FACTORS AFFECTING THE CHOICE OF TREE SPECIES TO PLANT IN URBAN AREAS OF MOROGORO AND KINONDONI MUNICIPALITIES: A SOCIO-ECONOMIC ASSESSMENT

BY

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ABSTRACT

The study investigated socio-economic factors affecting the choice of selecting tree species to plant in urban areas of Kinondoni and Morogoro municipalities. The study objectives were to (a) identify tree species preferred to plant in urban areas; (b) assess the importance of planted trees in urban areas; (c) examine the socio-economic factors affecting the choice of trees species to plant in urban areas; (d) examine knowledge, skills and perceptions of urban dwellers on urban trees and; (e) identify limitations of urban tree planting. The study was a cross-sectional and data were collected from 120 respondents whose homesteads were planted with trees. Focused group discussions and participants' observation were also applied. Household heads were eligible for interviews. Data were analyzed using SPSS computer software. A total of 49 tree species were identified and ranked in order of their preferences. The study showed that urban dwellers of different socio-economic status planted trees mainly for shade, fruits, windbreaks provision and aesthetics. The study showed that selections of tree species for urban areas were affected by complex socio-economic, cadastral and technical factors as a result, trees were haphazardly planted. The study showed that municipals' plans, regulations and bylaws were inadequate, weak and relaxed. The study indicated that urban trees' development were conflicting with infrastructures. Lack of knowledge and skills of trees planting among urban dwellers was also revealed. The study recommends master plans and bylaws and regulations for tree planting in urban areas be amended to take care overlooked issues when selecting tree species for urban area. The study also recommended that the identified most preferred tree species be further studied and be

coordinated forestry extension agents to serve different stakeholders of urban forest. The study also recommended urban forestry be area of emphasis within Tanzania Forest Policy (TFP), Forest Action Plan (FAP).

DECLARATION

I, **LAZARO MARTIN MADADI** do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work, and has not been submitted for a degree award in any other university.

Signature.....

Date.....13/07/2005.....

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LIST OF ACRONYMS

AFORNET	African Forest Research Net Work.
ASS	African Academy of Sciences
ANOVA	Analysis of Variance
BTC	Belgian Technical Cooperation
CARE	Cooperative Assistance for Relief Everywhere
CBD	Central Business District
CDA	Capital Development Authority
CUFR	Centre for Urban Forest Researches
DAWASA	Dar es Salaam Water and Sewage Authority
DCC	Dar es Salaam City Council
EADCLA	Environmental Affairs Department of City of Los Angeles
FAO	Food and Agriculture Organization of the United Nations
FBD	Forest and Beekeeping Division
FGD	Focused Group Discussion
FOA	Faculty of Agriculture of Sokoine University of Agriculture
GIS	Geographic Information System.
HD	High Density
IGA	Income Generating Activities
IUCN	International Union of Conservation of Nature
KMC	Kinondoni Municipal Council
LD	Low Density

MD	Medium Density
MMC	Morogoro Municipal Council
MNRT	Ministry of Natural Resources and Tourism
MOROWASA	Morogoro Water and Sewage Authority
MTC	Municipality of Thames Centre
NADF	National Arbour Day Foundation
NGOs	Non-Governmental Organizations
NRCSD	Natural Resources Conservation Services Department
NTSP	National Tree Seed Agency
PANA	Pan African News Agency
PhD	Doctor of Philosophy
RCO	Regional Commissioner's Office
RTD	Radio Tanzania of Dar es Salaam
SPSS	Statistical Package for Social Sciences
TANESCO	Tanzania Electric Supply Company Limited
TFAP	Tanzania Forestry Action Plan
TFCG	Tanzania Forest Conservation Group
TFP	Tanzania Forest Policy (1998)
TISTPP	Tanzania International Small Group Trees Planting Programme
TTSA	Tanzania Tree Seed Agency
TTSA	Tanzania Tree Seed Agency
TVT	Television of Tanzania

UA	Urban Agriculture
UF	Urban Forestry
URT	United Republic of Tanzania
USA	United States of America
UWAMU	Umoja wa Wauza Miche Ubungo
VPO	Vice Presidents' Office
WEOs	Ward Executives' Offices
WSSD	World Summit for Sustainable Development

CHAPTER ONE

INTRODUCTION

1.0 Background Information

1.1.1 Concept of Urban Forestry

This study is about urban forestry and factors affecting the choice of selecting tree species to plant in urban areas of Morogoro and Kinondoni municipalities. A conventional definition of a tree and urban area as highlighted by Dar es Salaam City Council (DCC) and Morogoro Municipal Council (MMC) bylaws of 1989 and 1998 respectively, applies in this study (MMC, 1998; and DCC, 1989). Here, a 'tree' means a tree or shrub, or a fruit tree growing within the city or town, while the term 'urban area' means the area of jurisdiction of the respective urban authority as may from time to time be constituted (DDC, 1989).

The concept of urban forest and urban forestry had been defined in various ways (Nadel *et al*, 1977; Sène, 1993; Kuchelmeister, and Braatz, 1993; and McPherson, 2003). The Society of American Foresters at one time defined urban forestry as the cultivation and management of trees for their contribution to the physiological, sociological and economic well being of the urban society. Urban forestry has also been defined as the application of forest management principles to the ecology of densely populated human environments (CUFR, 2003). The Centre for Urban Forest Researches (CUFR) at the

University of California defined the term "urban forest" as the aggregate of all vegetation and green spaces within communities that provide benefits vital to enriching the quality of life (McPherson, 2003).

1.1.2 Trees Planting Efforts in urban areas of Tanzania

From early 1990s to date, The Tanzanian government through regional, district and provincial administrators had implemented a considerable number of ambitious national based tree planting campaigns aiming at re-greening the country. In Tanzania tree planting activities are under the Ministry of Natural Resources and Tourism (MNRT) in collaboration with the Vice Presidents Office (VPO). The national tree planting campaigns were launched on first of December of every year and the general slogan emphasize tree planting in residential plots (PANA, 2003). In 2003, the slogan in Morogoro and Kinondoni municipalities stated that "If you want to plant a tree for shade provision at your household compound, consider a fruit tree because you will get both a shade and a fruit at a time" (KMC, 2003).

Following the World Summit for Sustainable Development, different international and local based programmes were designed and developed to achieve integrated sustainable development objectives through sustainable agriculture and tree planting. In Tanzania, the Tanzania International Small Group Trees Planting Programme (TIST) was one of these programmes (WSSD, 2002).

Through these concerted efforts many trees were planted in homestead compounds, side roads, median roads, open spaces, seashore, catchments, farms, forest plantations, schools, colleges, universities premises, recreational places, government and non-governmental organizations offices. In Kinondoni municipality, about 1 548 033 trees were planted from 1999 to 2003, but only 1 204 294 survived, which was equal to 77.79% of all trees planted (Table 17). It had earlier reported that in developing countries, most of the planted urban trees perish, or survive with difficulties or become hazardous to social infrastructures and structures before growing to desired maturity due to different reasons (FAO, 1999). To ensure smooth tree planting, the Ministry of Natural Resources and Tourism (MNRT) in collaboration with the Vice Presidents Office (VPO) issued directives to Regional and District government authorities on how they can implement tree planting activities. Among the directives given included to ensure that botanist, foresters, and planners were involved in providing technical advices to politicians and government leaders responsible for addressing the campaign slogans to the public (PANA, 2002).

Apart from the directives, respective urban authorities were required to abide with their tree planting bylaws. However, important technical information on what type of tree species to plant, where, how, and why to plant were given less emphasis in most urban areas. The given directives and bylaws were partially followed and were implemented under political pressure without adequate urban forest based scientific information to assist people wisely decide on issues regarding tree planting in urban areas. As a result

of these set backs, some trees were planted haphazardly due to inadequate technical advice given to people. The reported planted tree seedlings survival rate in Morogoro and Kinondoni municipalities for 2001-02 planting season were 60%[1] and 75%, respectively (Table 17). These survival rates were relatively low. Low survival rates of planted trees have long been associated with selection of right species for the wrong site and vice versa (Cermak *et al.*, 2000).

