

**SMALL- SCALE HORTICULTURAL PRODUCTION AND HOUSEHOLD
INCOME IN THE PERI-URBAN AREAS OF MWANZA CITY – TANZANIA**

BY

SITTA EPHRAIM SHIMBA NGISSA

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ABSTRACT

In many developing countries, Tanzania inclusive, the contribution of small-scale horticultural production at household and in the national economy is unknown. The output of the gardening sectors in developing countries is neither expressed in quantitative monetary equivalent terms, nor recognized as a significant contributor to household economies. This study seeks to determine the contribution of horticultural production in the promotion of income generation among the small-scale horticultural producers so as to show its economic contribution in comparison with other household's sources of income. In year 2001 a study was conducted in Mwanza peri-urban areas to investigate the contribution of horticultural products to the household income. The study covered a total of 134 horticultural growers from 5 villages of Mwanza peri-urban. All of 134 respondents were sampled from 400 vegetable producers who were the beneficiaries of Mwanza Smallholder Horticultural Development Project – MSHDP also engaging in other economic activities. The results showed that horticulture growers are among the higher income earners in comparison with other agricultural cultivators of other crops such as cotton, cassava, maize and rice. About 19 per cent earned an income that ranged between Tshs. 300 001 – 500 000 and 8.2% gained between Tshs. 500 001- 700 000 per year. In general, the income variation among the surveyed villages are very insignificant because the villages are located in the same kind of environment of Mwanza greenbelt. In other non- horticultural production, the study revealed that the income performance was very poor because 34.3 % of producers earned income that was less than Tshs. 100 000 and only 4.5% earned income between Tshs. 300 001 – 500 000 per horticultural grower. Also the survey revealed that more than 80% of the horticultural growers used their plots for cultivating cabbage and tomato. Furthermore the study shows that horticultural production

created 1930 employment opportunities. The survey indicated that 52.2% of the farmers sold their produce to the city wholesale market and itinerary vendors. Therefore horticultural production is a chief contributor to the household as well as the national income in Mwanza peri-urban areas. Horticultural production is one of the industries, which employ people almost throughout the year in the agricultural sector than any other field of agricultural crops production in Mwanza region. It is high time economic and social development planners and policy makers recognized that horticultural production is one of the pillars of the household and national economy. What is needed is to make use of its potential value for which agricultural research and development programmes have overlooked for a long time.

DECLARATION

I, SITTA EPHRAIM SHIMBA NGISSA, do hereby declare to the senate of Sokoine University of Agriculture that the work presented here is my own, and has not been submitted for a higher degree in any other University.

Signature.....

Date.....01. 09. 2003.....

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DEDICATION

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LIST OF ABBREVIATIONS AND ACRONYMS

AVRDC	Asian Vegetable Research and Development Centre
CAN	Calcium Ammonium Nitrate
CO	Carbon monoxide
DC	Developing Countries
ENDA-ZW	Environmental and Development Activities – Zimbabwe
FAO	Food Agricultural Organisation
FO	Field Officer
GDP	Gross Domestic Product
IGA	Income Generating Activities
ILO	International Labour Organisation
JICA	Japanese International Co-operation Agency
MSHDP	Mwanza Smallholder Horticultural Development Project
N	Number
NEMC	National Environment Management Council
NGOs	Non –Governmental Organisations
NIGP	National Income Generation Programme
NRI	Natural Resource Institute
PUVeP	Peri-Urban Vegetable Project
S/A	Sulphate of Ammonia
SO ₂	Sulphur dioxide
SPM	Suspended Particulate Matters
SPSS	Statistical Package for Social Sciences
UN	United Nations
UNDP	United Nations Development Programme
URT	United Republic of Tanzania
VAT	Value Added Tax
W/H	Wife & Husband
WHO	World Health Organisation

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the study

In many developing countries, Tanzania inclusive, the contribution of small-scale horticultural production both at household and in the national economies is unknown. Small-scale gardens can be managed without agricultural subsidies, and they use less external inputs than field agriculture. Vuollet (2000) states that, among the advantages of small scale horticultural production compared to large scale or market gardens and field agriculture include use of simple hand tools by using hand-watering cans, or mobile water pipes, low input costs, the minimal economic assistance and low labour costs (as the work is done by the household members on part-time basis) (Dei, 1991). The space is used efficiently and gives a sound way of recycling solid waste as well as white waste (Vuollet, 2000; Terrell *et al.*, 1986).

In terms of urban agriculture Vuollet (2000) states that, subsistence horticulture is a peri-urban garden undertaking, which is relatively small as its area coverage, no exceeding two acres and to some extent involves the selling of garden products. Some remote gardens are often situated in riverbanks, fertile valleys greenbelts, and lakeshores (Dei, 1992). However, the area should be intended for plant production, mainly for food crops (for the household consumption) and to a variable extent for crops generating cash income, shade, fodder and non-food multi-purposes (McConnell, 1992; Vuollet 2000). Many crops may be found in such gardens including fruits, vegetables, legumes and spices. The garden has also important authentic social and ecological values, which will not be considered because this study does not focus on those aspects.

This study seeks to determine the contribution of horticultural projects/production in the promotion of income generation among the small-scale horticultural gardeners so as to understand the volume of garden produce in economic contribution, whether is relatively significant in comparison with other household's sources of income. Other aspects of the garden may be of great importance for the household, like small livestock keeping, and other prestige values will not be included in this study as economic contributions.

1.2 Statement of the problem

According to FAO (1994) the output of the subsistence horticulture or gardening sectors in developing countries is not expressed in quantitative monetary equivalent terms. Also the industry is not recognized as a significant contributor to household economies, as a result its potential value is often overlooked by agricultural research and development programmes. To date it is difficult to get a picture from the literature of how the economic contribution of vegetable production can be measured and what is the contribution of gardens to the household income (Vuollet 2000). While in developed countries, farmers benefit from horticultural activities, the situation is different in Developing Countries (DCs). Many small scale farmers involved in horticultural activities their contribution is neither known nor included in GDP. Thus there is a problem on the perspective of horticultural contribution to the household level up to the national level in terms of domestic accounts. Horticultural crops such as leaf and non-leaf vegetables can take years or very short time to develop before harvesting. For instance, when different crops are grown during one year, the yield may differ a lot from time to time. Hoogerbrugge and Fresco (1993) observed that the household's horticultural income figures are not really comparable, as they have been estimated in different ways. Naturally, factors such as

garden size, share of cash crops and other sources, household size and urban agricultural policies influence the proportion of the household's income derived from the horticultural production.

1.3 Problem justification

With appropriate policies and technology, horticultural production could significantly supplement the income of small farmers and provide additional employment in labour abundant in developing countries (Islam, 1990; Jonsen and Colins, 1985). Ironically, vegetable activities could be of special importance to the disadvantaged (Gill, 1991). The landless, for example, who have no fields, but often have at least a small plot or piece of homestead land which could support a kitchen garden and some small stock, use horticultural production for income generation (Gill, 1991; Niewkeep van *et al.*, 1994). Today, in many urban and peri-urban areas horticultural production has been playing a key role in household's food security and livelihood.

Vegetable crops, unlike other traditional cash crops, (such as coffee, tea, cotton) give immediate returns mainly two or three months from the time of plating. Farmers therefore, prefer these to cash crops, which take too long to mature (Yamaguschi, 1983; Verheij, 1982 and Byaruhanga, 1977). Vegetables grow virtually in any ecological environment in Tanzania. This, therefore, means that there are lots of potentials for Tanzanian small peasants to enter into this industry.

In recent years, horticultural sector in Tanzania has been given more attention and a much higher priority in the allocation of resources (Nyange, 1993). For instance, in mid –

1990's the United Nations Development Programme (UNDP) in collaboration with the National Income Generation Programme (NIGP), facilitated through funding the establishment of horticultural projects in Dar es Salaam, Arusha and Mwanza Urban/peri-urban areas.

In most places of Tanzania including Mwanza region, horticultural contribution is not yet recognized to be included in GDP. This study looks into this aspect in order to bridge the gap in terms of knowledge so as to enable the planners and decision-makers to be familiar with the situation. Other gaps are as follows: most of the studies in Tanzania have been done in the urban not periurban areas hence, the role of peri-urban horticulture in employment has not been fully explored. Marketing experiences are not known so there is inadequate information on this aspect, and most past studies have concentrated only in few urban areas of Tanzania.

However, the United Nations (UN) statistical office recommends that the value of the home garden production should always be included in the GDP (UN 1986). Whether this is done in the different nations' domestic accounts could not be answered in this study's literature review and this aspect needs to be verified further on a case-by case basis.

1.4 Research objectives

1.4.1 Main objective

To investigate the contribution of horticultural products to the household income among the horticultural producers, so as to enable planners and policy makers to design specific intervention strategies in order to improve household income.

1.4.2 Specific objectives

The study has five specific objectives, namely to:

- a) determine the types of horticultural crops grown in peri-urban areas of Mwanza city.
- b) measure the employment status among the peri-urban dwellers of Mwanza city.
- c) determine the process of marketing of vegetable products among the smallholder vegetable growers
- d) compare the contribution of vegetable gardens' income relative to other crops and other sources of household income in the years 1999 and 2000.
- e) determine the smallholders' vegetable income in sustaining the household expenditure.

1.5 The conceptual framework

The conceptual framework proposed by this study is presented in Figure 1. The framework shows a set of independent of variables, which influence the contribution of horticultural production to the household income. The model seeks to examine the interrelationship between socio-economic, and the household material expenditure condition in realization of the level of household income.

Production process variables are land, vegetable, other cash and food crops, marketing process and technical and social problems. All these components have got a primary relationship in one way or another towards the determination of household income. Household expenditure variables that relate to one another are housing conditions, assets, general household expenditures for example on food, health, education and saving. These expenditures also determine the level of household income from horticulture as well as the

standard of living. The secondary analysis is not explained in details because it deals mainly with background information.

1.6 Hypotheses

1.6.1 Conceptual hypothesis: Vegetable production has been carried out for the purpose of income generation and creation of employment opportunities by peri-urban dwellers.

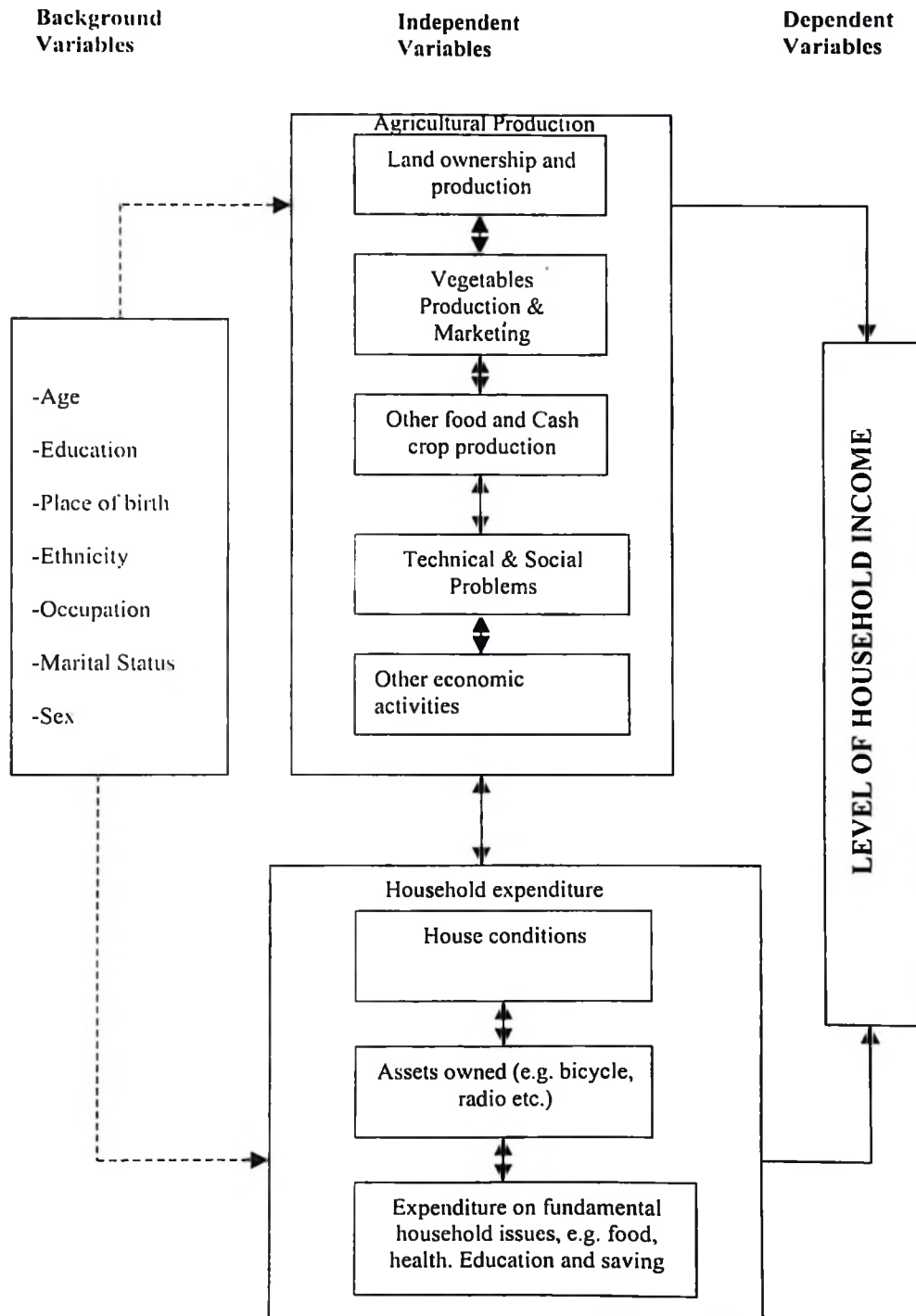
Operational hypothesis: 1) Peri-urban dwellers that are engaging in horticultural production are more likely to be self-employed and 2) Generating higher income throughout a year from vegetables than income from traditional cash crops and other economic activities.

1.6.2 Conceptual hypothesis: Vegetable production has been done in order to avoid land scarcity problems, the continuing cash crops' price decline and the current co-operative crisis.

