural and salaries/wages—represented inequality-increasing sources of income. This means that, *ceteris paribus*, additional increments of business, transfer payments and other sources of income will reduce overall income inequality and additional increments of agricultural income and salaries/wages will increase overall income inequality. When urban agriculture was considered alone, income from livestock enterprise represented inequality-increasing source of urban agriculture income and crop production represented inequality-decreasing sources of urban agriculture income.

There was no sufficient evidence to conclude that urban agriculture as an income generating activity in Morogoro urban contributed greatly to household income and income distribution as compared to other sources of income. This is mainly because of the constraints facing urban farmers explained above. In addition to these problems, the fact that agricultural activities in the study area were associated with ethnicity and income group suggest that status quo was the primary motive in urban farming. Profit was, therefore, not an important consideration in urban agriculture.

5.3 Recommendations

This study revealed that, in comparison with other sources of household income, urban agriculture was not contributing greatly to poverty reduction and income distribution because of the constraints facing farmers as presented above. If these constraints are addressed, urban agriculture has a great potential in poverty reduction and income distribution. In order to harness the potential of urban agriculture the following recommendations are put forward:

If the government has to reduce urban poverty through urban farming, then urban agriculture should be legitimised as an acceptable urban activity and become an integral

part of the urban economy. At present, the legal position regarding urban agriculture is somewhat confusing for urban farmers since perceived favourable national policies clash with restrictions imposed by local government by-laws.

The government should formulate a national urban agriculture policy which would both recognise the importance of urban agriculture and encourage it while at the same time ensuring that its dangers are known and addressed. The government has well established the national agriculture and livestock policy of 1997 but it does not deal with many of the constraints revealed by this study. There is also a need of integrating urban agriculture into urban policies, planning and development. For example, urban agriculture may be integrated in urban food security policy aiming at improving access of urban farmers to agricultural research, technical assistance and credit services, improving systems for input supply and product distribution, and the integration of urban agriculture in environmental policy.

Access to land is one of the major obstacles in urban agriculture. So, providing land to urban farmers should be the highest priority. Since land is scarce in most of built-up areas, arrangements may be made to earmark some land for agriculture in peri-urban areas. Such arrangements should be co-ordinated and supported by the local governments. Institutional support in combination with the creation of farmers associations ('social capital') is a prerequisite for successful poverty eradication by means of urban agriculture.

There is a need to develop community networks such as community urban farming or urban market gardening on a co-operative basis. These will help to realise economies of

scale thereby reducing production and marketing costs. Community networks will facilitate the sharing of knowledge, and promotion of participatory problem solving.

The government should provide subsidies to all agricultural inputs so that their prices go down. If this is done, productivity will raise. Agricultural productivity will rise if farmers switch over from “traditional” to “modern” agriculture in very large numbers, involving the use of high-yielding varieties of seeds, organic manure, chemical fertilizers, insecticides, better implements and animal power.

The government should put in place a well functioning credit scheme for farmers so that they borrow funds for boosting crop and animal production. It is totally unrealistic to expect farmers to have enough savings of their own to finance capital investments in agriculture. They have, therefore, to be enabled to make these investments by giving them access to the necessary credit facilities.

Often times, a question is raised as to whether urban food production competes with rural food production. Experience suggests that this is rarely the case since segmented markets and product price differentiation move against such an adverse rural-urban competition. However, more research into this question would be useful and hence recommended.

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		A	% B	C	% D	E=A+C	F	G=E×F	H	I=G-H	J=I×D
Dairy Cattle	Ltrs(milk)										
Beef cattle	Kg										
Layers	eggs										
Broiler	Birds										
Pigs	Kg										
Sheep	Kg										
Goat	kg										
16. Totals											

Working space for variable inputs incurred in managing livestock enterprises per year

Type	Input name	Quantity used K	Price per unit L	cost per unit M=K×L	Total for each livestock type
Dairy Cattle					
Beef cattle					
Pigs					
Sheep					
Goats					
Layers					
Broilers					
17. Totals					

F. INCOME FROM OTHER SOURCES

	Source of income	Amount earned per month (Tshs)
18	Salaried employment	
19	Business (Gross income- costs)	
20	Transfer payments	
21	Other sources	
22	Total	

G. CONSTRAINTS FACING URBAN AGRICULTURE

24. What are the problems facing you as an urban farmer?

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25. What are the causes of these problems?

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26. In order to solve the problems what do you think should be done?

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.....
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THANK YOU VERY MUCH FOR YOUR TIME AND CO-OPERATION