Haphazard tree planting practices were also associated with inadequacies and relaxation of set bylaws and lack appropriate master plans to ensure that right trees are planted to right sites. According to MMC and DCC bylaws (DCC, 1989; and MMC, 1998) "Any person who owns a surveyed plot, which is built up or not shall plant on such a plot a number of trees, thus high-density (HD) shall be one tree at face; medium-density (MD) shall be four trees at face and low-density (LD) plots shall be six trees at face. Failure to adhere to this shall be guilty of an offence against these bylaws and shall be liable to a fine not less than Tsh 5 000 and not exceeding Tsh 6 000 or imprisonment of three months or both such fine and imprisonment (MMC, 1998). The MMC bylaws seem to be inadequate and relaxed as there were no follow-up made to ensure that trees were planted as stipulated. To be effective and explicitly define tree species to be established, where, why, how and how much in each urban area, the urban authorities bylaws were supposed to be supported with proper guidelines, master plans and ministerial directive to (Miller, 1988). In practice, many urban households in Morogoro and Kinondoni

[1] Data were based on secondary information from Morogoro Municipal Council (MMC) Office.

municipalities did not abide with these bylaws and they lacked relevant supportive guidelines for planting trees.

1.2 Problem Statement

The development of urban and peri-urban forest is experiencing many constraints, generally related to complex political and social situations but typically of the underdevelopment of the countries concerned (FAO, 1999). In urban areas of most Developing countries and Sub-Saharan Africa in particular, many established trees perish, survive with difficulties or become hazardous to social infrastructures before growing to desired maturity (FAO, 1999; and Sène, 1993). Many authors had reported the conflicts between vehicles, pedestrians, infrastructures, and trees for space at ground level and above ground (Sydnor, 1994; and McCurdy and Sicheneder, 2000; Mhagama, 2002 and Poor, 2002). For example, above the canopies of trees interfere with overhead utilities and views while beneath the ground, tree roots compete with utilities and paving (Eugene, 2003).). Yet, due to increasing rural deforestation it was argued that more emphasis now be increased in trees-off-forest (TOF) as future forest products and services might depend on them (Lund, 2000). Urban forest is part of TOF, however in trees planting activities in urban areas seem to lack adequate data to assist some decision making, particularly on issues regarding what species be planted, where, how and why trees be planted in urban areas of Tanzania, a processes which was termed as "selecting the right tree for the right spot" (Cermák *et al,* 2000). It seems social, political, economic, cultural and technical and biophysical factors are affecting tree-planting

activities in urban areas of Tanzania. This study investigated the socio-economic factors affecting choice of selecting trees species to plant in urban areas.

1.3 Justification of the Study

As stewards of the urban forest, today's tree planters have an obligation to contribute the best possible trees to future generations (Eugene, 2003). Urban growth in Tanzania had long been on the increase through on different administrative levels in nearly all the towns, municipalities and cities (URT, 2003). With expanding urban area in Kinondoni and Morogoro municipalities, urban trees were expected to provide cooling effects in hot environment in the municipalities for numerous economic, social and cultural activities to take place. Urban forests are important for human development due to a number of reasons (McPherson and Simpson, 1999; Mhagama, 2002; and McPherson 2003). However, when tree planting is not properly planed, it becomes a major threat to urban development (Sydnor, 1994). The relaxation or inadequacies of KMC and MMC bylaws, guideline and regulations concerning trees planting "even after World Summit on Sustainable Development (WSSD) at Johannesburg in South Africa in 2002 is a threat to urban development and is jeopardizing the current millennium development goal on environment conservation" (World Bank, 2002).

According to Zawadi (2002), urban tree planting in Morogoro municipality were being affected by lack of fund and knowledge of management practices by most municipal residents. Findings from Municipality of Thames Centre showed that there were many

challenges underlying tree species selection for urban areas in particular tree planting on public right of the way and homesteads and that tree planting is a long term initiative and what is done today can have a serious impact on urban trees maintenance activities for years to come (MTC, 2002). Impact of street trees on social infrastructures and structures seem obvious in many places within urban areas of Morogoro and Kinondoni municipalities (Mhagama, 2002). Before this study it was not known which socio-economic factors were responsible for haphazard tree planting in urban areas of Morogoro and Kinondoni municipalities.

The study findings from this study will assist not only in assessing the socio-economic factors affecting the choice of tree species to plant in urban areas but also form a basis for reformulating strategies, bylaws, regulations and master plans of tree planting in respective urban authorities. As it will deem appropriate the result may be channelled at ministerial levels to assist in amending the existing Tanzanian Forest Policy (TFP) of 1998 and Forestry Action Plan (TFAP), which seem to give less emphasis on issues regarding urban tree planting (Yonazi, 1991; and MNRT, 1998). Following these justifications it was therefore imperative that this study be done to add to the urban forest knowledge base.

1.4 Objectives of the Study

1.4.1 General objective

The general objective of the study was to investigate socio-economic factors affecting the selection of tree species to plant in urban areas of Morogoro and Kinondoni municipalities.

1.4.2 Specific objectives

Specific objectives of the study were to:

i) Identify tree species that urban dwellers preferred to plant in urban areas of Morogoro and Kinondoni municipalities.

ii) Identify the importance of planted tree species in urban areas of Morogoro and Kinondoni municipalities.

iii) Assess knowledge, skills and perceptions of urban dwellers on tree planting in urban areas of Morogoro and Kinondoni municipalities.

iv) Examine the socio-economic factors affecting the choice of selecting tree species to plant in urban areas of Morogoro and Kinondoni municipalities.

v) Identify limitations of urban tree planting practices in urban areas of Morogoro and Kinondoni municipalities.

1.4.3 Hypothesis of the study

Socio-political-economic factors do not have a significant effect on the choice on selecting tree species to plant in urban areas of Morogoro and Kinondoni municipalities.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides highlights of the findings of other studies in line of the research topic, including critical studies. The chapter provides some research findings that have relevance to the proposed study on factors affecting the choice of selection tree species to plant in urban area. It also provides critique of methods used in previous researches, conclusions drawn by other researchers who previously reviewed the literature relevant, and lastly discusses the importance of trees in urban areas.

2.1 Trends of Urban Forestry Studies in Tanzania

In developed countries, a considerable number of studies have been undertaken to understand urban trees issues (Khosla, 1996; Tewari, 1995). However, in most developing countries including Tanzania limited urban forestry studies have been carried out. Inadequate support for urban tree planting from governments and international organizations has been highlighted as major reason for urban tree planting practices set back in developing countries (Sène, 1993; FAO, 1999). In developing countries, urban tree planting activities are common however urban forestry researches are still in its infancy stage and are strongly oriented towards the style of industrialized countries (Khosla, 1996; Tewari, 1995). In Tanzania few studies have been carried out to address issues regarding urban forestry.

Urban forest sector set back in Tanzania can also be associated with Tanzania Forestry Acton Plan (TFAP), which is a long-term programme for the development of forestry sector aims at halting the negative environmental tendencies and at the same time increasing the sectors' contribution to the development of the country's economy. TFAP emphasizes on the management of natural forests and industrial plantation on sustainable basis and the highlighted areas of emphasis were catchment's forest, miombo woodlands, and Mangroves (Yonazi, 1991).

Munishi (2001) argued that with increasing industrialization, urban forestry research are now of priority since urban trees are seeming to be more important for environmental conservation through immediate creation of sinks for carbon dioxide and other industrial based emissions from urban areas. For example in Morogoro municipality, it was found that there were about 36 different tree species that included S*enna siamea (Mjohoro)* being the most dominant specie (5.8%), followed by *Polyalthia longifolia (Muashoki), Leucaena leucocephala (Mlusina),* and *Pithecelobium dulce (Mchongoma)* both accounted for 4.3 percent (Mhagama, 2002).

2.2 Urban Forestry Studies in Developed Countries

In developed countries, particularly in Canada and United States of America (USA), urban forestry research has considerably increased as many individuals, government, non-governmental organizations and international organizations realized the importance of urban forestry and its intrinsic value of trees on environmental improvement (Fraser

et al, 2000). In Canada, respondents were asked whether they had planted or would like to plant shade, ornamental or fruit trees in their home yards the responses differed significantly among the culturally different respondents (Fraser *et al*, 2000). The study results revealed that factors such as number of years lived in Canada, age, gender and number of years lived in their homes had significance influence on the choice of tree specie to plant in home yards. Fraser *et al*, (2000) study found that urban dwellers who migrated from Britain planted the most shade trees, followed by those from Italy, Portugal and lastly from China. A plausible hypothesis from that study showed that cultural factors resulted in widely different attitude towards tree planting in the urban environment

2.3 Choice of Tree Species Selection to Plant in Urban Areas

One of the most important aspects of urban forestry is selecting and acquiring trees. As stewards of the urban forest, today's tree planters have an obligation to contribute the best possible trees to future generations (Eugene, 2003). Tree selection and acquisition are also among the most challenging activities of urban foresters (McCurdy, 2000; McCurdy, 2004). Thousands of species are available, many of them genetic hybrids that have not been tested by time. Few people know these species. Objective information on long-term maintenance requirements and other potential problems is not readily available. In the absence of hard data, some tree managers assume that maintenance needs correlate directly to the rate of growth (McCurdy, 2004). In other words, a fast growing species will require more long-term maintenance than species with moderate or

slow rates of growth. It may also be reasonable to assume that larger trees require greater expense for maintenance and replacement. With proper care, a tree could live for centuries. It makes little sense to ignore known shortcomings, simply because the problems will become apparent only when the tree matures (Sydnor, 1994).