Operational hypothesis: Households that have shifted to vegetable production are likely to enjoy less land conflicts, stable prices and decision making in marketing their produces than those who cultivate other cash and food crops for sell.

1.6.3 Conceptual hypothesis: Vegetable producers have benefited from profit maximization due to low production costs

Operational hypothesis: In Mwanza peri-urban areas,households' cost- benefit analysis is more likely to indicate good returns to vegetable production than to other crops and the rest of economic activities.



Conditional Variables: Residence = Mwanza peri-urban (MSHDP area)

Key: Relationship of Variable: = Primary analysis,
 Secondary analysis

Figure 1: The Conceptual framework for Determinants of Small- Scale Vegetable Production and Household Income.

1.6.4 Conceptual hypothesis: The Mwanza city's rapid growing population at 6% has been a potential market for vegetable products from Mwanza – peri-urban areas.

Operational hypothesis: Mwanza peri-urban vegetable growers face high demand for their produces from Mwanza city based markets than outside available markets.

1.7 Delimitation

This study has focused on the micro-economy level of the individual households. In order to keep the survey manageable, the study concentrates on the direct importance of the household garden to the peri-urban households in the sense of providing direct income or expenditure savings, employment and marketing processes. The reasons why gardening is undertaken or not, are not examined. However, information on the set-ups of the households, gender aspects, food security and nutrition would need to be set into the context.

Indirect issues such as environment and water availability, health risks and genetic resources, are in themselves quite complex to study so is kept outside the general focus of the work though they are retained for assembling general contextual remarks.

1.8 Definitions of key terms

Peri-urban zone: The location definition is more problematic (Mougeot, 2000). Peri-urban locations are in closer contact with rural areas and tend to undergo, over a given

period of time, more dramatic agricultural changes than do locations in more central and built-up parts of the city. Stevenson *et al.* (1996) contend that this outer boundary varies, depending on the reach of those urban influences with the greatest impact on the production system considered. Lourenco-Lindell (1995) used the area within which people, living in the location of the city's administrative boundaries, can travel in and out to engage in agricultural activities. Mougeot (2000) used the maximum distance, which urban residents could travel to their farms in the peri-urban area on a daily basis. However, in relation to this study, peri-urban areas are the places whereby all rural way of living may be found with little urban flavour such as decent houses and working in urban centers as employees.

Household: In this study, a household is the unit of inquiry. It is that group of persons who live and eat together and share common living arrangements (URT, 1994). A normal household consists of a husband, wife, and their children, but can also include other persons, relatives and domestic servants provided they live together and eat most meals together. A household can consist of one person to very many people. A household should not be confused with a family group. In demography a "household" refers to a co residential unit, whereas the "family" refers to a group of individuals related by blood marriage, or adoption (Mwageni, 1996). If two families live together for instance husband, wife, and children and married son (or brother) and his wife and children, and regularly eat together, then they constitute one household. But, in economic literature the two words are used interchangeably and sometimes combined into the term "family household. Special care should be taken with polygamous relationships. Wives can form separate households and the husband should be associated with the wife where he spends most of the time.

Head of household: mainly is the person recognized as such by the rest of the members of the household to be their head. Often he/she is responsible for financial support and social welfare of the household members.

Household dwelling unit: is all the living space occupied by one household regardless of the physical arrangement or facilities available. It may be a room occupied by lodgers or it may be one, two or more housing units occupied by an extended family or household.

Household income: includes any cash received by the household during the 12 months preceding the survey, which has been earned in form of wages, salaries or cash from products sold.

Vegetables: Considering their diverse nature, it is very difficult to come up with a single acceptable, all-encompassing definition of vegetables. Definitions of the word “vegetable” are generally based on their use. A vegetable could thus be defined as an edible, usually a succulent plant or a portion of it eaten with staples as a main course or as a supplementary food in cooked or raw form (AVRDC, 1992).

Horticulture: is usually defined as the art of gardening or the cultivation of fruits, vegetables and flowers. Horticulture stems from the Latin word, “*hortus*” which means the same as the old English word “garden”, namely enclosed area-surrounded by a fence, hedge or wall for growing crops including the house within but when is at large scale may be grown outside the house compound (Verheij, 1982).

1.9 Summary

This chapter presented the background information on the subject of small-scale horticultural production and household income. It highlighted the magnitude of horticultural production from the broader and narrow perspectives. The chapter also presented the research problem, study's economic importance, research objectives and its hypotheses to be tested. The chapter ended up by defining some of the key terms used in the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

In this chapter literature on horticultural production as an industry is reviewed. Firstly, the peri-urban concept is defined followed by a description of the world horticultural performance. Secondly the chapter looks at horticulture and household economy in terms of income generation and employment creation, horticulture and marketing process, community development, gender, nutrition and environment issues. Finally, the status of research in horticultural production in Tanzania is presented.

2.2 Peri-urban concept

The term peri-urban in relation to location definition is more problematic as stated before (see section 1.8). Authors have been trying to delienate the outer boundaries of the peri-urban areas of 30 km (Mougeot, 2000). Stevenson *et al.*, (1996) consider a peri-urban as the maximum distance within which a given per centage of producers can sell their crop at farm-gate close to an urban area. How far from the city this outer limit will be drawn will depend on the level of development of the local road infrastructure and transportation costs: 10 km wide in Bissau, Guinea-Bissau, but 20 km in Brazzaville, Dar es Salaam or Kumasi (NRI 1995) and at least 90 km away from Metro Manila (Ali & Porciuncula 1999 as cited by Mougeot 2000). But in general the question of distance depends on the size of the particular urban center from town to town or city to city including economic level of the country. For example in Mwanza city, the whole area of Mwanza district is located as Mwanza peri-urban area (MSHDP, 1998). So this concept varies from town to town.

2.3 Horticulture in world perspective

Most urban/peri-urban agriculture field studies have been carried out in large urban centers, national capitals or secondary cities; however, few actually differentiate between intra-and peri-urban locations (Mougeot 2000). Some studies have focused on specific categories, such as production systems based at home and open-space locations, (Freeman 1991; ENDA-ZW 1997 as cited by Mougeot 2000). In reality, the location of horticultural site or a garden depends on the climatic condition of a particular place.

In Sofia City-Bulgaria, 28% of households earned something from urban gardening. Official statistics show 1-2.6% of the total income in Sofia comes from this source, but this likely excludes a large number of the informally employed in agriculture (Nugent, 2000). A comprehensive household survey in Russia revealed that urban gardeners earned an average of 12% of their income from gardening in 1995. While in smaller cities the proportion of income earned was 10.6%, this is according to Seeth *et al.*, (1998) as cited by Nugent (1999). Based on average monthly income, the earnings from gardening in Russia are much higher in rural areas than in urban areas, but the poverty level is higher in the latter.

In African countries, it is generally the poor who are cultivating in urban and peri-urban areas as reported by Nugent (2000). But the Harare Survey of 720 households shows that the higher income farmers engage in more gardening and cropping activity such as maize growing, (ENDA 1999, cited by Nugent 2000). However, other research from Harare puts income earnings at 10% of total for the 40% of urban high-density area producers that sell their output Nugent (2000).

In several African cities, income earned by urban/peri-urban farmers was found to be a significant contributor to household maintenance. Horticultural activities in Lusaka produced an equivalent of the months' income at the average worker level in 1992 (15,000 Zambian Kwachas in 1992), but was extremely seasonal, (Drescher 1999, cited by Nugent 2000). An earlier study found that low-income households in Lusaka obtained one-third of their total food consumption from farming, (Sanyal 1986 cited in Tevera 1986).

In Kumasi (Ghana) and Lome (Togo), Abutiate (1995) states that, vegetable producers are classified according to time dedication, including three sub classes of part-time producers (urban night-security men, artisans, peri-urban absented farmers), full-time and year – round producers (hiring labour). In Bissau, Lourenco-lindell (1995) differentiates types of urban and peri-urban based on a combination of tenure modality. For instance in Kampala, stated by Maxwell (1995) and Accra-Ghana (Zakariah *et al.*, 1998) time allocation and product destination are used as criteria for classification of vegetable produces. Policy may benefit or affect the future of urban producers, depending on how they account for and intervene on those criteria, according to which particular groups of producers differentiate themselves from one place to another (Mougeot 2000). In Nairobi for example families in slum areas, although they sold relatively little and consumed their own output the standard of living exceeded that of neighboring non-farming families (Maxwell 1995).

2.4 Horticulture and income generation

For the urban poor who have low or irregular income from other sources, growing horticultural crops provide income. Another income 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. This is important, especially in cities of the developing countries where over 50 per cent of the family expenditure is for food (Maxwell & Zziwa, 1993), Ethelston 1992, Maxwell 1994). Urban and peri-urban agriculture also provide job for the poor and income for the sustainability of the disadvantaged groups like women, youth and the older population.

Mlozi (1995) comments that, most studies suggest that low income farmers in developing countries do the most urban/peri-urban agriculture, because growing their own food is the only way they can survive in the metropolis. In this way, urban agriculture decreases poverty and malnutrition for the people because in cities today, poor families supplement their food requirement through consumption of horticultural products from small homestead gardens (Mlozi 1995).

2.5 Horticulture and employment creation

Income/employment are the top most reasons for cultivating fruits and vegetables in the peri-urban areas (Stevenson et al, 1994). In Havana city study, Novo & Murphy (2000) state that the development of vegetables in urban agriculture has created new employment opportunities. Overall the Cuban government estimates that 117,000 people work in urban agriculture and 26, 426 workers are employed in jobs related to urban agriculture. In 1998, urban agriculture mainly vegetable production accounted for six to seven per cent of the new jobs created. Lima *et al.*, (2000) adds that, the household income of many people working in urban agriculture in Mexico is actually higher than the national average salary. The primary reason is that, in those countries the level of farmers who are engaged in urban agriculture do practice modern farming techniques.

In Lima *et al.*, (2000), the Marshy Xochimilco zone in the Mexico City study, vegetable production generated around 12,000 jobs, proof enough that agricultural production still provides a significant benefit to the families involved. In the same study Lima *et al.* note that, in sub and peri-urban areas of the Mexico City, vegetable and legume production, accounts for up 80% of income. Today in developing countries, large numbers of jobless people have been employed themselves through urban and peri-urban horticultural production (Lima *et al.*, 2000) thus solving the problem of the unemployed people in urban areas.

2.6 Marketing of horticultural products

Agricultural production which is not directly consumed is either processed or marketed through various channels (Yoveva *et al.*, 2000) such as auction (in the case of non-perishables). Open markets (in the case of the more attractive goods). direct sales by producers, and middlemen who buy vegetables and fruits.

The Cagayan de Oro City Study in Philippine indicate that, marketing of horticultural products is mainly a women's task: 73% of vendors of agricultural products are women. Most vegetable vendors, on average earn about 25% over their capital outlays (Potutan *et al.*, 1998). Yoveva *et al.*, (2000) in Sofia city study found that, the markets for horticultural produces are located in the densely populated urban quarters. Each of the central communities has at least one open market. The markets are managed by specialized municipal enterprises and strictly controlled by respective sanitary authorities.

2.7 Producers' marketing knowledge

Drechsel & Kunze (1999) state that, a lack of knowledge among small-scale urban and peri-urban farmers impedes their access to market or prevents them from producing for markets, even when it could be uncreative to do so. This can happen because small producers are not welcome at established markets, or because they do not know what consumers prefer or what prices their products would obtain in the official market. They also have little training or time to ensure high quality of their products, often only primitive means of packaging and transporting to market are applied. In addition they have little choice among market outlets, which is normally caused by the limited demand in some seasons. That is why some growers cultivate horticultural crops.

Potutan *et al.*, (2000) in the Cagayan de Ore city in Philippine observed that; to both farmers and sellers, the seasonality of vegetable supply is an issue. Among the farmers, 30% reported occasional oversupply of vegetables during the harvest season, 20% said they had problems with regard to limited market display area, and 13% said that middlemen dictate vegetable prices. However, at the market side, in some seasons especially in wet periods the horticultural produces is low because everybody in peri-urban wants to produce horticultural demand crops in order to cut off cost expenditure. Among the wholesalers, 40% mentioned lack of supply of vegetables as their primary concern, 20% remarked on limited display area in their market, and 13% mentioned cheap wholesale prices (Potutan *et al.*, 2000). Among the retailers, 23% mentioned lack of vegetable supply, 22% limited display areas in the market and 21% lack of capital.

However Potutan *et al.*, (2000) underscore that small-scale food processing from urban and peri-urban agricultural production can be promoted in the city with the City

Agriculture office – taking the lead role. The possible products are peanut butter, cashew nuts, banana chips, lonaniza sausage, tocino ham, papaya pickles and camote candy. On average, each vendor dealing with small-scale food processing earns about 35% over total cost. This indicates that generally marketing knowledge is the key determinant of profit maximization in relation to horticultural products.

2.8 Horticulture and community development

The impact of urban/peri-urban agriculture on urban community welfare is more documented than the impact on the rural counterparts. For example, in low-income urban districts of Bissau, Brazzaville and Nairobi, horticultural growers contribute to community welfare and funeral groups, and to formal and informal channels of food acquisition (Mougeot 1999). Horticulture production supplement seasonal income for other basic needs (processed food), link up with the food trade, produce food products otherwise unaffordable, reduce dependence on purchased food, enhance exchange entitlement and provide food gifts and meal sharing (Dennery, 1996).

Urban and peri-urban communities have been benefiting from community involvement in horticultural production. For instance in Bissau and Port-au-Prince cities, the frequent gifting of food by home producers strengthens reciprocity within assistance networks and reduces incidence of theft (Mougeot, 1999). Open-space producers also unwillingly contribute to curbing food insecurity through loss of crops, animals and other assets to theft, commonly reported in surveys (Lourenco-Lindel, 1995). Horticultural farming increases community interaction and improves community sense of awareness that enhances security and peace (Mlozi, 1995).

2.9 Gender aspects of horticultural production

A survey made in Turkey revealed that women who worked in traditional sectors and non-market activities received significantly lower incomes (Duchin & Sinha 1999, Esim 1999, as cited by Nugent 2000). A research in India shows that women make up a disproportionate share of unpaid helpers in household enterprises, and are concentrated more than men in the agricultural sector. Wages for women in agriculture averaged roughly to 20% of men's wages (Muagent, 2000).