According to Miller (1988) the first phase in a street tree-planting programme consists of selecting the appropriate species for the community and individuals planting sites. Poor (2002) had earlier argued that picking the best tree species for a particular site is crucial and it was similar to separating gold ore from the surrounding rock since trees must pass though levels of selection similar to a series of sieves. As for many developing countries, most urban dwellers in Tanzania have no knowledge and skills about choosing tree species to plant in urban areas. Chamshama (1991) had earlier argued that the approach of finding the right tree species to plant was crucial for soil conservation and amelioration, and people must select the tree species that grew best on the site in question and at the same time fulfilled the objectives of tree planting. According to Khiari (1991), a decision on priority species for afforestation must be made after taking into consideration the objectives, soil characteristics and growth rate of species in relation to planting objectives.

Choosing a tree for urban area should be a well thought out decision as proper selection can provide people with years of enjoyment and can significantly increase the value of social infrastructures and structures (NRCSD, 2000). Inappropriate trees on home yards

can be a source of constant maintenance problem or even hazard. Also study findings from NRCSD (2000), had earlier commented that choosing a tree should be a well thought-out decision as it can be a significant investment in money and time. Based on Miller (1988) the first phase in a street trees planting program consists of selecting the appropriate species for the community and individual planting sites.

2.3.1 Factors to consider when choosing a tree to plant in urban area

According to NRCSD (2000) key questions to consider in selecting a tree include: (a) what purpose will this tree serve; (b) is the specie appropriate for the targeted area; (c) how big will it get; (d) what is the average life expectancy of the tree; (e) does the tree have any particular ornamental value such as leaf colour or flowers, and fruits; (f) does the tree have any particular insect, disease or other problems that may reduce its usefulness and lastly; (g) is the tree evergreen or deciduous. After answering these key questions, one can therefore go out and purchase trees to plant on a house plot. Unfortunately, most of these questions are not considered by a local urban resident in Morogoro and Kinondoni as the Morogoro municipality lacked master plans to guide tree planting while the master plan for Kinondoni municipality and Dar es Salaam seem inappropriate.

Furthermore findings from NRCSD (2000) argue that people be advised to check with local authorities on the regulations pertaining to placement of trees since most communities have ordinances restricting placement of certain tree within a specified

distance of a streets, side walks, street lights or the utilities. Under the Tanzanian context, there are municipal by-laws made under different Acts. For example, the Morogoro Municipality bylaw under section 55 (1) (6) and Act No. 9 of 1982 states: "Any person who own a surveyed plot which is built up shall plant on such a plot a number of trees as forest officer of the council shall advice providing that the forest officer shall not exclude any parson from planting trees. Failure to adhere to this shall be guilty of an offence and shall be liable to a fine not less than Tsh. 5 000 and not excceding Tsh. 6 000 or imprisonment for three months or both (MMC, 1998).

Also item 9 of the same bylaw states "Any person who owns a surveyed plot which is in built up or not shall plant on such a plot a number of trees, thus in HD plot, one tree at face; MD plot four trees at face, and in LD plot, six trees at face. However, in most towns these bylaws seem to be dormant as there are many urban dwellers who have not planted even a single tree around their homesteads. Those who have planted without any technical guideline should be assisted to consider key questions to consider before purchasing a seedling for urban area.

Bradshaw *et al.* (1995) also mentioned five generally accepted criteria for selecting tree species to plant in cities as: (a) It must with-stand poor soils, sunlight, water, noxious dust, soil, high wind, and vandalism; (b) the stem should grow straight for beauty and to avoid interference with sign or wire utilities; (c) the foliage should be full providing cover and green colour through out the year; (d) branches and shape should be

symmetrical; (e) there should be no disposable back of fruits that can create nuisance and unnecessary maintenance cost to the city authorities.

McCurdy (2004a) cautioned that when selecting trees for planting many important considerations need to be taken and that the long-term commitment of installing a tree warrants pre-planting planning. The author argued that key issues to consideration include: (a) soil and other conditions i.e. soil pH, soil drainage, temperature and sunlight, (b) size of the tree; (c) function of the tree on the compound (http://www.na.fs.fed.us/spfo/pubs/uf/techguide/selection.htm).

Under the Tanzanian context urban authorities' bylaws seem weak. For example, The DCC bylaws of 1989 made under the local government urban authorities Act No 8 of 1982, Section 80, items 6, 7 and 9 on regulations for planting trees and maintenance seem to be dormant. This bylaw states that: "Every resident who holds land under the grant of a right of occupancy or in accordance with customary law pertaining to land tenure shall plant trees as set out in the schedule to those bylaws. And according to trees planting schedule for 2002, this bylaw required people to plant five trees in the high-density areas, 10 in medium-density and 20 in low-density areas. However, in practice this by-law has never been followed. Also, item 4 of the same bylaw of 1989 on ownership of trees in specified areas which states. "Any tree growing in specified area shall be the property of the council" (DCC, 1989). This implies that urban dwellers were not owners of the trees they had planted leading to vandalism.

Sydnor (1994) highlighted that when selecting a tree for landscaping purposes consider the following: (a) will the chosen tree be able to attract birds to the area; (b) provide appropriate shade; (c) screen and unsightly view; (d) enhance the view of the home (e) identify an entrance or exits. Sydnor (1994) also pointed out that when selecting a specific tree for certain urban areas one has to consider the space available at the specific site and nature of tree size, which all reduce the maintenance cost. Sydnor recommends that tree distance should not exceed ten feet away from the transformers, not exceed 25 feet away from over heads power lines, and not near the underground utilities. Findings from NRCSD (2000) also cautions that planted trees should not be near houses or other infrastructure.

The author emphasized that individuals should consider neighbours' interests as a tree could provide too much shade and impede flowering and gardening activities of neighbours as these require considerable amount of sunlight. This consideration is crucial and has implications on urban agriculture (UA) in the study areas as many households in Kinondoni grew vegetables (Mlozi, 1995b). On this, findings from NRCSD (2000) argue that it is important to consider the placement of trees in a particular site, how they will obstruct driveways, side walks, buried or overhead utilities.

2.3.2 Problems associated with improper selection of tree species in urban areas

Critical problems caused by urban trees as highlighted by Sydnor (1994) are those related to public safety, broken side walks, drive ways, interference with lighting, dangerous screening, electrical power failures, damage to buildings, clogged sewers and drains. These problems are discussed below.

Sydnor (1994) argue that public safety dictates that homeowners and municipalities alike have an obligation to maintain planted trees. Failure to properly place any tree can cause safety problems, especially in urban sites which are characterized by compacted soils and large amounts of paving, both of which reduce oxygen penetration and force surface rooting in all trees. When trees are planted in spaces that are too small as often happens in urban areas, trees size and service lives are reduced. Trees planted in too small spaces, not maintained properly or those that are declining should be removed in the interest of public safety, as trees do not live forever and should be replaced.

Sydnor (1994) argue that careful consideration should be given to the space available for the tree height and spread as a six-foot square planting area can accommodate a tree with a mature height of 20 to 35 feet. When planted in narrow places, larger trees cause damage when trunk and roots lift and crack pavement and sidewalks. This argument is valid in Morogoro and Kinondoni municipalities, because of lack of technical advice. Sydnor (1994) emphasized that trees with dense foliage or low spreading branches should not be planted in areas of street lighting or they will interfere with sidewalk

illumination, and that trees planted opposite each other on both sides of the street will also interfere with security lighting. Selection of tree species for urban areas seem to conflict with lighting in the two study towns.

To minimize danger of tree limbs blocking visibility of street or traffic lights, signs, drive ways, and side walks, new trees should be planted at least 35 feet from an inter section. Sydnor (1994) emphasizes that branches of existing trees should be limbed up at 61/2 to 7 feet above ground and that trees severely hindering visibility should be removed. Use of shrubs along streets is not recommended since its density and spread impair vision. However, the prepared master plan for Kinondoni municipality has highlighted some shrubs species like *Nerium oleander* and *Allamander spp* as priority species for median road. Shrub tree species are not recommended for planting along median roads as they impair drivers' visibility to road signs. It seems the urban authorities are not aware of the generally accepted criteria for planting trees in roads as the provided criteria have not been considered during formulation of Dar es Salaam city master plan for planting trees.

In Tanzania, TANESCO is responsible for power supply, and is responsible for limbing up over grown branches along power lines to avoid interferences and power failures. According to Sydnor (1994) power failures normally happens when tree branches or whole trees face or contact electric lines and such power failures become serious during

storms. Urban trees also contribute to momentary power failure that may interfere with appliances. Momentary power failure can be a minor irritant to the home owner.

Because of these problems, trees be planted in areas where they will not interfere with utility services. Underground utilities, including electric and gas lines, telephone and cable service should also be considered. In Kinondoni and Morogoro municipalities major underground utilities which interfere with growing trees include Dar es Salaam Water and Sewage Authority (DAWASA) pipelines, Tanzania Electrical Supply Company (TANESCO) wires and Tanzania Telecommunication Company Limited (TTCL) wires.

Sydnor (1994) further argues that when planting trees in areas served with underground utilities, it is important to determine the location and depth of the utilities before digging, and that respective authorities be contacted before planting trees. Depth of buried utilities is generally two feet, however, this depth varies greatly due to grade changes and other factors, and that utility companies for this case must maintain their facilities so that trees and shrubs planted near these lines or within 10 feet of surface mounted transformers do not cause problems.

According to Kilahama (1991) trees growing by individuals and household were seen as a viable solution towards problems of households' domestic energy and livestock feeding. However, Sydnor (1994) cautioned that trees that are too close to the house or

are not kept properly pruned might cause damage to gutters, paint or roofing. Therefore, it is important to select trees that will not litter the out door living area or clog gutters with twigs, fruits, or other debris. Also avoid trees with spreading branches, which may cause damage to buildings, and remove all low hanging and dead or weakened branches that might break during a storm and trees that over hang buildings should be inspected for every 3-5 years by professional arborist. However, in Tanzania this is not always the case probably due to softness of by laws and regulations.

Trees may cause problems by dogging storm sewers, drains and sewage systems with flowers fruits, leaves, or roots. This problem is common in many urban areas of Tanzania particularly in Morogoro and Kinondoni municipalities that cause problems to DAWASA and MOROWASA sewage systems. According to Sydnor (1994) once the tree root gets into a sewer it will find water, air and nutrients that allow it to grow rapidly and clog the sewer. Fortunately, installing and involving cemented pipes that greatly reduces or eliminates this problem modernize most city sewers.

2.4 Conceptual Framework

2.4.1 Factors affecting choice of trees species to plant in urban areas

A conceptual framework consisting of factors affecting the choice of selecting tree species to plant in urban areas of Kinondoni and Morogoro municipalities is discussed below (Figure 1).

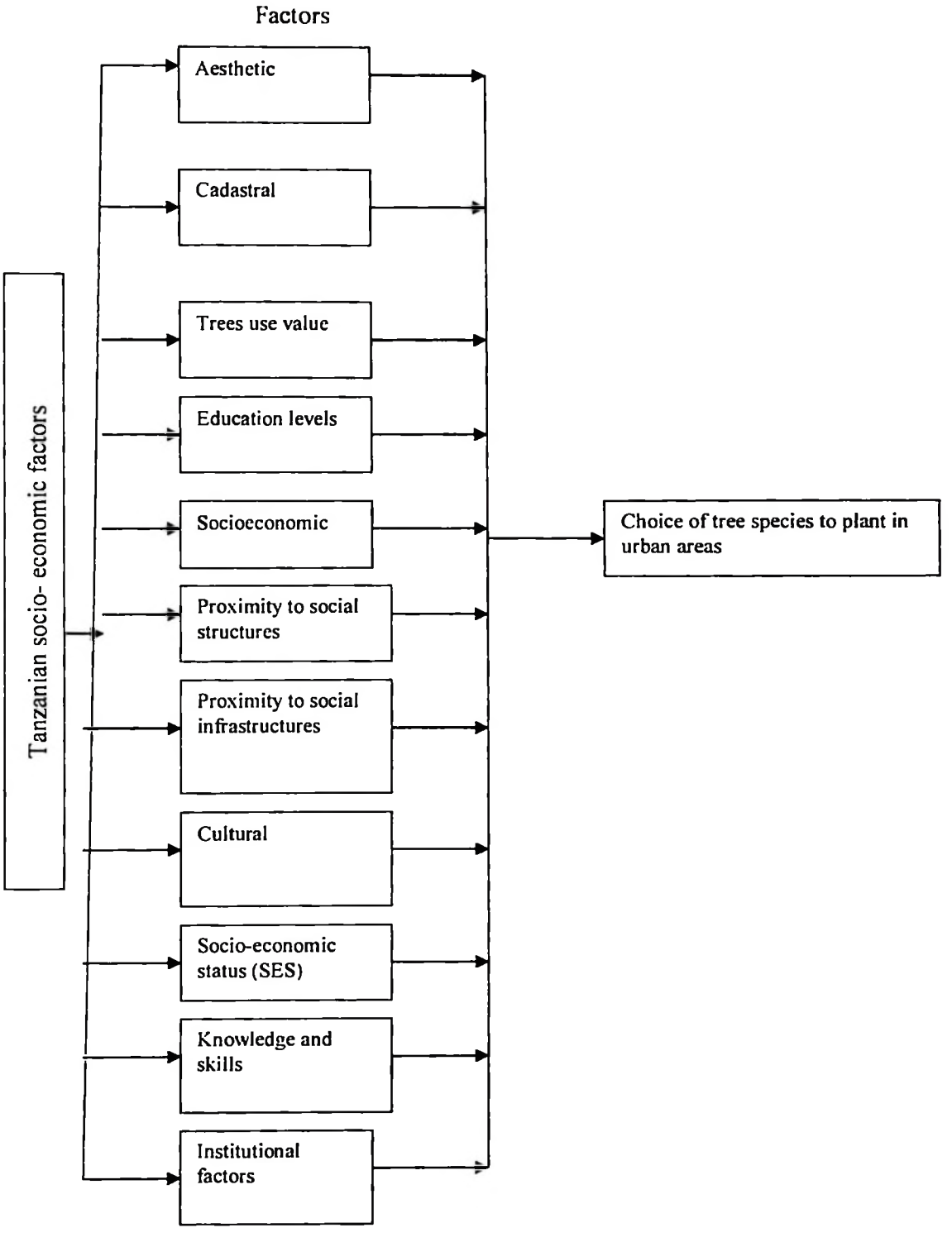

Figure 1: Factors affecting the choice of selecting tree species to plant in the municipalities of Kinondoni and Morogoro.

2.4.1.1 Socio-demographic factors

Socio-demographic factors in this study involved density and planning status of residential plots, gender, age and marital status of respondents, reasons for coming to town, years lived in town, education level of household members and household composition. Socio-demographic factors have long been known to affect urban forestry in developed countries in particular among the culturally distinct populations of Metro Toronto areas in Canada (Fraser *et al.*, 2000).

2.4.1.2 Economic factors

In this study economic factors involved main occupation, income generating activities, home assets and social services owned by a household. Beck *et al.* (1994) argued that in most developing countries, lower income residents attends frequently to city parks more than wealthier citizens do because lower income residents lacked the financial means and leisure times to reach more distance recreational sites. This argument could have an implication to the choice of trees species to plant in urban areas. According to Kuchelmeister (2000) urban trees and other green vegetation to be useful to low income people, they must have the amenities that people desire. This study assumed that low income could be associated with poor tree species selection because of buying the expensive seedlings. In practice, lower SES lived in high-density areas and has low income and low levels of education attainment. In this study, main occupations meant that the household heads depended on for financial earnings and it involved either in

formal employment, farming crops, livestock keeping, commerce, manufacturing and or , food vending. Other income generating activities included either operating kiosks, owning bars, transportation business, retail shop, food vending and selling charcoals. This study assumed that these economic factors could have an association with the choice of tree species to plant in urban areas.

2.4.1.3 Knowledge, skills and perceptions of people

For convenience of this study, knowledge, skills and perceptions will comprise media used to learn about urban trees, community based information for urban trees, and duration involved to receive tree-planting information in urban areas. Others include urban forest information received for previous six months, distances between planted trees, and residential house, places where respondents like to plant urban trees. Yet, others were if received enough information on trees planting, if advised on choosing a tree to plant on residential plots, and if had other places to plant trees, if thought that distance between central business district (CBD) and tree planting plot affected the choice for planting urban trees. Others were if residential plots were enough to plant the desired tree species, if they thought that tree planting on homestead compounds was good think, if urban dwellers were encouraged to plant trees in urban areas.