Furthermore research data from India as stated by Mougeot (2000) indicate that, more women than men are involved in urban agriculture. However fewer and fewer women are depending on urban agricultural activities, which may be due to the availability of other income generating activities, either formal or informal, which they can undertake within the context of other household duties. Agricultural activities do, though, remain a significant employment opportunity for the urban female workforce. Male employment in casual farm labour decreased as more males took up urban-based casual employment, particularly construction work (Mougeot, 2000).

Traditionally, both women and men are responsible for providing food for the household, but it is also understood that women have a greater responsibility. Both men and women farm, but their participation are clearly differentiated by the location of the field, (Mascarenhas 1995, cited by Jacobi *et al.*, 2000) and are thus closely related to the horticultural production system. Because of cultural aspects which hinder women to be involved in large scale production, women horticultural farmers are more numerous, producing on a micro-scale. In terms of yield produced, men are in the forefront as they occupy the larger plot (Jacobi *et al.*, 2000).

There is a strong link between the socio-economic status of the family and the objective of the production and the involvement of women. In poor urban households, women produce mainly for subsistence; very little produce is sold in the market place (Kogi-makau 1995). In medium-income households, both men and women are involved and they produce for both subsistence and sales (Jacobi *et al.*, 2000). In higher income households production market-oriented it takes place in open spaces and is clearly dominated by men. In the peri-urban production system, both men and women play a role, but more equality is found in farms outside the city, where the situation is similar to the situation in rural households (Mascarenhas, 1994).

The differentiation of agricultural activities does not make the difference, but the location, magnitude of enterprise and orientation of production does. Farmers in open spaces are men and farming is their main profession. Usually no other family member is involved, (Kiango & Likoko 1996 as cited by Jacobi *et al.*, 2000). Plot size correlates with the single labour force, in contrast, women usually tend to home gardens, as these are more easily combined with reproductive roles namely care for children, old and sick family members.

Female agriculture renders more benefit for the household because the produce is either directly consumed in the family or the income obtained is spent on the basic needs of the family, men contribute part of their earnings, but the share is less (Jacobi *et al.*, 2000). Access to land is a crucial issue to gender equality in urban agriculture. Significantly fewer women than men own land or houses as cited by Jacobi *et al.*, (2000), Mascarenhas (1995) found that local leaders are less likely to allocate land to women in informal land distribution systems since women are culturally excluded from possessing land.

In general, Africa has the largest proportion of women compared to Asia, and Europe who are involved in urban agriculture, except in Dakar and Accra, where men make up the majority of urban farmers (Armar Klemesu & Maxwell 1999 cited in Nugent 2000). In Harare and other cities where urban agriculture has less official support as a sector, women provide most of the work. This derives from their responsibility for household food provision and preparation (Mugent, 2000).

2.10 Horticulture and nutrition improvement

Food growing in the cities can and does help to improve the quality of people's diets by providing fresh fruits and vegetables, particularly to people in the low-income bracket (Armar-Klemesu 2000). The Cagayan de Ore study in Philippine, (Potutan *et al.* 2000) shows that urban farmers generally eat more vegetables than non-urban farmers of the same wealth class and consumers from a higher wealth-class (who consume more meat). Urban dwellers in most cities in the developing countries have a higher dependency on ready – prepared meals, popularly referred to as “street food”. Vending of street food has become an important component of the urban food supply system (Armar-Klemesu 2000). Local food production can be an important source of supply of fresh vegetables for street food preparation.

However, the level of understanding especially on matters pertaining to nutrition improvement contributes to the health performance level among people from one place to another. For example again, Potutan *et al.*, (1998) study in Cagayan de Oro-Philippine shows that, vegetables are considered a “poor man's food” rather than a “luxury food”. There are two factors associated with this, first compared to meat and fish, vegetables are cheaper in the city. Second, vegetables are readily accessible, as they are widely grown in

backyards, small farm lots and school gardens (Potatan *et al.*, 2000). In general horticultural production has proved to be a very important aspect in raising the nutritional status among the urban dwellers.

2.11 Urban environment and horticultural production

Armar-Klemesu (1999) argues that, health issues in urban agriculture are mainly related to pollution, both chemical and biological, of food prior to harvesting and possible contamination of horticultural produces during marketing and distribution. Human and environmental health risks of inappropriate urban horticultural practices arise from the following: poor handling of agrochemical by producers result into health problems, crop selection or location without due regard to the ambient pollution in the air, soil or water also contributes to environmental pollution. Livestock production, application of unsorted or insufficiently treated solid and liquid organic wastes to vulnerable crops and poor handling during marketing and distribution both affect environment and people's health. In most cities in the developing world, water bodies may be the only source of irrigation.

In Nairobi, the majority of plots farmed are located along the Nairobi River, which is heavily contaminated with both industrial and human waste (Foeken & Mwangi 2000 as quoted by Armar-Klemesu 2000). Studies carried out in Accra showed a high incidence of faecal pollution and microbial contamination along the banks of streams and rivers drainage used for watering vegetables (Amuzu & Leitmann 1992). In related studies on food contamination, lettuce was found to contain the highest levels of contamination of all vegetables examined in Accra (Acetone 1997, Abdul-Raouf *et al.*, 1993). This is not surprising finding, as lettuce is a low-growing crop, the edible parts of which are likely to

be directly contaminated if irrigated with dirty water (Armar-Klemesu 2000). In general terms, urban and peri-urban agriculture contributes to preserving open spaces, improving the urban and peri-urban microclimate, beautifying the city and preventing illegal dumpsites and squatting. In urban/peri-urban agriculture, a major concern is the quality of crops from urban and peri-urban areas (Jacobi *et al.*, 2000).

2.12 General observations

Authors have been calling for a regulation of urban food systems and for urban agriculture policies to target vulnerable groups, in order to effectively strengthen local sustainability and equity through activities such as horticulture. (Smith, 1998). Maxwell (1999) argues that the relative invisibility of urban food security as a political issue in Africa may be due to governments still perceiving this as a household-level responsibility. Pothukuchi & Kaufman (1999) noted that there are city institutions in Ghana that can address urban food systems in relation to horticultural production such as the city department of food, food policy council and the city-planning department.

Northern countries' own governments are increasingly being criticized for having agricultural/production policies instead of genuine food policies (Allen 1999, MacRae 1999). The depoliticization of food is contributed by the lack of data, understanding and policy on local food systems (Dahlberg 1998). The application of U.S.A.'s Community Food Security Act to urban community agriculture and horticultural projects since 1996, is a step in the right direction towards the recognition of urban farmers and may provide a useful reference (Pothukuch & Kaufman 1999), as well as growing public lobbying for a healthier food policy in Britain (Lang, 1999). Several agricultural departments do extend technical extension to urban and peri-urban areas. This should be adopted, through

research and training to urban/peri-urban conditions and needs of urban farmers. There is a good range of experiences with economic incentives (tax alleviation, input subsidies), but much less on model health and land use codes, (Mougeot, 2000). In general it is high time now for the issues of urban/peri-urban agriculture to be taken into policy consideration during the urban planning.

2.13 Research status in peri-urban agriculture in Tanzania

In Tanzania, urban vegetable production is carried out in three spatial environment systems, the peri-urban, open spaces and home backyard garden (Mlozi, 1998). Mlozi notes that, several studies on vegetable production show that open spaces produce vegetables for sale while the back yard gardens are for home consumption. Jacobi (1997) and Stevenson et al (1996) found that the urban, peri-urban and rural zones complemented each other in supplying specific produce to the city of Dar es Salaam. Tomatoes, African egg-plant, cabbage and onions come from rural locations; eggplant and okra from peri-urban, sweet pepper from urban and peri-urban, and hot pepper from peri-urban and rural locations.

However, urban and peri-urban fruit and vegetable production is relatively new activity for many cultivators. The study carried out by Stevenson, Kinabo & Nyange (1994) in Dar es Salaam indicate that; between 40% and 63% of all of the cultivators included in the survey begun to cultivate fruits and or vegetable at the average of five years of their settlement. Plot sizes for vegetable production vary widely, ranging from between 10 and 100 m² to as much as 500 m² in Dar es salaam depending on the population density of the district (Jacobi and Amend, 1997, Jacobi 1997, Kogi-Makau, 1997). Other studies (Sawio, 1993 and Stevenson et al 1994 as cited by Mlozi 1998) show that despite the

city's potential, the development of horticultural crops has been poor. It has been said that horticulture production in the city is constrained by both technical and socio-economic factors (Mlozi. 1998). The aspect of technical constrain, is the one which brings about many socio-economic problems and health risks to the community in most of urban/peri-urban areas in Tanzania. Despite existing laws to control air, water and soil pollution, there is no strict enforcement in Dar es Salaam (Ceest 1996). Sewage is usually discharged untreated into urban streams or rivers. Roadside garages' disposing of oil on the ground is a common sight. The traffic is ever increasing and no unleaded fuel is available.

Three surveys in Dar-es-Salaam analyzed the level of carbon oxide (CO₂), suspended particulate matters (SPM) and Sulphur dioxide (SO₂) in the air (JICA 1994, NEMC 1994). The results were contradictory: concentrations for CO₂, SPM and SO₂ both exceeded and remained within World Health Organization (WHO) standards, depending on the study. However, with ever increasing (private) transport, the situation will deteriorate if exhaust levels remain unchecked.

The level of water pollution in different streams in Dar es Salaam was also assessed (Qamara & Othman 1996, Sawio 1998 cited by Jacobi *et al.*, 2000). The contamination with heavy metals (lead, cadmium and chrome) was within the Tanzania standards for irrigation water. The two rogue samples had higher concentrations of lead (Qamara & Othman 1996). Biological agents discharged from households and industries were also present in the water. Only in few samples were the concentrations higher than the recommended levels. One sample contained coli bacteria (Muster 1997, Sawio 1996, cited by Jacobi *et al.*, 2000).

Soils under agriculture contained only traces of heavy metals, which posed no risk for farming. In the immediate vicinity of a major road, however, higher than usual concentrations were detected, which might threaten cultivation in the future (Amend & Mwaisango 1998). Contamination of leafy vegetables by heavy metals was analyzed by Othman & Bahemuka (1996). Lead and cadmium were in excess in several samples, while copper and zinc were below the recommended limits in all samples. Urban horticultural production needs a serious attention in order to avoid environmental pollution and health risks, which can affect the lives of people in urban and peri-urban areas.

Stevenson *et al.*, (1994) in Dar es Salaam, Dodoma and Arusha towns study state that the reasons given by urban household cultivators themselves for producing fruits and vegetables are for home consumption to reduce food expenditure and for income or employment. The most common reasons is to reduce food expenditure/ home consumption and income/employment. Reducing food expenditure is probably the single most important reason since many of those who responded for home consumption are primarily interested in reducing food expenditure. This has been evidenced by a one-year survey in Dar es Salaam, the producers consumption habits showed that own vegetable production plays a role in vitamin A and C supply, as purchases of fruits and vegetables from the market are cut when the household budget is tight, Kogi-Makau (1998) cited by Armar-Klimesu (2000).

Urban agriculture is vital for Dar es Salaams' food supply, more than 90% of leafy vegetables (especially Amaranthus) come from the open spaces and home garden (Stevenson *et al.*, 1996). However, the major problem is on the people's willing ness to take vegetables and fruits as an important consumption pattern. This situation is the same

in most parties of Tanzania, especially in lake zones as well as in the coastal areas. Also in the areas where people keep livestock, people tend to think that vegetables are for poor people while fish and meat are for the rich. The situation is different in developed world whereby people favour vegetable and fruit foodstuff.

A peri-urban Vegetable Project (PUVeP) survey in Dar-es Salaam shows that among 302 pupils (average age 8 years and average weight 19 kg) found that 69% were malnourished. Among the malnourished children, only very few belonged to households with backyard gardens. Numerous children among the well-nourished group came from families who had backyard gardens and earned an adequate income from other source (PUVeP 1998, cited in Potutan *et al.*, 2000).

In Tanzania, it has been estimated that for poorer people, about 70-75% of the household budget is spent on food (CARE, 1998; Kongi-Makau, 1998 as cited by Jacobi *et al.*, 2000). Those studies found that about 20% of the food budget in Tanzania is spent on vegetable and fruit. This suggests that any contribution from home production has a direct impact either on nutrition level of the family or on the budget by reducing expenditures or earning additional income. Savings can be between 5-7% of a low-income household budget (Jacobi, 2000).

Open-space production is often a full-time activity and contributes considerably to the family income. Jacobi (1996) projected that 500 m² of intensive African Spinach (*Amaranthus ssp*) production is comparable to a basic government salary (about US \$ 60 or 45 000 Tanzanian shillings/month), but the minimum salary in Tanzania during the study was T.shs 30 000. The same applies to maintaining one or two dairy cows in Dar es

Salaam and a well-maintained home garden of 720 m² (Mlozi 1998). The frequency of harvest for most open-space producers for instance *Amaranthus* earn more because they cultivate larger areas. Review of literature, reveals that horticultural production is one of the profitable income generating activities. Stevenson *et al.*, (1996) in the study conducted in Dar es Salaam indicate that, the primary problem that peri urban farmers face in marketing their crops are related to oversupply. The second most frequently mentioned problem is the transportation of crops. Other marketing problems included being forced to consign crops to traders on a loan basis (payment), and problem related to market infrastructure. However in Tanzania the study by Mascarenhas (1994) shows that in relation to gender the situation in urban areas is slightly better for women, which gives them a chance to demand a more equitable share of urban resources. However, the constraints still outweigh the opportunities.

2.14 Summary

This chapter presented a review of the literature on horticulture production from world perspective to the Tanzanian context. First the horticultural world performance in relation to socio-economic factors was discussed. This was linked to horticulture and household economy with income generation, employment creation, marketing process, gender, environmental issues and nutritional importance.

The Tanzanian experience has been discussed in order to review the current performance of horticultural production. From the comparison between world situation and the Tanzanian context, research gaps such as level of job creation, marketing process, urban concentration and economic contribution recognition were identified. In chapter three the methodology employed in data collection, processing and analysis is presented.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Overview

The purpose of this chapter is to describe the study area and the methodology employed in data collection and analysis. Section 3.2 describes the study location and justification for its selection. In Section 3.3 the research design is described while sampling procedures of the study population is described in Section 3.4. Section 3.5 outlines the data collection process and finally, Section 3.6 presents the data processing and analysis

3.2 Study location and justification for its selection

Mwanza Region lies in the northern part of Tanzania, located between latitude 1°30' and 3° South of Equator and between longitude 31°45' and 34°10' East of Greenwich. At the North West it borders Kagera region, Shinyanga region at South East and Mara region at its North East. Mwanza occupies 2.3% of the total land area of Tanzania Mainland. Mwanza region occupies a total of 35,187 sq km, out of this 43% of the region's surface area is occupied by water which is Lake Victoria (Mwanza Socio-economic Profile, 1997). In 2001 Mwanza region had seven districts namely Magu, Kwimba, Misungwi, Geita, Sengerema, Ukerewe, and Mwanza. The region has 33 divisions; 168 wards, and 682 villages.

Administratively, the former Mwanza district now (2002) is divided into two districts of Ilemela and Nyamagana both are in Mwanza peri-urban areas. Generally the district has two divisions, 20 wards and 17 villages (peri-urban). Mwanza peri-urban area was appropriate for this study because of the following reasons: horticultural production was

given a top priority since 1998 to date- when compared with other crops like cotton and paddy, which were used to be the main source of cash (MSHDP, 1998). The relative importance of vegetables in meeting household needs is greater than other areas even though Mwanza in the Lake zone/Lake shores is endowed with livestock keeping and fishing as the major component of the household income system (MSHDP – 1998).

From 1998 to March 2001, Mwanza peri-urban areas benefited from the services of MSHDP. The project aimed at the promotion to horticultural activities (MSHDP 1998, 1999). Mwanza is a new city with effect from the year 2000, there is no single study, which has been conducted with regard to horticultural production, so this study will lay a foundation for other studies. Many studies on vegetable production have been done in Dar es Salaam, Arusha, Dodoma and Morogoro (Stevenson 1996; Stevenson et al. 1996; and Mlozi 1998). In order to understand more about the study area location, the details of the surveyed areas are shown at Figures 2 and 3. The following subsections provide details about Mwanza region:

3.2.1 Population

According to 2002 Population and Housing Census “General Report” as taken from Tanzania National Website (URT, 2003). Mwanza region population was about 8.5% of total population of Tanzania which was 34 569 232. In the same report Mwanza population was 2 942 148, this survey was conducted in Nyamagana district which has a population of 210 735 and Ilemela district with 265 911 people that makes a sub total of 476 646 population. The Tanzanian population growth rate is 2.9% compared to 3.2% of Mwanza region. The population density in Mwanza region is 150 square km and average household size is 5.9 people.

3.2.2 Climate

Mwanza climatic condition is a tropical type marked by two seasons, the dry season and the wet season. The wet season is further divided into the short rains (October to December) and the long rains (March to May). The rainfall pattern is erratic. The average is 930 mm per year. It is wetter in the west and the western parts of Ukerewe Island where rains reach as high as 1 800 mm and drier towards the south and the southeastern where the rainfall average falls to 750 mm per annum. The average temperature is 31⁰C.

3.2.3 Agro-ecological zones

This has been categorized into 6 agro-ecological zones namely:

- Zone I High rainfall, low population density. Soils are of fair fertility normally Brown yellow/red loamy sands, which are well drained.
- Zone II High rainfall high population density. Soils of good fertility normally red to yellow red, sandy clay loams widely cultivated. Also has poorly drained and wet loamy sands and black clays.
- Zone III Low rainfall, high population density- “The Sukuma Heartlands” zone. Soils of the “Sukuma Catena” of granite in selbergs at top progressing through yellow/red sands to loamy sands and clays at valley bottom.
- Zone IV Moderate rainfall, moderate to high population density. Topographically, isolated hill masses and ridges with wide plains. Soils black waterlogged clays at valley bottom with small or large areas of sand at the top.
- Zone V Low rainfall, moderate population density. Soils almost exclusively waterlogged loamy soils and black clays.

Zone VI Very high rainfall, very high population density soils sandy. Therefore horticultural activities take place in Zones IV, V, and VI.

3.2.4 Socio-economic aspects

Those are economic factors such as natural resources agricultural systems and industries, so that, when interacting with human factors they bring about social change. In Mwanza region peasant subsistence food production includes maize and cassava. Cash crops constitutes mainly cotton. Production technology is low and there are no commercial farms. This situation leads the region to sometimes import food from other regions of Tanzania. On social services such as electricity, 5.4% of households had electricity (1988 Population Census). In Mwanza region, there are tourists attractions such as Saa Nane and Rubondo islands' game reserves which also contribute to the regional economy.

Source of unit, Mwanza city council, P.O. Box 1333 Mwanza

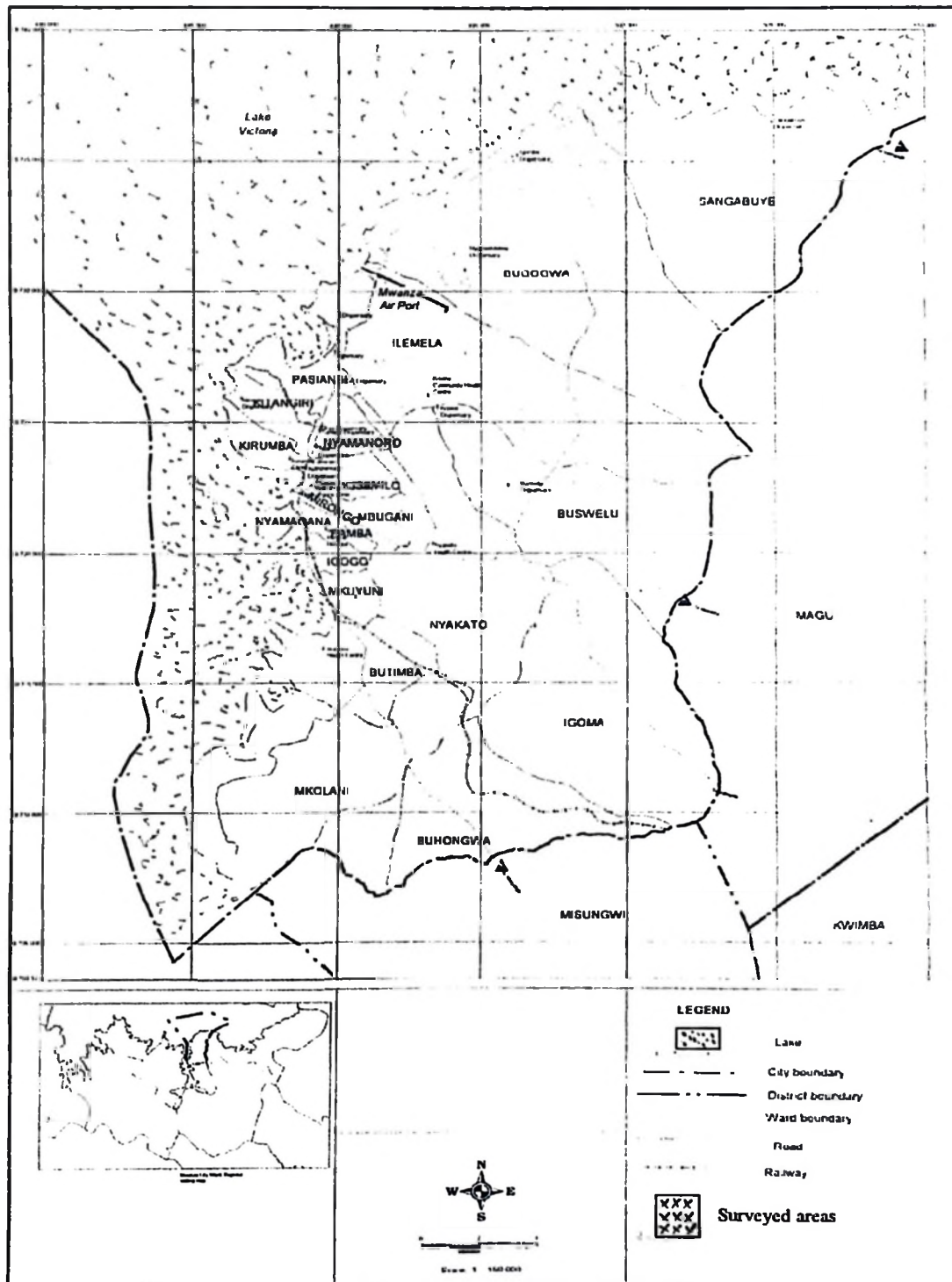


Figure 3, Map of Mwanza urban/peri-urban
Source: GIS Mwanza city council - April 2002

3.3 Research design

The research design for this study was a cross-section where data was collected at a single point in time from a sample selected to represent some larger population by using survey method. The reason for choosing this design was simply because: it was flexible, economic and according to the nature of this study, it minimized bias and maximized the reliability of data collection and analysis.

3.4 Sampling procedures

3.4.1 Study population

The study population consisted of small-scale vegetable farmers in the peri-urban areas of Mwanza city particularly in the villages of Buswelu, Nyamadoke Kahama, Igogwe and Nyamwilolelwa at the outskirts of Mwanza city where the Mwanza Small-holder Horticultural Development Project (MSHDP) operated.

3.4.2 Sample size

As far as this study was concerned, a household was considered to be an appropriate sampling unit, because it has a direct relationship with the central issue of the study area “contribution to household” as a basic unit of analysis. The study covered a total of 134 horticultural growers from the area of operation of the phased out MSHDP. All of the 134 respondents were sampled from 400, vegetable growers who were the beneficiaries of MSHDP also engaging in other economic activities. The study involved both sexes men and women. The choice of this sample size was dictated by the limitations of the study population (400) time, resources, accuracy and the need to ensure sufficient numbers for

meaningful subgroup analysis. The sampling proportion is 1 into 4 people, which adequately represents the study population.

3.4.3 Sampling methods and justification

Probability sampling technique was used in determining the significance of results from a finite study population of 400 MSHDP beneficiaries. The sampling of the respondents was done by taking one farmer out of four among the horticultural farmers in each village depending on the available number of farmers. The random sampling method gives each possible sample combination from the entire population an equal probability of being included in the sample.

3.5 Instrumentation

4.5.1 Questionnaire

Structured questionnaires were used for oral questioning of the respondents using both closed and open-ended questions. The questionnaires formulated in English were translated into Kiswahili to facilitate easy communication during data collection. In this exercise, male and female household heads were eligible for interview, and the focus was to investigate the contribution of horticultural production in relation to the study's specific objectives. Questionnaires are found in Appendix I.

To ensure validity and reliability, the first draft of the survey instrument (questionnaires) was pre-tested to 10 small horticultural farmers and necessary corrections were done prior to final administration.

3.5.2 Administration of documents and records

Relevant secondary records such as Mwanza region profile, MSHDP records and statistical data were obtained from district, regional and city council offices. Informal discussions were also held with all relevant parties like district, regional and city officers as well as the grassroots' stakeholders like divisional, ward, village leaderships and heads of the households on the whole management of the survey exercise. The focus of the discussions was to get the picture of how the government authorities and individuals do perceive the issues of horticulture as an industry. The discussions were guided by the specific objectives of the study.

3.5.3 Data collection

The researcher assisted by a community based extension officer who acted as a research assistant during data collection. The extension officer was the Field Officer (FO) for Nyamwilolelwa Ward, one of the surveyed areas. The collected data were checked in the field before processing and analysis at Sokoine University of Agriculture Computer Center and Lake Zone Research Center-Ukiliguru Mwanza.

3.6 Data processing and analysis

The collected data were verified, summarized, coded and transferred to the computer code sheet for processing. Statistical Package for Social Sciences (SPSS/PC+) was used to determine descriptive statistics such as means, frequencies, percentages and coefficients of variability. The applied statistical test was ANOVA, which was used for nominal and ordinal variables analysis. Qualitative data were processed, categorized, summarized and presented in tabular form.

3.7 Problems encountered in the field

During the survey the following problems were encountered:

- a) Availability of funds was a big problem since this research was done on private sponsorship basis. So the researcher and one assistant used bicycles in data collection instead of a reliable transport such as a car.
- b) The horticultural farmers were scattered in various valleys in their respective villages as the location of the gardens depend on the availability of water. so to trace and find the farmers was very difficult.
- c) In most cases the community events interrupted the survey exercise; such as funerals, wedding, village open market day, respondents' person commitments, tradition security assemblies (sungusungu) and government leaders public meetings.
- d) The farmers doubted to mention their real income gained because of fear of being taxed by the government.

3.8 Summary

This chapter described the study area and presented the methodology used for collecting and analyzing the data. It began by presenting the study location and justification for its selection. Research design, sampling procedures and characteristics of respondents described on how the study was planned. Then, instrumentation, data processing and analysis are presented. The chapter ended up with the problems encountered in the field. The whole of chapter three explained on the details of the research methodology, which will be revealed in chapter four through is the discussion of the results.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Overview

In this chapter results of the study are presented and discussed. The discussion starts with the characteristics of respondents, identification of horticultural crops and its production process. Horticulture and employment is another section, which examines the situation in the surveyed area. The marketing process and horticultural income comparison against non-horticultural businesses are also discussed. The discussion ends up in examining horticulture and household expenditure.

4.2 Characteristics of respondents

This study was conducted in five randomly selected villages in the peri-urban areas of Mwanza city namely: Nyamadoke, Buswelu, Igogwe, Kahama and Nyamwilolelwa as indicated in Table 1. In those villages 134 randomly selected respondents of peri-urban gardeners growing vegetables and fruits were interviewed. The proportions of the respondents in respect of gender were 84.3% and 15.7% male and female respectively. The number of women who were horticultural growers was very small because of cultural barriers, and lack of land and capital.

Table 1: Distribution of respondents in surveyed areas

Area (Village)	Number of Respondents			Per cent of respondents (N=134)
	Total	Male	Female	
Nyamadoke	29	24	5	21.6
Buswelu	58	49	9	43.3
Igogwe	20	18	2	14.9
Kahama	12	10	2	9.0
Nyamwilolelwa	15	12	3	11.2
Total	134	113	21	100

Horticultural production as any other economic activity involves people of different background. This is due to the fact that horticultural production is an industry within agricultural sector. This study also investigated the respondents in order to know their background information as it has been shown in Table 2.