2.4.1.4 Cultural factors

In this study, cultural factors include religion of respondents, place of birth, how which a household head acquired house, and zone of origin of respondents. Many urban forestry studies in developed countries revealed that socio-cultural factors affect the perceptions of urban forest practices (Fraser *et al.*, 2000). According to Miller (1988), attitudes towards public trees can vary by neighbourhood, community, and ethnic background. This study assumed that variation of cultural backgrounds and perceptions of respondents on urban trees could affect their choice of tree species to plant in urban areas of Morogoro and Kinondoni municipalities. According to McPherson (2003), urban trees provide numerous social and cultural co-benefits, aesthetic improvement, health benefits, and educational opportunities.

Experience from other parts of Tanzania show that some people may grow trees because their social derives since some ornamental trees species may be required to make homes attractive (Kilahama, 1991). The author argues that customs and beliefs affect choice of tree species for rural afforestation, for example, the Wasukuma in Mwanza and Shinyanga (Lake zone area of North West Tanzania) area believe that most tree species attract birds (quelea quelea), and they refuse to plant trees in their fields. The Wasukuma also associate tree cover with presence of tsetse flies, which affect their cattle, they also reject tree species that are likely to produce a lot of shade on either farms or homesteads. Such feelings could also be present in urban areas.

2.4.1.5 Cadastral factors

In this study, cadastral factors involved ways in which respondents acquired a plot for tree planting and the ownership of planted trees, planting intervals i.e., distance between plots and central business district (CBD), number of plots owned, condition of plots, size of plots, and prices for buying plot. Three distinct groups of residential areas were categorized on basis of densities in Dar es Salaam in city. These groups were the low density areas with plot sizes typically measuring 4 640m^2, the medium density areas with plot measuring about 896m^2 and the high density areas with plot with sizes measuring about 300m^2 and that majority of plots are of this category (Mlozi, 1995b). According to Murray (1994), most urban research dealing with spatial dynamics and major land management issues in urban and peri-urban zone in Africa, Asia and Latin America are not at all directly related to tree management and may be in conflict with tree development and conservation objectives. This argument applied in Tanzania.

2.4.1.6 Proximity to social infrastructures and structures

In this study, social infrastructure factors included distance interval between planted tree and residential house, damage caused by urban trees on tarmac roads, building floors, telephone wires, interference with road signs and damages on water supply pipes.

Critical infrastructure problems caused by urban trees as highlighted by Sydnor (1994) are those related to public safety, broken side walks, drive ways, interference with lighting, dangerous screening, electrical power failures, damage to buildings, clogged

sewers and drains. According to Cermak *et al.* (2000), tree roots are notorious for buckling the pavement of sidewalks and streets. Uneven surfaces may pose a hazard to pedestrians and motorists. Researchers are looking into several methods of preventing or at least delaying, this type of damage. Planting time offers the best opportunity to prevent conflict between trees and pavement.

2.4.1.7 Aesthetics and other tree utility factors

In this study, aesthetic and other utility factors meant the importance of urban trees in Dar es Salaam and Morogoro towns, which included livestock feeding, beatification from trees, and provisional of fruits, barks, leaves, and shade. Other provisions included: human food (fruits), fuel wood, poles, windbreak, and medicine. Yet others included charcoal making, enhancing water sources, soil erosion prevention, and use of trees for boundary marking. According to McPherson (2004), trees are the major capital assets in cities across the world, and have the following benefits: (a) improvement of air quality through carbon sequestration and reduction of other pollutants; (b) extend the life of paved surfaces; (c) increase traffic safety; (d) improve economic sustainability; (f) affect consumer perceptions and behaviour (g) add aesthetic value; and (f) increase real estate value.

According to Kuchelmister (2000) there is a growing recognition that urban forests improve the quality of urban life in many ways by providing both tangible (food, energy, timber and fodder) and less tangible benefits (environmental service social benefits to

meet local necessities). The Centre for Urban Forest Research (CUFR) says that urban forests can also bring communities of people together and form connections between humans and the urban flora and fauna (CUFR, 2004).

Kuo and Urlich (1993) showed that apart from urban trees having an overall physical healing and mood improving effect, trees have been credited with reducing aggression and violence in cities and encouraging positive behaviour. Dwyer *et al.* (1989) reported that trees offered an immediate connection to nature within an urban area and people generally appreciated more wooded recreational sites over open space with fewer trees. These intrinsic values of trees and the environments they improve is an often overlooked aspects of urban and suburban forestry and that they do have influence on people when choosing trees to plant in their plots.

All tree planting and management in cities are done with a human value and objective in mind and the term aesthetic was defined as ability of trees and green vegetation to give amenities that people desire (Murray, 1994). A well-known example of urban tree planting efforts in cities of developing countries has a focus on aesthetic improvement (FAO, 1999). Urban trees provide numerous social and cultural co-benefits, aesthetic improvement, health benefits, and educational opportunities are only a few of the positive effects that urban and sub urban tree can have on a community (McPherson, 2003). These arguments for planting trees in urban areas applied in study areas and the choice of tree species to plant in urban areas of Dar es Salaam and Morogoro towns.

According to Webb (1998), tree species with desired aesthetic value could rise up the value of infrastructure, for example, in Hong Kong house prices were increased by up to five percent due to trees planting. Morales *et al.* (1998) also reported an increment of up to 18 percent in USA, and in Singapore and Kuala Lumpur it has been recognized that a tree in urban landscape has an important attraction for new businesses and investors.

2.4.1.8 Climatic factors

In this study, climatic factors included elements of weather temperature wind, light, geographical location and rainfall. This factor was assed through secondary data and focused group discussions conducted with different staff. According to Kilahama (1991) species suitable for high rainfall areas may resist to grow in semi-arid areas. However, many people may not understand such a pre-requisites as they may demand a certain tree species based on their social needs or mere interests and aesthetics perceptions. Findings from different studies have shown that at a level of household, there are significant local micro-climate impacts of vegetation; in particular that influences the daily and seasonal temperature fluctuations, and wind speed, depending on plant type and location (McPherson, 1993; Akbar *et al.*, 1992). This study assumed that climatic condition affected the choice of tree species to plant in urban area.

Environmental conditions tend to be more varied in urban areas than in less developed areas. For example, asphalt surfaces surrounding one site make it hot and dry, but

around the corner, buildings cast shadows that cut temperatures and minimize evaporation of soil moisture. Light, wind, temperature, and soil conditions can change abruptly from one spot to another. Urban conditions are frequently more severe for the growth of plants than in natural environments. However, the city as a whole generates heat that usually keeps temperatures warmer in all seasons than more natural areas. This is called the "urban heat island" effect (Eugene, 2003). Conditions vary considerably, and it is wise to assess each site individually and the best way to identify site conditions is to tour on foot. Be sure to consider changes that are planned in the vicinity, even if plans are not yet final. The construction of streets and buildings, channelling surface water, and routing utility corridors can all affect the ability of a site to provide for the needs of trees. While it is best to anticipate urban evolution, it is safe to assume that plants and people will always have to adapt to unforeseen changes.

2.4.1.9 Availability of seeds, seedlings, and their prices

The Forestry and Natural Resources Department of the Dar es Salaam City in 1997/8 targeted to raise 252 360 tree seedlings by using the space of three nurseries in Kawe, Kimbiji and Boko (KMC, 2003). The target was achieved and the tree seedlings were distributed to villagers, schools, and other institutions. Since 1989, when the government of Tanzanian established the National Tree Seed Programme (NTSP), there was monopolistic behaviour in undertaking duties pertaining to identification, establishment, and management of good quality seed sources and to prepare certificates of origin of

seed supplied for export and domestic customers. However the system was inefficiency and this resulted in order to maximize its efficiency in service delivering, in January 2003 the TTSA with its major objective of selling seeds and seedlings and providing consultancies. Since the TTSA privatization, other stakeholders and individuals can now legally be allowed to sell some tree seeds, particularly those which do not loose viability easily (URT, 2004a). For example, experience showed that the easiness through which a farmer can obtain tree seeds locally is an important factor to consider in deciding on tree species to be used in villages (Kilahama, 1991).

Apart from the availability of planting materials, affordability may be a constraint to urban dwellers for seeds or seedlings to plant in their plots. This study assumed that availability of seeds, seedlings and prices of seeds and seedlings did affect peoples' choice of tree species to plant in urban areas.

CHAPTER THREE

MATERIALS AND METHODS

3.0 Introduction

This chapter discusses the methodology used in this study. It covers the location of the study areas, research design, and description of study population, sampling procedures, pre-testing of questionnaires, data collection procedures, and tools used for data analysis. The limitations encountered during the survey are also discussed.

3.1 Location of the Study

3.1.1 Morogoro Municipality

Morogoro municipality in Morogoro region was the first research site, and is about 220 km west of Dar es Salaam lying between latitude 5°0' and 7°40' South of the equator, and longitudes 37°10' and 38°33'East of Greenwich. It is situated north of Uluguru Mountains and the area covers about 65 km^2. In 2002 census, Morogoro municipality had a population of 0.23 million, 0.11 and 0.12 million being male and female respectively (URT, 2003; Appendix 1). Morogoro town was selected to show tree-planting situation in a small growing town as compared to large city like Dar es Salaam.

3.1.2 Kinondoni Municipality

Kinondoni municipality was the second study area (Appendix 2; and Appendix 3). Kinondoni is within Dar es Salaam city. Dar es Salaam city was selected to show tree-planting situation in cities. Kinondoni Municipal Council is one of the three municipalities constituting the Dar-es-salaam city, while the other municipalities include Ilala and Temeke. Kinondoni Municipal was established through an official government gazette Number 14 of 2000. The municipality is bordered by the Indian Ocean to the North East, Ilala Municipal Council to the South, Bagamoyo District to the North, Kibaha District to the West and Kisarawe District to the South West (KMC, 2003; Appendix 2; Appendix 3).

In 1992, Dar es Salaam city area was estimated to cover about 1 393 square kilometres and is the biggest urban agglomeration in the country and the most dynamic socio-economically, culturally and geographically. The city lies 10 meters above sea level and is located around latitude 7°0'S and 39°0'E. Based on the 2002 Tanzania Populations and Housing Census, Dar es Salaam had a population of about 2.5 million people and an average household size of 4.2, while the annual average population growth was 4.3. The 2002 census showed that the female population was 1.23 million, while male population was 1.26 million. Administratively Dar es Salaam City Council (DDC) is responsible for administration of the city (URT, 2003).

The original occupants of Kinondoni municipality (Appendix 3) were Zaramo and Ndengereko, but due to urbanization many people of different ethnicity have migrated to live in the Municipality, with most people predominantly of African origin and with sizable Asian and Arab communities. Average population density per km^2 is 2 825 persons. The dominating religions are Moslem and Christianity (URT, 2003).

3.2 Research Design

A cross-sectional design was applied where by data was collected at a single point in time from a sample selected to represent some larger population (Babbie, 1990). The design is suitable for data collected through cross sections for both description and determination of relationships between variables. The study findings were supplemented by researcher's observations, which involved the identification of tree species planted around residential plots using hired botanist. Discussions and interviews with various staff and key stakeholders of urban forests in respective municipal authorities were also conducted.

3.3 Description of the Study Population

The study population consisted of household heads who had planted trees in their residential compounds in urban areas of Kinondoni and Morogoro municipalities.

3.4 Sampling Technique and Procedures

The sampling unit was the household head and a multistage sampling technique was employed. This technique was convenient for studying large and diverse urban

population of which the list of actual individuals to be studied was not available (Beck *et al.*, 1994). The sampling stages involved the regions, municipal authorities, wards, streets and finally the household heads. A household was considered a unit of problem analysis because all decisions about investment, production and utilization of planted trees are made at the household (Corbelt, 1988). Random sampling method was used to pick wards, streets and households. During sampling process, all urban wards within respective municipalities were listed, and in Morogoro Municipality there were 19 wards, while in Kinondoni there were 27 wards. It was revealed that out of 27 wards in Kinondoni municipality, 25 were within urban areas, while in Morogoro there were only 18.

With the assistance from Morogoro and Kinondoni municipal urban planners, the urban wards were grouped into planned and unplanned areas. Thereafter, the grouped wards were further classified based on their density status namely: low- density (LD), medium-density (MD), and high-density (HD). After the categorization of the urban wards, six density-planning classes were identified as: planned-high density, planned-medium density, planned-low density, unplanned-high density wards, unplanned-medium density wards, and unplanned-low density wards (Table 1). Thereafter a table of random numbers was used to pick one ward from each of the six density planning classes, and from each randomly selected ward one street was selected for further study. To randomly select streets, names of all streets within a ward were listed in alphabetical order, and randomly selected using a table of random numbers. This procedure produced

about five to ten household heads who were selected for the study from each street who had at least one tree in their urban homesteads. Random sampling was selected because it avoids biases and gives a better representation of the intended population and a significant representation of population is achieved when a sample of at least 5% of total desired population (sampling frame) is taken into account (Boyd *et al.*, 1981).

Table 1. Multistage sampling technique used in the study.

Region	Municipality	Density-planning status of identified ward	Name of identified wards for interview	No
Morogoro	Morogoro	Planned high-density	Mji mkuu	5
			Mafiga	5
		Unplanned high-density	Mbuyuni	5
			Kichangani	5
		Planned medium-density	Kilakala	5
			Kihonda-Maghorofani	5
		Unplanned medium-density	Kihonda kwa chambo	10
		Planned low-density	Boma	10
		Unplanned low-density	Mlimani	10
Dar es Salaam	Kinondoni	Planned high-density	Ndugumbi	5
			Sinza	5
		Unplanned high-density	Tandale	5
			Hanna Nassif	5
		Planned medium-density	Ubungo	5
			Kijitonyama	5
		Unplanned medium-density	Mwananyamala	5
			Kinondoni	5
		Planned low-density	Mikocheni	10
			Msasani	10

It was assumed that the number of residential plots with trees (N) in a street would not be below 100 to make a sample of at least 5 percent of desired population (sampling frame). To obtain a sample, Boyd's (1981) formula was used: it states that **n/N *100 = C**, where C represented a percentage figure of picked households, N the total number of households in a street and n the number of picked households for the interview. In this study one female respondent was interviewed after every one male respondent. This

procedure was used to interview all 120 respondents in the two study areas of Morogoro and Kinondoni town i.e. 60 respondents from each municipality.

3.5 Data Collection

3.5.1 Questionnaire pre- testing

Pre testing was done to test the questionnaire for its validity and there after necessary adjustments and corrections were made to the instrument before its final administration. For Kinondoni municipality, pre-testing of questionnaires was done at Mwananyamala and Msasani wards while for Morogoro municipality the questionnaire were pre-tested at Boma and Mafiga wards.

3.5.2 Primary data

A structured questionnaire was prepared and used to elicit information from household heads whose residential plots had trees planted on them (Appendix 4). Interviews with various staff of respective municipalities and discussions with key informants of urban forests were also conducted. Collection of data was done by a researcher assisted by one botanist, for trees identifications (Appendix 5). Before embarking on data collection an official letter of approval was secured from the university authority to undertake this study (Appendix 6).

The researcher then went to the Regional Commissioners' Offices (RCO) of Morogoro and Dar es Salaam to seek for permission to undertake the study (Appendix 7; Appendix 8). Having received permission from RCO's a researcher went to Municipal Director's Offices in Morogoro and Kinondoni to seek for further approval to carry out the study within the study site (Appendix 9; Appendix 10). Upon completion of these logistics, the researcher went to Ward Executive Offices (WEO) to seek permission to carry out the study in the sampled streets. Then the researcher met street leaders for formal introduction and showed them letters of permission to interview household heads who planted trees in their streets. Data collection involved meeting individual household heads on their compounds and interviewing them using a structured questionnaire after identifying the planted trees.

Other data were collected through direct observations and through discussions with the relevant municipal, other institutions, organizations staff, teachers, agricultural and livestock officers, and tree seedling sellers. Others included university lecturers, district natural resource officers, and land use officers, wards executive officers, street leaders, and various tree nursery attendants. Participants' observations by the researcher involved direct observations of urban community and household's activities and the type of tree species planted on their compounds. The observations were recorded in the field notebooks. The process of participant observation was primarily used to tie together the more discrete elements of data gathered by other methods such as questionnaires. According to Kajembe (1994), the questionnaires tool allows aspect of life in the study

area to be isolated and studied out of context of community life while participants' observations permit the aspects of life to be examined within the context of social system.

3.5.3 Secondary Data

Data from secondary sources were obtained by consulting relevant official documents both published and unpublished. Kinondoni and Morogoro Municipal Council official documents were used and brochures and secondary data from TTSA were also utilized.

3.6 Data Processing and Analysis

After each interview data from each questionnaire were inspected for its accuracy immediately before proceeding to another respondent. Thereafter, all survey field data were cleaned, coded, and entered into a computer and analyzed using the Statistical Package for Social Sciences (SPSS) computer program.

3.7.1 Descriptive statistics

Descriptive statistics of mean, range frequencies and standard deviations was employed to determine distribution of values of variables and to summarize the data.