In Mwanza peri-urban the age class boundaries which are the most active in horticultural activities are 15-34 years, which makes 58.2% among the surveyed horticultural growers. This age group is followed by the 35-44 which makes 23.1%. The reason here is the nature of the activity itself needs a lot of energy and commitment. Watering of the crops by using canes is the toughest job because horticultural crops need water twice per day. Therefore it is very difficult for older people to engage themselves in horticultural activities.

Table 2: Background variables

Variable	Per cent % N=134
Age:	
15-24	26.9
25-34	31.3
35-44	23.1
45-54	13.4
55-64	3.7
Education:	
< Standard 7	16.4
Standard 7	56
Form VI	20.9
Certificate	3.0
Other	3.7
Place of birth:	
Rural	91.8
Urban	8.2
Ethnicity:	
Sukuma	95.5
Other	4.5
Occupation:	
Farming only	91
Teacher	3
Other	6
Marital status:	
Married	73.1
Single	10.4
Widowed	7.5
Divorced	3.7
Other	5.2

As far as education is concerned, the study revealed that 56% of the horticultural growers are standard seven leavers. Further more, in the surveyed areas the large number of horticultural growers was Sukuma (91.8%) by tribe and about $\frac{3}{4}$ were married. The farmer status was that 71.6% were natives, 26.9% settled immigrants and only 1.5% were work immigrants. Table 2 shows that only 8.2% of the respondents in Mwanza peri-urban were of urban origin.

Horticultural production needs high degree of specialization because in most cases people who are engaged in this business have no time of doing other economic activities. This is because horticultural activities are very demanding and time consuming. In Mwanza peri-urban areas, the survey indicates that only 9% of the horticultural growers were involved in other activities such as teaching and commercial businesses.

4.3 Types and production process of horticultural crops

The purpose of one of the specific objectives was to determine the types of horticultural crops grown in peri-urban areas of Mwanza city. This section will attempt to examine one of the hypothesis of the study stated earlier (see section 1.6.2) that vegetable production has been done in order to avoid land scarcity problems, the continuing cash crop' price decline and the current co-operative crisis. In order to know that the respondents were asked to give details on the main horticultural crops grown, pests and diseases control and the challenges facing horticultural producers.

4.3.1 Main horticultural crops grown

In the survey, 86.6% of vegetable growers, used their plots for cultivating cabbage, and 82% used for growing tomato (see Table 3). About 62.9% of farmers grew amaranthus while 20.9% farmers were interested in growing other vegetables such as egg-plants and hot pepper. In Mwanza peri-urban areas, the horticulturalists grow cabbage, tomato, amaranthus and onions because, these crops have got higher demand at the market. That is why when MSHDP started; the project encouraged the horticultural growers to improve the production of those crops for income generating purposes. During the survey, among the four crops, the respondents stated that growing tomato is more expensive because it needs big capital in comparison with other crops.

Table 3: Main vegetable types and fruits grown in the surveyed areas

Crop type	Number of respondents	Per centage
<u>Vegetables:</u>		
Cabbage	117	86.6
Tomato	110	81.1
Amaranthus	83	62.9
Onions	60	44.8
Carrot	43	32.1
Chinese cabbage	37	27.6
Egg-plant	19	14.2
Hot pepper	9	6.7
<u>Fruits:</u>		
Paw-paw	94	72.9
Banana	55	42.6
Orange	44	34.4
Mango	25	19.5
Guava	18	13.4

Note: The total number of the respondents more than 124 because the analysis was done by assessing the total number of respondents against each crop.

However, Mwanza peri-urban horticultural growers grow also carrot, chinese cabbage, egg-plant and hot pepper, those crops are grown in a small scale because of its low demand at the market. The targeted consumers of chinese cabbage, carrot and hot pepper are big hotels and the Indian community in Mwanza city as the rest of the consumers do not prefer those crops.

As far as the production of fruits is concerned, 72.9% were growing paw paws. In Mwanza peri urban most of the families have several fruit trees. So fruit growers in the surveyed areas stated that it was economical to grow paw-paws because it takes only one year to give its first fruits. That is why paw-paw is one of the highly ranked horticultural

fruit tree in Mwanza peri-urban. The reason behind for many farmers not growing mango trees is that it takes three to four years to get the first fruits, so it is a long term crop which horticultural growers do not prefer. Another reason is the fact that, some farmers have small plots for gardens and hire the plots from the landlords, who might not allow them to grow permanent fruit-trees.

Banana is another fruit, which is doing well, as 42.6% of the respondents had banana plants. In the surveyed areas each household at least have had a plot planted banana, the reason behind is because the indigenous farmers do not consider green banana as staple food for their main menu as it has been used to be in regions like Kagera and Kilimanjaro. Maize flour used for cooking ugali and is the main staple food for the Sukuma people and the survey shows that banana is consumed only as fruits. Orange and guava are grown by a small number of farmers as they take long time to get the first fruits. Another reason is that because of the climatic condition, the quality of the fruits produced is poor, so the consumers do prefer to buy oranges from Arusha, Morogoro and Tanga.

4.3.2 Land used for horticultural production

In the study areas land ownership is based on private small plots. Reliable land for horticultural production is very limited. The question of land is very sensitive because the majority of horticultural producers access land through clan ownership rights. In order to determine land use pattern the respondents were asked to state what proportion of land is used for horticulture. The summary of the distribution is presented in Table 4 as the land proportion, which was used for horticultural production, and less than 25% was 17.9% of the respondents' land. In the survey it was revealed that 32.8% of the surveyed horticultural growers used land proportion, which was between 25% and 50%. For easy

analysis the land proportions are respectively treated as less than quarter, between quarter and half; between half and three quarters and over three quarters (the last category combines 75-99% and 100%). See Table 4.

Table 4: Per centage of land used for horticultural production

Land proportion	Per centage (N = 134)
Less than $\frac{1}{4}$	17.9
$\frac{1}{4}$ - $\frac{1}{2}$	32.8
$\frac{1}{2}$ - $\frac{3}{4}$	26.1
Over $\frac{3}{4}$	23.3
Total	100.00

Among 134 respondents, only 23.3% used over $\frac{3}{4}$ of their land/plots for horticultural production of which 9% used all their land. This is a small proportion of population and the reality is that those gardeners are the immigrants to the areas. They normally hired the plots from the landlords and therefore used all their areas for horticultural production. Due to the fact that many gardeners are small-scale producers, the survey revealed that about 50% of the horticultural producers use less than half of their land for horticultural production and rest of the land used for cultivation of other crops.

4.3.3 Pests and diseases control

The study revealed that pests and diseases are the key problems, which affect the production of horticultural crops in the area as it has been indicated in Table 5. In order to overcome the pests' problem farmers have been using pesticides. The farmers stated that in most cases if they don't apply the pesticides they get poor yields and sometimes no yields at all. However, Armar-Klemesu (1999) urges that, health issues in urban areas are

mainly related to agriculture pollution, both chemical and biological. Possible produce's contamination occurs during marketing and distribution processes. In the peri-urban areas of Mwanza city the use of strong pesticides is common and high especially in places like Buswelu and Nyamadoke. In order to reduce the environmental pollution through the use of strong pesticides, Mwanza Smallholder Project tried to educate farmers on how to use alternative methods such as using biological pest control techniques; but the farmers' responses were low, and slow.

Table 5: Pesticides commonly used in the surveyed areas

Pesticides type	Per cent of farmers
Thionex	59.0
Brovo	41.8
Antracol	38.1
Corbox	36.6
Ridomil	33.6
Diellthin	29.9
Sumithion	20.1
Fenom	16.4
Selecrom	7.5
Thiodan	6.0
Shelper	4.5

Note: The per centage of farmers has been arrived through summing up the number of farmers who use the same pesticide type in terms of frequencies

According to Table 5, the most common pesticide in the areas is Thionex as more than half of farmers do apply. The reason behind is because Thionex is cheaper compared to other pesticides. One litre of Thionex costs Tshs 6 000 while for pesticides such as Antracol, Sumithion, Brovo, Corbox and Redomil, its costs range between Tshs 8 000 and

10000 (MSHDP, 1998, 1999). For the farmer to access the pesticides the horticultural inputs-sellers have to portion the pesticides into small units so as to enable the farmers afford to buy according to their requirements. The small units are sold at the price of Tshs 300-500. However, pesticides such as Shelper and Thiodan are not commonly used because are not effective to the pests and diseases in the area.

However, there is no evidence from this study which pinpoints direct the continuing cash crops' price decline and the current co-operative crisis. With the exception of land scarcity problems, the study revealed no significant associations which implies that the key factor of the horticultural crops being grown in the Mwanza peri-urban areas is due to the field crops price decline and co-operative crisis despite the fact that there are some elements of land scarcity. Therefore this has no sufficient evidence from the study to support the above hypothesis.

4.4 Horticulture and employment status

The leading hypothesis in this part is suggesting that vegetable production has been carried out for the purpose of income generation and creation of employment opportunities. The purpose of this part is to measure the employment status among the peri-urban dwellers of Mwanza city in order to know the economic contribution of horticulture to the household. The details such as classification of employment, employment at family level, sustainability of horticultural employment and gender and the created employment opportunities are described.

4.4.1 Classification of employment

The study reveals that, in Mwanza peri-urban areas people earn their living through various forms of employment. However horticulture is the leading economic activity as it has been presented in at Table 6. General or field farming is second economic activity in priority. General farming refers to both cash and food crops production. The third activity was private small businesses.

Table 6: Distribution of respondents by employment category

Employment category	Per cent (N= 134)
Horticulture	45.5
Other cash crops	23.1
Run own Business	11.2
Private company	7.5
Livestock keeping	4.5
Day workers	3.7
Parastatal	1.5
Government	1.5
Fishing	0.7
Fish industry	0.7
Total	100.0

Other important forms of employment in the area are private businesses and employment in private companies, for instance in the industries situated in the Mwanza city. Those who walk around in the streets and peri-urban centers for selling various items (commonly known as ‘marching guys’ or day workers) were among the minority. A few people were employees of Water Authority and Cooperatives Association of Mwanza; while another small group was employed in fishing and fish industry.

4.4.2 Employment at family level

As far as involvement in employment is concerned, the study revealed that all family members within the household benefited from horticultural employment. It was observed that, more than a quarter of households took horticulture as an employment to all household members as shown in Table 7.

Table 7: Involvement of household members in gardening

Who was involved	Per cent (N =134)
Father	56.0
All members of the household	25.4
Mother	9.7
Male children	3.7
Other relatives	3.6
Employed labour	0.7
Female children	0.7
Total	100

Regarding horticulture and gender, 56% of the respondents explained that the head of the family especially father of the households were the ones who took all the gardening responsibilities. Many respondents stated that at the household level men were responsible for all garden matters. But few of farmers favoured women for assistance of their garden activities. In the study area the respondents stated that very few female children work in the gardens, compared to male children. A small number of the surveyed households stated that they involve other relatives in the gardening activities.

Generally the study shows that in most households it is the father who leads the whole horticultural production process. However the survey revealed that, there is unequal distribution of income among the family members, because during the survey, 80% women explained that always men took the lion share of the horticultural earnings.

4.4.3 Sustainability of horticultural employment

Sustainability of horticultural activities at the household level depends on the participatory decision-making as well as ownership of gardening activities by the members of the household as it has been shown in Table 8. Majority of the respondents stated that, in the household, father and mother had the final say on the horticultural earnings as 50% of the respondents said both husband and wife do the decisions together. However, fathers have an upper hand than mothers. A small number said that the whole family or other family members make decisions. The respondents explained that, they have been able to achieve the women involvement through facilitation done by the MSHDP for three years; the project was aimed at building the capacities of horticulture farmers on various aspects including income generation and technical aspects.

Table 8: Final decisions for horticultural earnings

Who decides	Per cent (N = 134)
Both (Father/Mother)	50.0
Father	32.1
Mother	10.4
Family	4.5
Other family members	3.0
Total	100.0

4.4.4 Horticultural employment and women involvement

In this survey it was discovered that, horticultural activities are basically divided on gender basis. The study showed that women are more involved in the supervision of horticultural activities at the field level as presented in Table 9. But as the role and nature of activities changes towards earning money, the supervision role shifts from a woman to a man (husband). That is why activities such the selling of products and secure of markets involved only 2.2% of female in gardening.

In Mwanza peri-urban, gardening activities is becoming a long time occupation which enable farmers to earn their life. For example farmers have been getting money for buying school facilities such as uniforms and stationery from gardening (MSHDP, 1998,1999). Women regard horticultural activities as a source of income for household expenditure. Men take gardening as an economic activity, which enable them to achieve various personal development goals. So in all the surveyed areas, gardening was taken to be an industry, which engage people as a full time employment. However, the study revealed that 70.9% of the respondents supported the idea of using insecticides in order to get high yield, however, 26.1% of respondents showed their worry that, horticultural activities could be considered as source of pollution through the application of the insecticides and inorganic fertilizers.

Table 9: Role of wives in gardening

Role	Per cent (N= 122)
Supervision	47.0
Supply inputs	23.9
Transport vegetables	9.7
Other activities	9.0
Decision on what to produce	6.0
Sell products	2.2
Secure markets	2.2
Total	100

Note: This variable focused only on the married respondents (122)

4.4.8 Created employment opportunities

According to MSHDP, horticultural production facilitated the creation of employment opportunities for the project, non-project beneficiaries and casual labourers who were employed in various industries. In 2001, within the MSHDP project area, there were 677 horticultural growers among them 70.6% were male and 29.4% were female. In the 5 surveyed villages there were 397 gardeners and 1191 casual labourers or day workers who were employed on daily basis as shown in Table 10.

In the surveyed villages, MSHDP achieved to create employment for 2031 casual labourers for the whole project period. In summary, there are 1930 employment opportunities that have been created by horticultural industry in Mwanza peri-urban and urban areas. Its distribution is as follows: 397 Horticultural growers, 1191 Labourers; 71 whole sellers of vegetables; 271 Retailers (MSHDP, 2001).

Table 10: Employment creation

Village	Horticultural growers	Casual labourers
Buswelu	150	516
Nyamwilolelwa	55	291
Nyamadoke	115	180
Kahama	39	117
Igogwe	38	87
Total	397	1191

Source: MSHDP (2001) *Internal Evaluation Report*

One of the hypothesis of this study (see section 1.6.1) was that; vegetable production has been carried out for the purpose of income generation and creation of employment opportunities by Mwanza peri-urban dwellers. The result in Table 10 reveals that there is a reasonable number of employment opportunities created. Therefore one can argue that vegetable production contributed to the income generation and employment creation in Mwanza peri urban areas.

4.5 Vegetable marketing process

In this study one of the hypothesis suggests that the Mwanza city's rapid growing population at 6% has been a potential market for vegetable products from Mwanza peri-urban areas. Also, one of the specific objective was to determine the process of marketing of vegetable products among the smallholder vegetable growers. In order to understand the Mwanza peri-urban vegetable marketing process, it is important to go to the details of importance of marketing process, the main sellers of vegetable produce, means of transport to the market, key market places and the marketing challenges.

4.5.1 Importance of marketing process

In the study it was observed that, marketing processes aimed at the fulfillment of the farmers' production requirement through marketing. Horticultural growers realized the attainment of loss/profit accounts. In Mwanza district, this was achieved through the horticultural growers marketing outreach programme. The horticultural growers reported to use different marketing channels in selling of their vegetable. In fact there were influences of middlemen who contribute to the reduction of farmers profit as it has been indicated in Figure 4.

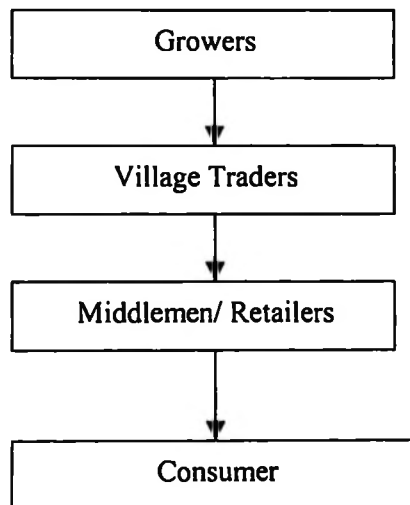


Figure 4: Marketing channels for MSHDP Producers

The marketing process is facilitated by the following functions:

- (a) to develop and improve marketing systems by coordinating activities such as product consolidation, improved storage and shared transportation.
- (b) to identify and implement appropriate technologies in product packaging, handling, transportation and storage.

- (c) to provide technical inputs on means of reducing product losses and improving quality.
- (d) to help identification of new market opportunities, facilitate the implementation of simple processing techniques such as drying or packing fruits and vegetables for the purpose of capturing new markets.

4.5.2 The main sellers of vegetable produce

In the survey it was observed that the majority of the respondents stated that the responsible sellers of vegetable produce at the household level were the husbands as Table 11 shows. This indicates that horticultural production process and marketing are still under the control of men. In gender perspective anything that brings income to the households is monitored by the head of the family, mostly men. (MSHDP, 1999). Only 15.7% of the respondents allowed children to sell their produces. A small number of the respondents indicated that, both wife and husband did the selling of produce, but 6.7% of the respondents stated that the selling of produces were done by the family. This means that any member of the family is empowered to sell the produces and bring back the income to the other family members especially the head of the family. Another observation was, the marketing process mainly depended on the farmers' knowledge aspect. Some horticultural growers gained good profit while others gained losses when sold their produces this is because of lack of marketing knowledge (MSHDP, 2001).

The good news is that, 7.5% of the gardeners were members of Farmer's Associations, so the responsible person in the sell of their produces represented them. This means that a few of the farmers organized themselves in groups and some of the group members sell the produces on behalf of their fellow members. In general the main sellers of horticultural

produces are the heads of the families and they are ones who decide joining in the associations. However, this number is likely to decrease in future when other groups/members in the families involve themselves in horticultural activities.

Table 11: Main sellers of vegetable produce

Responsible	Per cent (N=134)
Husband	37.3
Wife	20.9
Children	15.7
Both (W&H)	11.9
Farmer's Associations	7.5
Family	6.7
Total	100.0

4.5.3 Means of transport to the market

The survey revealed that there was a transport problem for marketing of horticultural products as indicated in Table 12. The respondents who were horticultural growers, commented that it was very difficult to take the produce to the reliable markets. About half of the respondents were using bicycles to take the produce to the market. A third of farmers joined together to hire vehicles for transporting their produces to the market while 11.2% used public transport.

The use of bicycles to carry their produce to the market implies that in Sukumaland this is a chief means of transport, this is because the topography is very flat. In addition, bicycle

as means of transport is cheaper than other means of transport. In general, this situation indicates that the level of production in the surveyed areas is of real small-scale category due to its nature of transactions volume.

Table 12: Means of transport to the market.

Transport means	Respondents	Per centage
Own bicycles	54	40.3
Hired bicycles	42	31.3
Hired vehicles	36	26.9
Public transport	15	11.2
Hired labourers	1	0.7
Own vehicles	1	0.7

Note: the number of respondents is 149 because some of them used more than one means of transport.

4.5.3 Key market places for horticultural produces

In general, the marketing process for horticultural produces is very complicated as indicated in Table 13. The survey revealed that, the marketing process and its sources is very fragmented due to the fact that there are numerous outlets. According to the survey, a large number of the gardeners sold their crops to the itinerary vendors, city wholesale markets and city retail markets. Those were the three leading market sources, as more than half of the horticultural growers sold their produces through those outlets.

About 13% of farmers marketed their products to various institutions in Mwanza city such as hospitals, hotels supermarkets, boarding schools and centers for street children simply

because, those institutions can afford to offer good price as they know the importance of fruits and vegetables with the exception of Indians in Mwanza city.

Table 13: Market place where produces were mostly sold

Market typ	Per cent (N= 134)
City wholesale market	26.1
Intinerary Vendors	26.1
City retail market	17.2
City supermarkets	9.0
Vendors and retailers	8.2
Other Institutions/Schools/children centers	4.5
Neighbours	3.0
Kiosk	3.0
Restaurants/Hotel	2.2
Hospitals	0.7
Total	100.0

Most people do not consume vegetables as per standards because majority of Lake zone people eat fish and meat. That is why, one of the objectives of MSHDP was to sensitize the Mwanza urban and peri-urban people to take fruits and vegetables as a top class nutrition's food as they value their traditional menu of meat and fish (MSHOP 1998).

Generally, the survey revealed that, the market points depend on the item, which a producer is selling as indicated in Table 14. The survey results show that, amaranthus and cabbage are crops, which have many market outlets than tomato. But tomato is the only crop, which has got a large proportion sold in Mwanza city markets. However, because of its perishability, amaranthus was the only crop which was sold right in the field. The survey revealed that 14.2% of the amaranthus growers sold their produces at the fields and

the specific time for selling the amaranthus was in the morning because at that time the uprooted green leaves tend to attract the buyers rather than in the evening time when they up.

Table 14: Horticultural crops market outlets

Amaranthus	%	Cabbage	%	Tomato	%
Market outlets:		City markets	26.4		
Homesteads	19.4	Homesteads	16.4		
City markets	16.4	Other peri-urban market	15.7	Mwanza city market	30.6
At the farm gate	14.2	Street markets	1.5		
Other peri-urban markets	11.2				

4.5.4 Marketing challenges

In order to have an effective market structure, horticultural growers suggested to come up with a kind of an organization which could allow them to have a voice in fair prices of their crops. This study revealed that horticultural growers have been trying to form horticultural growers' association, however the association plans have been facing various challenges as indicated in Table 15.

Table 15: Problems encountered in forming organization for vegetable marketing

Problems	Per cent (N =134)
Lack of communication among gardeners	38.1
Insufficient vegetable extension agents	21.6
Convincing gardeners to grow single type of vegetables	18.7
Low yields (low product volumes)	13.4
Reliable market problems	7.4
Always initiator have vested interests	0.7
Total	100.0

The majority of the producers lacked business management skills. The study revealed that this was one of the difficult problem to be solved as the farmers failed to come with a problem prioritization strategy or ranking them as well as to set plan of action for dealing with the problems. Though they formed their growers association, but it didn't give them the expected results as farmers remained divided. It is true to state that to unite peasants in a common direction is one of the toughest achievements. However, the results in Figure 4, Tables 13 and 14 reveal significant evidence that the rapid growing population in Mwanza city has been a potential market for vegetable products from Mwanza peri-urban areas. So the study results support the above hypothesis.

4.6. Horticultural income versus other businesses' income

In order to know the horticultural income, it was also necessary to investigate the contribution of other businesses, which a horticultural grower performed. The purpose of this subsection is to compare the contribution of vegetable gardens' income relative to other sources of household income two years before the survey (1999 and 2000). The study gathered information on annual household income from gardening, villages mean income, production of food and cash crops against horticulture. However in this

subsection the discussion will be examining one of the hypothesis (see section 1.6.3) that vegetable producers have benefited from profit maximization due to low production costs.

4.6.1 Annual household income from gardening

During the survey, the respondents were asked to state the position of their farming status in relation to other economic activities. According to Table 16, 95.5% of horticultural growers kept their records. Income from horticultural production ranked high in comparison to other sources of income. The survey showed that, a large number of the horticultural producers had income, which was between Tshs. 100 001 and 300 000. This was followed by the producers group, which earned less than Tshs. 100 000 however, that was higher than the Mwanza region average income of Tshs. 92 127 (Luhanga 1998). Thus horticultural growers earn high income. Also in the survey, it was revealed that the more the level of income, the fewer is the number of farmers. For example 0.7% gained between 1.1 – 3.0m per year compared to income less than Tshs. 100 000 which was gained by 26.1% of the respondents.

The highest income gained was between Tshs 1.1-3.0 million. However, the respondents doubted about mentioning their real income gained because of fear of being taxed by the government. Some thought that the survey was one of the government techniques of knowing their income and later tax them through a certain imposed crop levy. Therefore there is a possibility that some income was hidden or not clearly explained by the farmers. This means that the data for the income generated through horticulture production as presented by this study is probably minimum.

Table 16: Annual household income from gardening

The range of income gained	Per cent (N =134)
<Tsh. 100 000	26.1
100 001 – 300 000	32.8
300 001 – 500 000	19.4
500 001 – 700 000	8.2
700 001 – 900 000	5.2
900 001 – 1.1m	3.0
1.1m – 3.0m	0.7
No records	4.5
Total	100.0

4.6.2 Sample villages mean income

Table 17 shows the comparison of income of the major horticultural crops in Mwanza peri-urban areas as it has been stated in section 4.3.1. In this part the sampled crops are tomato and amaranthus. The mean income for tomato was higher in comparison to other crops. For example in Buswelu village, the mean production was Tshs. 97 615.38. The reason for high yields and revenue at Buswelu is that there is plenty sources of water for irrigation, reliable market and good transport facilities. Another important factor is that, at Buswelu there was a storehouse for keeping horticultural crops, sorting and grading of the crops.

Nyamwilolelwa village was the second, followed by Nyamadoke village. In the production of amaranthus, Igogwe village led. The reason for Igogwe to lead in production

of amaranthus was the shortage of water. In that village, farmers decided to shift from cultivating other crops into amaranthus which do not need a lot of water. Amaranthus is a short-term crop 2-3 weeks, so doesn't need too much water as other horticultural crops such as tomato and cabbage. Cucumber and egg-plant demonstrated low sales because, those crops are usually sold at low prices. So this contributes for its average performance to be low.

In order to examine the variability of income, analysis of variance (ANOVA) was applied. According to Table 18 there was insignificant difference in the volume of production and revenue as there was no difference in terms of the costs of production among the surveyed villages. There was a significant difference for cost of pesticides in revenue for cabbage whereby Buswelu farmers earned the mean of Tshs. 73 726.39, Kahama Tshs. 42 714.29. In general, the level of production among the five surveyed villages is very insignificant because there is a very small difference as the villagers are located in the same kind of environment, which is Mwanza green belt.

Table17: The mean of income gained.

Surveyed villages		N	Mean(Tshs)
Total cost of pesticides and fertilizers used for tomato, and cabbage	Nyamadoke	26	30 904.62
	Buswelu	48	49 535.71
	Igogwe	16	30 687.50
	Kahama	11	80 545.45
	Nyamwilolelwa	9	21 333.33
Total		110	44 536.36
Revenue for tomato sales during the month period	Nyamadoke	21	82 523.81
	Buswelu	26	97 615.38
	Igogwe	12	10 5916.7
	Kahama	10	92 500.00
	Nyamwilolelwa	9	93 000.00
Total		78	93 641.03
Revenue from amaranthus sales during the month period	Nyamadoke	18	28 407.89
	Buswelu	44	34 802.27
	Igogwe	3	57 333.33
	Kahama	4	25 416.50
	Nyamwilolelwa	5	13 800.00
Total		74	32 233.89
Revenue from cabbage sales during the month period	Nyamadoke	26	29 669.23
	Buswelu	36	73 726.39
	Igogwe	11	41 090.91
	Kahama	7	42 714.29
	Nyamwilolelwa	6	17 000.00
Total		86	49 750.58
Revenue from cucumber sales during the month period	Nyamadoke	4	17 250.50
	Buswelu	9	15 744.44
	Igogwe	2	16 500.00
	Kahama	3	15 000.00
	Nyamwilolelwa	0	
Total		18	13 789.00
Revenue from eggplant sales during the month period	Nyamadoke	4	13 200.5
	Buswelu	3	17 500.00
	Igogwe	2	35 000.00
	Kahama	0	
	Nyamwilolelwa	1	15 000.00
Total		10	66 550.20

4.6.3 Production of cash crops against horticulture

Table 19 shows that, 64% of the respondents use between a quarter and half of a family land for production of cash crops. The survey revealed that 15.9% of the household use above three quarters of their land for cash crops production as compared to 23.3% for the

same proportion who use for horticultural production as shown in Table 4. This indicates that large number of farmers were engaged in horticultural production than other cash crops. This indicates that, farmers in Mwanza peri-urban areas have shifted from the production of cash crops into gardening. In the surveyed areas, only 5.2% of the respondents use all their land for production of cash crops, but that group of farmers obtain land for horticultural production by hiring from other farmers.