3.7.2 Bivariate analysis

Bivariate analysis was done to investigate how variables were related to each other. Cross tabulation and Chi-square were employed to demonstrate the presence or absence of relationships among variables.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter describes the results of the study and some observations made during the study. The chapter is divided into five sections. The first section discusses the socio-economic and demographic characteristics of the respondents followed by a section describing the identified trees in the respondent's compounds. Third, is a section highlighting the importance of the planted urban trees and other wood plants while knowledge, skills and perceptions of the respondents on trees are presented in the fourth section. Section five describes factors that respondents mentioned as affecting the choice of trees to plant in urban areas in the respective municipalities.

4.1 Socio-economic and Demographic Characteristics of Respondents

Appendix 11 shows both the demographic and socio-economic characteristics of respondents which included among some: gender, age, marital status, religion, education level, main occupation, home assets and social services, and income generating activities of the respondent (Appendix 11). There were equal representations of males 60 (50.0%) and females 60 (50.0%) in the interview and there were no statistically significant differences at $p< 0.05$ between the two groups. Age of respondents ranged from 21 to 80 years, and old, with a mean of 49 years, and less than half of the respondents, 47 (40.2%) were in the age range of 30 to 45 years old, followed by those between 46 to 50

years, 33 (28.2%), and above 60 years, 27 (23.1%). This age structure implied that most respondents were in the active working group (30 to 45) years old and could make decisions regarding urban tree planting (Appendix 11). The study showed significant difference at $p< 0.05$ among the age groups. Over two thirds of the respondents 84 (70.0%) were married followed by widowed, 11 (9.2%), while others were polygamous 9 (7.5%), single 8 (6.7%), divorced 7 (5.8%), and separated 1 (0.8%). The study showed no statistical significant difference ($p < 0.05$) among the marital status groups, which implied that all groups participated in urban tree planting (Appendix 11).

Half of the respondents were Moslems, 61 (50.8%) followed by Christians, 59 (49.2%), and there was significant difference at $p< 0.05$ between the two religions. This finding implied that both Moslems and Christians planted trees in their residential plots. Considering the education level of respondents 46 (38.3%) had attended seven years of formal schooling (primary school), followed by those who had attained college/university education, 30 (25.0%), ordinary secondary education 22 (18.3%) and lastly those who had no formal schooling (6.7%). The study shows that there was no statistical significant difference at $p< 0.05$ between levels of education of respondents, implying that both literates and illiterates planted trees on their residential compounds.

One third of the respondents, 39 (32.5%) were business people, 32 (26.7%) and formal employees, 24 (20%). Other respondents' occupations were livestock keeping, manufacturing, and food vending. There was a significant difference at $p< 0.05$ between

the main occupations of respondents. This difference has socio-economic implication on the selection of tree species to plant in the urban dwellers' compound.

Household composition of surveyed respondents based on age and sex distribution show that majority of households composed of male below 18 years (51%), followed by female below 18 years (25%). Male aged between 18 and 65 accounted for (13.6%) while female of this category accounted for 6.7 percent. Another category involved male and female elders above 65 years, who accounted for 2.1 and 0.5 percent respectively (Table 2)

Table 2: Percentage distribution of household composition of respondent from Kinondoni and Morogoro municipalities (N=120).

Household composition	Morogoro (n=60)	Kinondoni (n=60)	Total (N=120)
Male (<18)	47.7	54.8	51.6
Female (<18)	29.0	22.8	25.6
Male (18-65)	13.5	13.7	13.6
Female (18-65)	5.7	7.5	6.7
Male (>65)	4.1	0.4	2.1
Female (>65)	0.0	0.8	0.5
Total	100.0	100.0	100.0

Analysis was based on multiple responses.

Household composition in terms of their age-sex distribution has implications in urban forestry as people who are capable of being involved in productive activities are only those within certain age-sex group.

Main income generating activities (IGA) of respondents were mentioned as operating kiosk, 22 (44%), and retail shop, 13 (26%). Other IGA that respondents mentioned were operating bars, transportation business, and food vending, and selling charcoal (Table 3).

Table 3: Income generating activities of respondents from Morogoro and Kinondoni municipalities

Activity	(n=9) Morogoro	(n=41) Kinondoni	(n=50) Total	χ^2-value	P-value
Operating kiosk	1 (11.1)	21 (51.2)	22 (44.0)	14.609	0.012
Own bar	0 (0.0)	3 (7.3)	3 (6.0)		
Transportation	2 (22.2)	6 (14.6)	8 (16.0)		
Retail shop	4 (44.4)	9 (22.0)	13 (26.0)		
Food vendor	2 (22.2)	0 (0.0)	2 (4.0)		
Selling charcoal	0 (0.0)	2 (4.9)	2 (4.0)		

Figures in parentheses are percentages and those out of parentheses are frequencies.

There was significance difference at $p<0.05$ among IGA for the respondents. Most respondents, 116 (98%) indicated that they owned radios and there was a statistical significant difference at $p<0.05$ (Table 4). Two thirds of the respondents, 72 (66%) indicated that they have television sets. There was a statistical significant difference ($p < 0.05$) for urban dwellers owning television sets. Other home assets that respondents indicated to own included refrigerators, bicycles, motor cycles, electricity, electrical cookers, vehicles, cattle, goats, and water reservoir tanks (underground and overhead). Electricity as one of the home social services was indicated by 89 (74.2%) of the respondents, only 33 (27.5%) of the respondent indicated that they use electricity for cooking, heating and other domestic uses (Table 4). This finding has socio-economic implications on urban forestry as planted trees are used as alternative energy sources from fuel wood and charcoal.

Table 4: Home assets and social services of surveyed households (N=120).

Variable	Morogoro (n=60)	Kinondoni (n=60)	(120)	χ^2value	P-value
If own radio	56 (93.3)	60 (100.0)	116 (96.7)	4.138	0.42
If own television set	30 (50.0)	42 (70.0)	72 (60.0)	5.000	0.025
If own bicycle	33 (55.0)	26 (43.3)	59 (49.2)	1.634	0.201
If own motorcycle	10 (16.7)	6 (10.0)	16(13.3)	1.154	0.283
If own refrigerator	28 (46.7)	39 (65.0)	67 (55.8)	4.089	0.043
If own car	24 (40.0)	21 (35.0)	45 (37.5)	0.320	0.572
If own telephone	18 (30.0)	17 (28.3)	35 (29.2)	0.040	0.841
If connected to electricity	31(51.7)	58 (96.7)	89 (74.2)	31.707	0.000
If use electric cooker	14 (23.3)	19 (31.7)	33 (27.5)	1.045	0.307
If own cattle	14 (23.3)	11(18.3)	25 (20.8)	0.455	0.500
If own goat	7 (11.7)	1(1.7)	8 (6.7)	4.821	0.025
If own piped water	33 (55.0)	54 (90.0)	87 (72.5)	18.433	0.000
If own water reserve tank	6 (10.0)	5 (8.3)	11 (9.2)	0.752	0.500

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

Water supply as one of basic social service was indicated by, 87 (72.5%) respondents who were connected to piped water tested chi-square showed a significant difference ($p< 0.05$) of these, comparing the water supply in Morogoro and Kinondoni municipalities, the majority of respondents indicated to had been connected to piped water 54 (90%), than few, 33 (55.0%) in Morogoro municipality. Water supply had an implication for watering the compound planted trees. Other learned socio-economic variables of respondents are indicated in Appendix 11.

4.2 Preferred Tree Species to Plant in the Surveyed Compounds

Table 5 shows assessment of top 23 tree species that urban dwellers of Morogoro and Kinondoni municipalities preferred to plant on their compounds while Appendix 12

shows a full list of all 49 identified tree species during the survey in order of their preferences. *Azadirachta indica (Mwarobaini)* commonly known as "Neem tree" was the most preferred tree as of the 120 respondents 63 (52.5%) indicated to had planted the tree and there was significant difference at $p<0.05$ between those households that had planted the tree and those who had not. Over two thirds of the respondents who had planted the Neem tree were in Kinondoni 41 (68.3%) and in Morogoro were 22 (36.7%). Based on focused group discussion results with the municipal staff, the reasons that compelled most urban dwellers to plant the tree were their ever-greenish nature, shade, and fruits they could produce.

Staff members in Morogoro municipality indicated that the tree was preferred because of its ability to tolerate hardship in water logged and semi-arid areas, and that it is a fast growing tree. Another mentioned advantage was its ability to tolerate saline soils, as said in Kiswahili "Unavumilia sana maji ya chumvi". FGD results with TTSA staff indicated that Neem tree is dominant in Morogoro because of 1990's tree planting campaigns spearheaded by *Hon. Lieutenant Yusufu Makamba* who was then the District Commissioner of Morogoro District. Also, *Azadirachta Indica* and *Senna siamea* seedlings were then provided free of charge from municipal nurseries. Also a by-law was set which compelled urban dwellers to plant the tree in their compounds and defaulters were punished by not approving and giving them business licenses, and or fined.