Table 18: Income analysis by using ANOVA

Variation analysis in the villages		Sum Squares	df	Mean square	F	Sig.
Total cost of pesticides and fertilizer used	Between villages	2.5E +10	4	6.3E+09	4.129	0.004
	Within Groups	1.6E +11	105	1.5E+09		
	Total	1.9E +11	109			
Revenue for tomato sales during the month	Between villages	4.8E +09	4	1.2E+09	0.100	0.982
	Within Groups	8.9E +11	73	1.2E+10		
	Total	8.9E +11	77			
Revenue from amaranthus sales during the month	Between villages	4.3E_+09	4	1.1E+09	0.516	0.724
	Within Groups	1.4E+11	69	2.1E+09		
	Total	1.5E+11	73			
Revenue from cabbage sales during the month	Between villages	3.9E+10	4	9.7E+09	3.187	0.017
	Within Groups	2.5E+11	81	3.0E+09		
	Total	2.9E+11	85			
Revenue from cucumber sales during the month	Between villages	5.5E+08	4	1.4E+08	0.390	0.812
	Within Groups	4.6E+09	13	3.5E+08		
	Total	5.1E+09	17			
Revenue from eggplants sales during the month	Between villages	2.9E+10	4	7.3E+09	0.264	0.889
	Within Groups	1.4E+11	5	2.7E+10		
	Total	1.7E+11	9			

4.6.4 Food crops against horticulture

As far as food production is concerned, the study revealed that, more than half of land was used by 33.6% of the respondents for food crops production. This percentage is the largest number of the respondents, which is higher than for both horticulture and cash crops producers, because food crops had the most consideration in relation to family priorities as shown at Table 19. Above three quarters of the land is used by 30.6% of farmers for food production. This is the highest percentage of land utilization comparatively to horticultural and cash crops production. The reason is that, food crops usually need a large portion (mainly the upper lands) which are not suitable for horticulture production.

It should be noted that among the respondents, some of them defined cash crops including the horticultural crops simply because they sell and earn some money. The cash crops, which are usually cultivated in Mwanza peri-urban, include cotton and sunflower. Food crops are maize, cassava and groundnuts. Green-maize are considered as horticultural crop because are cultivated in the gardens by rotation and are harvested while still tender for sell in urban centers.

Table 19: Proportion of land used for horticulture, cash and food crops (%)

Land proportions (%)	Horticulture (%)	Cash (%)	Food (%) N= 134
Less than $\frac{1}{4}$	17.9	13.4	7.4
$\frac{1}{4}$ - $\frac{1}{2}$	32.8	50.7	28.4
$\frac{1}{2}$ - $\frac{3}{4}$	26.1	20.1	33.6
Over $\frac{3}{4}$	23.3	15.6	30.6
Total			100

The results in Table 17 and 18 reveal that, there is no significant variable associations between cost of production and the revenue gained in resulting into profit maximizations there is high cost of production for procurement of pesticides and fertilizers used for production of tomato and cabbage. Therefore, there is no sufficient evidence from the study to support the hypothesis that; vegetable producers have benefited from profit maximization due to low production costs.

4.7. Horticulture and household expenditure

This subsection seeks to determine how the smallholders' vegetable income sustains the household expenditure. It is divided into two parts namely household expenditures and development. The leading hypothesis on this part is that; the peri-urban dwellers that are engaging in horticultural production are more likely to be self-employed and generating higher income throughout a year than other economic activities.

4.7.1 Role of horticulture on household expenditure

In the surveyed areas of Mwanza peri-urban, horticulture is the main source of income. The survey revealed that it is mainly income from horticultural production, which has been running most of the family's expenditure among the gardeners as indicated in Tables 20 and 21. Horticulture income sustained the household expenditure in a number of ways and the common household expenditures were home consumption through buying food, clothing, medical expenses and children school fees.

Field crops and petty trading businesses, contributed to some extend at home consumption item but the major party was taken from horticulture. The substantial family saving also

was attained from horticulture. In other words, it can be stated that in the surveyed areas horticulture is the back bone of the households' economies. The study further revealed that, the households were doing also other economic activities, but horticulture had a lead role as it was used in supporting other economic activities such as cultivation of field crops and petty trading. The details on revenue per centage are indicated in Table 20.

Table 20: Vegetable income in sustaining the household expenditure.

Source of income Expenditure on:	Horticulture	Field crops	Petty trading
	Per cent	Per cent	Per cent
Food	47.0	33.0	20
Fees	40.3	46.0	13.7
Clothing	69.4	14.3	16.3
Radio	39.6	30.2	30.2
Bicycle	51.5	28.5	20.2
Motor vehicle	100.0	-	-
Medical	54.5	10.3	30.2
Other development	42.5	33.0	24.5
Saving	37.3	28.4	35.3
Home consumption (vegetable and fruit)	35.6	49.2	15.2

Note: the purpose of this table 27, is to show and compare the contribution of horticulture, field crops and other business (petty trading) to the household economy

4.7.2 Horticulture and household developments

In the surveyed areas of Mwanza peri-urban, horticultural production is a key supporter and source of income for all development initiatives. For instance, assets such as motor

vehicle, radios, and bicycles are procured from the horticultural income. While other field crops' income and other petty business on the same development expenditures only took less gardeners' expenditure. In Mwanza peri-urban, about 90% of the families own bicycles, as it has been shown in Table 21, 51.5% among the surveyed horticultural growers, got their income for buying bicycles from horticulture production while the small number of gardeners procured bicycles from other sources such as field crops. Among 134 surveyed gardeners, only 2 people own motor vehicles, but both acquired income for purchasing the vehicle from horticultural production.

During the survey it was realized that health insurance of the households among horticultural growers was mainly supported by the income from horticultural crops as well as petty trading. About 55% of the gardeners supported medical care expenses from horticultural crops. Field crops such as cotton, paddy and cassava provided meager income for family medical care among gardeners and petty trading income supported medical care only by 30.2% of horticultural growers. Therefore the household's development in the survey area depends on the horticultural production. It should be taken that horticulture industry is a key source of income as well as sustaining business in household expenditure.

Table 21: Utilization of horticultural income

Project Area	Utilization of income (Tshs. –By MSHDP beneficiaries)							
	Housing	Bicycles	Furniture	Radio	School fees	Food & domestic	Land & livestock acquisition	Other
Buswelu	2 837	141900	193000	0	593500	135600	460700	0
Nyamadoke	700	0	366800	0	197800	58100	902200	18000
Kahama	1262900	0	579100	0	49400	329400	3678100	50200
Igogwe	2698000	0	231600	61400	118700	377900	479900	20000
Nyamwilolelwa	229600	0	0	0	0	141080	335900	731400
Luchelele	1280100	0	71400	0	243300	329400	0	241100
Nyang'holongo	0	752300	1403500	86000	146400	862400	1426300	442100
Bwiru/Kitangiri	3098000	0	332000	0	0	0	180400	241100
Kishili	491700	0	270200	0	178000	242200	105500	60200
Laneso/Menonit	287000	0	0	0	0	0	0	0
Sub total	1218500	894200	3447600	147400	1527100	374580	7569000	1804100
Grand Total								31320200

Source: MSHDP (2000) *Progress Report Summary April 1998 to September 2000*

Note: The zeroes don't mean that, the household is not having such an item, it may be there but it was not attained through horticultural earnings.

That is why horticultural growers do gardening throughout the year at different phases. Among 50 farmers (gardeners) who had savings, the highest number of them acquired from horticultural production, 28.4% of gardeners achieved from other field crops and 34.3% from petty trading; so this justifies that horticultural production takes a leading role in Mwanza peri-urban economy.

The survey indicated that horticultural growers benefit from vegetable and fruits consumption. So the families of horticultural growers have higher level of nutritional status compared to non-gardeners. These results are similar to a peri-urban vegetable project survey in Dar es Salaam Puvep (1998) cited in Potutanetal. (2000). According to MSHDP statistics from April 1998 up to September 2 000, it was revealed that

horticultural income was largely spent in housing. In five villages of Buswelu, Nyamadoke, Kahama, Igogwe and Nyamwilolelwa the horticultural growers spent a total of nearly 10 million for procurement of construction materials and Tshs.1 370 500 on furniture, Tshs. 2 311 800 on food and other domestic utilities, and Tshs. 5 856 800 on land and livestock acquisition. So this indicates that horticultural activities are key source of income among horticultural growers as shown in Table 21.

Generally, it seems that horticultural production facilitated in the transformation of lives of people in the study population and not only on household expenditure but horticulture production played a vital role in the development of farmers in the then MSHDP. The results in Table 20 reveal that horticulture compared to field crops and petty trading, growers are more likely to be self employed and generating higher income throughout a year than other economic activities. In this aspect this has been a significant variable and sufficient evidence for supporting the above hypothesis in regards to this study.

4.8. Summary

This chapter presented results and discussion of the descriptive statistics such as means, frequencies, per centages and the applied statistical test was ANOVA. The processed quantitative data were categorized and presented in tabular form. Types of the horticultural crops grown were the basis of the discussion because this was the key determinant of the realization of income gained towards the assessment of horticultural positive or negative contribution to the economy.

Horticulture and employment status was the basic area in connection to vegetable marketing process, income generation in both aspects of horticultural and non-horticultural earned income. The discussion of the results went further into the examination of horticulture on household expenditure, here realized that in the study area, the household expenditure was financed by the horticultural production rather than any other economic activity. So in the socio-economic analysis horticultural production took the lead role in comparison to the non-horticultural production. In the next chapter summary of major findings, conclusions, recommendations and policy implications are presented.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Overview

In this chapter, conclusions and recommendations and policy implications are presented and discussed. The following is the presentation arrangement; summary of major findings will be presented in section 5.2, conclusions in section 5.3, recommendations in section 5.4, and areas for future research are presented in section 5.5.

5.2 Summary of major findings

a) The types of horticultural crops grown.

The survey of 134 horticultural crops growers revealed that 86.6% of the vegetable growers used their plots for cultivating cabbage and 82% grown tomato. About 62% of farmers grew amaranthus while 20.9% were interested in growing eggplants and hot pepper. The fruit trees, which were commonly grown by the farmers, were paw-paw grown by 72.9% of the respondents, banana by 42.6% and orange 34.4% while mango and guava both grown by 32.9%.

b) The status of employment created

Horticultural production managed to create 1930 employment opportunities in Mwanza peri-urban and urban areas. Its distribution is as follow; 397 were horticultural growers; 1191 labourers; 271 retailers of vegetables; and 271 wholesalers. Also the study revealed that, MSHDP achieved to create employment for 2031 casual labourers for the three years project duration in the 5-surveyed village.

c) The process of marketing of vegetable products

The marketing process and sources were very complicated and fragmented because of the fact that, there were numerous sources of the markets. The survey indicated that 52.2% of the farmers sold their produces to the city whole sell market and itinerary vendors. About 17% sold to city retail market and 9% to city supermarkets. However, other small market opportunities were neighbours (individuals), kiosk, restaurants and hotels, vendors retailers as well as other institutions including schools and hospitals.

At the household level, the main sellers of vegetable produce were as follows, 37% indicated that husband was a chief seller while 20.9% voted for wife as main seller. About 16% indicated that children were involved in the sell of the produces. However, both (wife and husband) were supported by 11.9% and any family member within the household was supported by only 6.7%. However, there were farmer groups, which formed an association, those who channeled their crops to institution were only 7.5%. In relation to means of transport, about half of the respondents were using bicycles to take the produce to the market. In the survey area, 26.9% of the horticultural growers hire vehicles and 11.2% used public transport. But generally the survey indicated that the chief means of transport was bicycles.

d) Vegetable income against other economic activities

In the comparison of horticultural income versus other businesses income, the study revealed that out of 134 respondents, 32.8% gained income between T.sh 100 001-300 000, this group was the biggest though 26.1% gained income less

than T.shs 100 000 and 19.4% achieved a good income of Tshs. 300 001-500 000. In this particular income distribution, the trend is that the more the income increases, the lower the less number of beneficiaries. This is evidenced by the fact that 8.2% of the farmers gained T.shs 500 001-700 000 and at the same time, 5.2% gained T.shs 700 001-900 000. Also, T.shs 900 001-1.1m gained by 3% and the highest income of 1.1m-3.0m only achieved by a smallest number of 0.7% of the farmers.

The performance of non-horticultural business in the surveyed area was very low compared to horticultural production. The study indicated that 34.3% of the respondents earned income of less than Tshs. 100 000 and 29.9% gained income of T.shs 100 001-300 000. However, 22.4% stated to have no any extra non-horticultural business except garden production as the key source of income.

e) Vegetable income and household sustainability.

By comparing horticulture, field crops and other petty business in sustaining the household expenditures and development it has been proved that horticulture takes a lead role. The survey revealed that horticulture financed the family food expenditure by 47% while field crops by 33% and only 20% for petty trading. Another expenditure is clothing whereby 69.4% of its expenditure supported by horticulture and petty trading by 16.3% while field crops contributed by 14.3%. At the development part, farmers purchased motor vehicles from horticulture income by 100%, in the procurement of radio, horticulture financed 39.6% of the cost while field crop and petty trading contributed only 30.2% of the total expenditure. Also, the survey shows that, in the 5 villages where the study was conducted,

horticultural growers spent about Tshs. 10m for procurement of building materials, T.shs 5 856 800 on land and livestock acquisition and other T.shs 1 370 500 on furniture. So this indicates that horticultural activities are key source of income among horticultural growers as compared to other economic activities.

5.3 Conclusions

The following conclusions can be made from the findings of this study. In Tanzania, horticultural production at present is one of the upcoming industry which enables the producer to earn high income in comparison to other food and cash crops such as maize, rice and cassava. This study sampled 134 horticultural growers in Mwanza peri-urban out of 400 who were doing horticultural activities within the area of operation of the phased out MSHDP. For the sake of this study, the study area covered five villages of Buswelu, Nyamadoke, Kahama, Igogwe and Nyamwilolelwa. The study revealed that, horticultural production is a significant contributor to household and national economies, so it is high time to recognize that contribution and incorporate in the calculation of the national Gross Domestic Production (GDP) as appropriate.

In Mwanza peri-urban, the small-scale producers do possess a plot ranging between less than a $\frac{1}{4}$ of an acre to 2 acres for the production of horticultural products. Again the study revealed that, those small-scale farmers used hand-hoes in their production process. The findings generalise that there was a positive change in farmers attitude because they have been transformed from traditional way of farming into the application of modern agricultural techniques. For instance the horticultural growers have been using improved seeds for growing tomato, cabbage, onions and amaranthus. The good example is the introduction of the new tomato generated seed variety, "Tengeru" from Tengeru

Horticultural Research Institute. Today the consumers and sellers in Mwanza city use the Tengeru tomato type because of its taste and the fact that it can be stored for two weeks without going bad. This type of tomato was first introduced to the Mwanza peri-urban horticultural growers by the MSHDP.

Therefore this situation leads us into the conclusion that horticultural production is a chief contributor to the household as well as to national income in Mwanza peri-urban areas. Horticultural production is one of the agricultural sector that employs people almost throughout the year within the agricultural sector than any other branch of agriculture. In Mwanza region other types of agriculture employs farmers only from November to May per annum.

This study concludes that horticultural production builds the capacity of farmers in marketing techniques. In Mwanza peri-urban, horticultural growers have learned the application of improved marketing processes such as sorting, good storages, grading and ways of advertising and displaying their produces. As a result the gardeners know at what time a day they should sell some of the items and when its not appropriate. This is a big advancement because without having specific knowledge in marketing procedures, it is not easy to sell horticultural produces except only when the demand is high and this is not the case in Mwanza city as sometimes the market is flooded by supplies from Morogoro, Arusha and even imported vegetables and fruits from South Africa.

Horticulture in Mwanza peri-urban is the key sustainer of household expenditure than any other economic activity. However, in order to improve the knowledge of farmers in relation to horticultural production, extension services and information transfer should be

brought closer to the farmers. Because there is no way horticultural growers can do effectively their activities without the facilitation of the Extension officers. In Mwanza peri-urban, the Government field Extension Officers reached 53.7% of horticultural growers. MSHDP in collaboration with the government facilitated the gardeners throughout, so this indicates that there is a need for the government to network with other agencies in order to reach the unreached farmers.

In the surveyed areas, horticultural production enabled the farmers to access training in line with horticultural management. The nature of this industry (horticultural production) if is well organized, facilitates farmers to unite together for the purposes of negotiating with the government about the input prices and its availability. Also the horticultural producers in most cases are required to have a common strategy on how to market their produces in order to overcome the price fluctuation and other market setbacks as appropriate.

5.4 Recommendations and policy implications

On the basis of this study, the following recommendations are made

Policy makers:

- a) It is high time economic and social development planners and policy makers recognized that horticultural production is one of the pillars of the household and national economies. So what is needed is to make use of its potential value for agricultural research and development programmes which have been overlooked for a long time.

- b) The government has to put in place the appropriate policies and technologies especially in urban and peri-urban areas which will facilitate horticultural production significantly to supplement the income of small farmers and provide additional employment in labour-abundant developing countries such as Tanzania.
- c) This study recommends that the value of the horticultural production to be included in the GDP. So the challenge is to the government to establish simple and less administrative costs on acquiring the necessary information on this industry.
- d) Through this study it has been discovered that it is very difficult to compare horticultural income figures because of varying factors such as garden sizes, share of other cash crops and other sources of income, household size and the particular urban/peri-urban policies. All those factors and others influence the proportions of the households' income from horticulture. So planners and policy makers should look for standard criteria that could facilitate the process of getting adequate socio-economic information.
- e) In order to safeguard the economic position of our local horticultural producers, the government should look for means and ways of protecting the small-scale horticultural growers in order to protect the horticultural domestic market against the influx of external supplies, which have been flooding in the market instead of the locally produced vegetables. It is possible to protect this tender industry as the government does for the other sectors of the economy such as manufacturing and processing industries.

- f) The Ministry of Agriculture and Food Security is advised to facilitate our domestic horticultural producers to secure the possible external markets. This study suggests making use of the available fish market to be linked with horticultural production by using the air cargo, which land at the Mwanza Airport to carry horticultural produce to European market.
- g) Institutional credit should be linked to the marketing system and made available to the farmers.
- h) The Ministry of Agriculture and Food Security and NGOs make horticultural specialists available at ward level in order to facilitate the horticultural growers at village level.

Programme managers:

- a) The public should be facilitated to understand that, vegetables grow virtual in any ecological environment in Tanzania. This therefore means that, there are lots of potentials for Tanzanian small-scale peasants to enter into this industry.
- b) NGOs and International Labour Organisation (ILO) should promote processing to avoid wastage during glut periods and ensure availability of processed vegetables during scarce periods.

Community:

- a) Horticultural growers should come up with a marketing mitigation strategy by formation of farmers associations in order to influence supply and demand of their products.
- b) The general public should be facilitated to understand that horticulture is a high profit making business in agricultural sector

5.5 Areas for future research

- a) To date it is difficult to get a picture from the literature of how the economic contribution of vegetable production can be measured and what the contribution of gardens to the household income. So other researches can be done specifically on this area.
- b) The effects of environmental pollution and health risks in relation to urban/ peri-urban horticultural production, can be researched separately as a specific study.
- c) Horticultural production and gender aspects in urban/ peri-urban areas.
- d) The nature of horticultural production is short-term. For instance, when different crops are grown during the year, the yields may differ a lot from time to time. This single study visits cannot monitor the whole value of the production, which makes the evaluation of the income from many horticultural crops more difficult. So other researches can be done to establish more facts on those aspects.

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please specify

9. Are you a native of this area? Yes, No.....
10. What is your highest level of general education? completed primary education,completed "O" level. completed "A" level, completed a diploma, completed degree
11. What is your occupation?
.....

Horticultural production process

12. Name of Person(s) in household primarily responsible for garden:
.....
Brothers in no.
Sisters in no.
Other relatives (specify)
13. What per centage of your land is used for horticultural production? 25%, 50%, 75%, 100%
14. How about for other cash crops 25%, 50%, 75%, 100%
.....
15. What is the position of food crops like paddy, Maize, sorghum etc in %.....
16. What is the size of this house-plotbysquare metres.
17. How big is your garden?by metres.
18. How long have you been gardening? years.
19. What is the most important source of water for gardening?..... Other sources:,
20. Will you still continue to garden in the future?Yes,No.
21. Do you have any formal training in gardening or related field?Yes,No.
22. If answered Yes in ABOVE Question at what level of training did you attain
.....

23. How many months do you grow vegetables in the year

?.....

24. Where do you get the vegetable seeds for the plants that you grow in your garden?

- Buy from the farm stores/input shops.
- Buy from the district/region agriculture office
- Buy from the urban agriculture/livestock extension agents
- Buy seeds from neighbors
- I get seeds free of charge from

25. Where do you get the seedlings that you grow in your garden?

- I raise them in my garden from the seeds
- I buy them from town
- I buy them from input shops within the village
- I buy them from agriculture/livestock extension agents
- I get seedlings free of charge from the project or other sources such as

26. Do you apply organic matter in your garden?Yes,No. If yes what kind?

27. What kind of organic manure do you use in your garden:

Type of manure	Amount applied (kg or debe) per plot
Cow dung	
Chicken manure	
Compost	
Pig manure	
FYM (Farm yard manure)	

28. If you do not raise livestock where do you get organic manure?buy cow manure from neighbours with livestock,make own compost,bring FYM from distant farms,other sources, please specify

29. Do you apply mineral fertilizers in your garden?Yes,No

30. What kind of mineral fertilizers do you use in your garden?

Kind of fertilizer	Amount applied/plot
Sulphate of ammonia	
Calcium ammonium nitrate	
Tripple super phosphate	
Urea	
Others, please specify	

31. Do you have problems with pests and diseases in your garden?Yes,
.....No. If Yes how do you control them?

32. Which kind of pesticides/fungicides do you use to control insect pests and diseases in your garden? Please, name them,,
.....,

33. Do you consider pollution a problem in your gardening?Yes,No.

34. If answered Yes in Question above what are the sources of pollution?
.....

Extension and information transfer

35. Where did you get the first information about gardening?family,
.....friends,neighbours,
.....extension agents,(MSHDP)
Project facilitators.,brochures,newspapers,
.....radio,person experience,others ,
please specify

36. Where do you currently get the information about gardening?
.....family,friends,neighbours,
.....extension agents,Project facilitators,brochures,
.....newspapers,radio,personal
experience,.....others , please specify
.....

37. Do government employed urban/peri-urban agriculture/livestock extension agents visit you to give advice on vegetable production? Yes,
.....No.
38. What are the main constraints of gardening? Please rate them on a scale of 1 to 5, where 1 is most serious and 5 least.
- 1)
2)
3)
4)
5)
39. If you had access to more land would you increase the size of your garden?
.....Yes,No.
40. If answered Yes in how big would you want the plot to be?.....metres by
.....metres.
41. What comments would you offer to a person in peri-urban areas wanting to start gardening in the city of Mwanza
.....

Horticultural crops' income versus other business

42. Does the family alsooperate a kiosk/grocery, run a retail business,own a bar,own transportation business, others, please specify
.....
43. What is your annual household income from gardening?
.....<Tshs 100 000,100 001-300 000, 300 001-500 000,500 001-700 000,700 001-900 000, 900,001-1.1 million,1.1-3.0 million,3.1-5.0 million,5.1-7million,
.....7.1-9 million,9.1-11.0 million,>13 million.
(Gross amount/figures in Tshs.)
44. What is your annual household income from other business besides horticulture?.....<Tshs 100 000,100 001-300 000,300 001-500 001-700 000.700 001-900 000, 900 001-1.1 million,.....1.1-3.0

million.3.1-5.0 million,5.1-7.0,7.1-9.0 million,9.1-11.0 million,>13 million.

(Gross amount/figure in Tshs.).

45. Estimated monthly household income from both horticulture and other business.

Activity income	Monthly income	Total annual income	% of total household
Horti. Production:			
Other business:			

46. Other main economic activity & contribution to h/hold income:

activity:....., Amount,per centage.....

47. Secondary economic activity & contribution to household income:

per centage, Amount.....

48. Time engaged in fruit/veg. Production in terms of

months.....

Number of years involved in fruit/vegetable. production:

49. In your opinion what is the importance of gardening to children?can foster learning about plants,can be a hobby for some children,can help them appreciate the beauty of biodiversity,can inspire them to garden in the future,can teach them about the economic importance of vegetables.

50. Mention the vegetables that you grow in your garden?

.....,,

51. Mention the fruits that you grow in your garden?

.....,

52. Which of the vegetable mentioned above cover the most space in your garden?

.....,

53. Do you raise livestock? Yes,No

54. If answered Yes how many of the following:

Types of livestock	Number
Dairy cattle	
Laying hens } poultry	
Broiler Chicken }	
Pigs	
Local chicken	
Sheep	
Goats	

Vegetable marketing process

55. How much do you save per month by growing own vegetables? Tshs.

56. Do you give away vegetables grown in your garden? Yes,No.

57. Who mainly sells vegetables produced in your garden?mother,
.....father,others, specify
.....

58. In the table below name vegetables that you sell per month and the money earned per month?

Type of crop	Quantity(kg)	Price per kg(Tshs)	Revenue (Tshs)	Place sold	Remarks

59. If you sell vegetables, mention the places/people you sell to?

.....neighbours,kiosks,itinerary vendors,
.....the city wholesale market,to the city retail markets,to
restaurants/hotels,schools,hospitals,others,
please specify

60. Who organizes transport for vegetables when selling outside the household?
producer organizes own transport, buyers organize own transport.
61. What kind of transport is used to carry vegetables to the markets?use hired bicycle,use own vehicle,use own bicycle,use public transport,head-carry vegetables to markets,use hired labourer,use children to head-carry vegetables to markets.
62. Do you have other places for marketing your vegetables outside Mwanza city? Yes
No.
63. If yes, what are those places? Name.....
64. Do you organize marketing of vegetables with other producers? Yes,
No. In any case, what was your experience?

65. What are the problems that hamper people to form organizations for selling vegetables?difficult to get large volumes of products,difficult to convince gardeners to grow one type of vegetable,lack of communication among gardeners,lack of vegetable extension agents,others, please specify

Organization Structure

66. Are there any kind of organization that exist in your community in which people join their common interest?Yes,No.
67. If there are any organizations, are they different for women and men?Yes,
No. How do they differ?

68. Is there any organisation for Horticultural growers? Yes?No
69. If is yes what are these?,,
, which benefits do you get,

Horticulture and employment

70. Who mainly looks after the garden?..... all in the household,the mother, the father,employed labourer,female children,male children, dependants, others, please specify.
71. How many months a year do you spend in gardening?

72. What is your top priority form of employment?government,
private company.parastatal,run own business,
farming,.....fishing,horticulture cultivation
73. How many people do you employ to look after the garden?
74. If you employ a labourer for gardening how much do you pay him/her per month?
 Tshs.
75. What is the role of the wife in gardening?supervises.supplied
 inputs,sells products, harvests vegetables,secures
 markets,transports vegetables to markets,has no role.
76. Who owns what in horticultural production, Father,,
, Mother,
77. Who has the final say in earnings from horticulture: father, Mother,
, both, family
78. How many of your children help with gardening?
79. Who controls the land mother, father Who have the access to
 land? Mother, father, family
80. Who of your children mostly helps you with gardening?female,Male

Horticulture and household expenditure

Household expenditure item	Amount	Source of Income (activity)
To procure food for family		
Procurement of house construction materials		
To pay school fees for children		
Clothing for the family		
Radio		
Bicycles		
Motor vehicle/Cycle		
Family Medical Care (treatment)		
Leisure expenditure		
Saving		
Purchase of livestock		
Plough		
Oxen-Cat		
Any other developmental expenditure		

81. Is this house originated from farming?Yes....., No
82. If Yes how worth is it? Tshs.
83. If No. what was the source of income? Specify
84. Do you consume vegetables produced in your garden? At home?.....Yes,No.
85. If yes, which benefits do you get from health point of view,

“Thank you very much for your co-operation.”

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