Table 5: Top 23 tree species preferred by urban dwellers of Morogoro and Kinondoni municipalities (N=120).

Specie code	Local/Kiswahili name	Scientific/Botanical name	Common name	Morogoro (n=60)	Kinondoni (n=60)	Total (n=120)	χ^2-Value	P-value
14	Mwarobaini	*Azadirachta indica*	Neem	22 (36.7)	41 (68.3)	63 (52.5)	12.063	0.001
13	Mjohoro	*Senna spp*	Yellow cassia/cassia	25 (41.7)	27 (45.0)	52 (43.3)	0.136	0.715
3	Mwembe	*Mangifera indica*	Mango tree	34 (56.7)	15 (25.0)	49 (40.8)	12.452	0.000
5	Mwashoki	*Polyalthia longifolia*	Ashok tree	23 (38.3)	20 (33.3)	43 (31.7)	0.326	0.582
4	Mnazi	*Cocos nucifera.*	Coconut Palm	24 (40.0)	14 (23.3)	38 (31.7)	3.851	0.050
6	Mchungwa	*Citrus aurantium*	Sweet Orange	19 (31.7)	19 (31.7)	38 (31.7)	0.000	1.000
8	Mkungu	*Terminalia spp*	Terminalia	13 (21.7)	19 (31.7)	32 (26.7)	1.534	0.215
25	Mstafeli	*Annona reticulata*	custard apples	19 (31.7)	10 (16.7)	29 (24.2)	3.683	0.055
12	Mchongoma	*Dovyalis caffra*	Kei apple	14 (23.3)	12 (20.0)	26 (21.7)	1.165	0.559
9	Mpera	*Psidium guajava*		20 (33.3)	3 (5.0)	23 (19.2)	15.545	0.000
33	Mkrismass	*Delonix regia*	Flamboyant	8 (13.3)	14 (23.3)	22 (18.3)	3.927	0.048
29	Mlimao	*Citrus limonum*	lemon tree	13 (21.7)	5 (8.3)	18 (15)	4.183	0.041
23	Mfenesi	*Artocarpus heterophyllus*	jackfruit	8 (13.3)	7 (11.7)	15 (12.5)	0.076	0.783
26	Muavuli	*Schefflera actinophylla*	Umbrella tree	6 (10.0)	9 (15.0)	15 (12.5)	0.686	0.408
7	Mparachichi	*Persia americana*	Avocado tree	8 (13.3)	6 (10.0)	14 (11.7)	0.323	0.570
15	Mgrevilea	*Grevillea robusta*	Silky oak	10 (16.7)	4 (6.7)	14 (11.7)	2.911	0.088
1	Mbrushi	*Callistemon citrinus*	Little john	7 (11.7)	5 (8.3)	12 (10.0)	0.370	0.543
21	Mkaratusi	*Eucalyptus spp*	Gum tree	7 (11.7)	5 (8.3)	12 (10.0)	0.370	0.543
38	Mkodia	*Cordia africana/sebastina*	E.African cordia	2 (3.3)	10 (16.7)	12 (10.0)	5.926	0.015
19	Mleucaena	*Leucaena spp*	Leucaena	7 (11.7)	4 (6.7)	11 (9.2)	0.901	0.343
10	Mng'ongo	*Sclerocaryia birrea*	Marula	7 (11.7)	3 (5.0)	10 (8.3)	1.745	0.186
24	Mzambarau	*Syzygium cuminii*	Java palm	7 (11.7)	3 (5.0)	10 (8.3)	1.745	0.186
30	Mkungu	*Ficus benjamina*	Weeping fig	4 (6.7)	5 (8.3)	9 (7.5)	0.120	0.729

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

The approach whereby government leaders were forcing urban dwellers to plant trees without educating them on the type of trees suitable for their compounds under different density status and soil characteristics seem to be a top-down approach which led to improper tree planting in various locations of the respective municipalities. Trees were planted through government schemes to satisfy politicians and meet business licences acquisitions shops, bars and hotels. *Azadirachta indica* and *Senna siamea* were planted because seedlings were available, the presence of bylaw, and not because urban dwellers liked them. However, FGD results indicated that Neem trees were not ate by livestock, termites and other insects because of its bitter taste.

The study results indicated that the second preferred specie was the *Senna siamea/spectabilis* (Mijohoro) commonly known as "Yellow cassia" (Table 5). Of the 120 households, 52 (43.3%) indicated to have planted S*enna spp.* on their residential compounds. However, there were no statistical significant difference at $p<0.05$ between households that had planted *Senna siamea* and those that had not. Comparing *Senna siamea* planting in the two study sites, study findings showed that 25 (41.7%) respondent in Morogoro town had planted *Senna spp,* while 27 (45%) indicated so in Kinondoni municipality (Table 5).

FGD results with staff in Kinondoni municipal indicated that *Senna siamea* were preferred because they were easy to grow and its seedlings were reliable throughout the year. FGD with tree seedling sellers in Ubungo indicated that a seedling of *Senna*

siamea prices ranged from Tsh. 200 to Tsh. 3000 depending on the polythene tube used to raise it. Further discussion with seedling sellers indicated that urban dwellers preferred *Senna siamea* to others species because of its shade, and yellowish flowers they could produce on roads and home compounds (Figure 2).

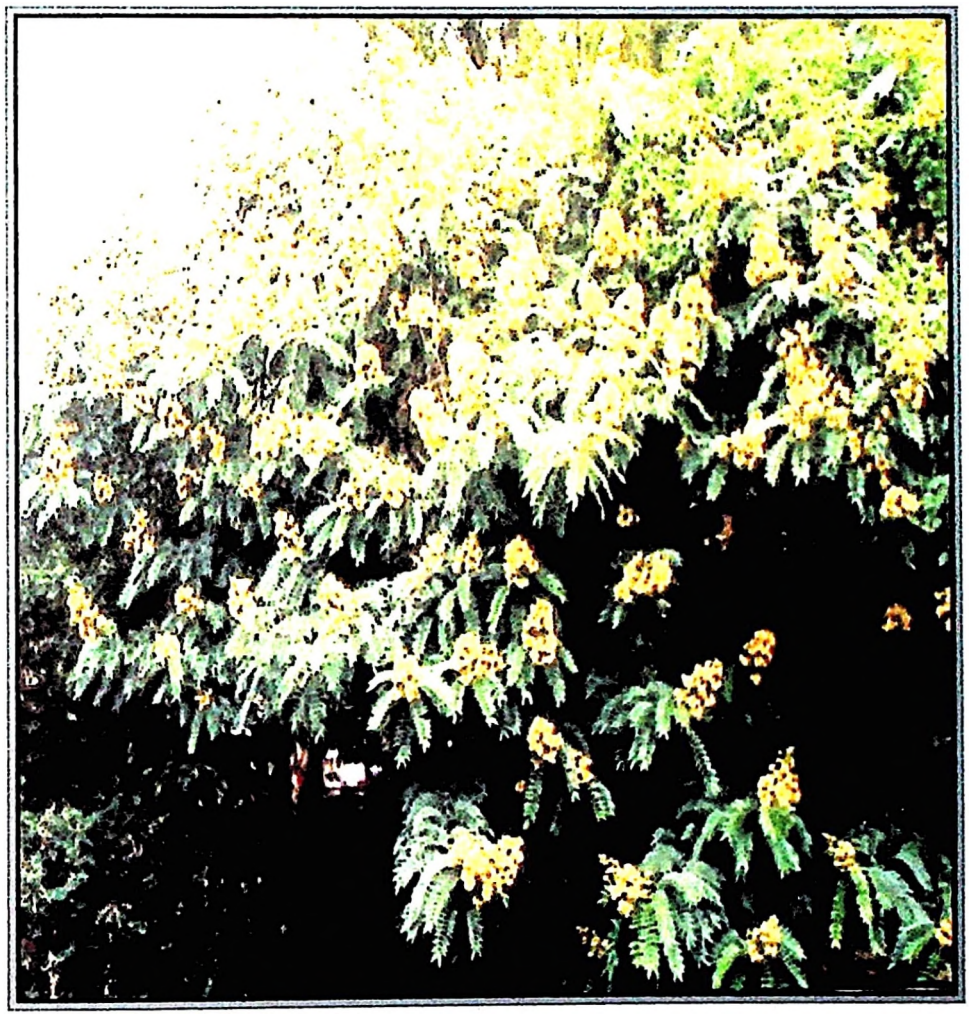

Figure 2: *Senna spp* (Yellow cassia) or *Mijohoro* in Kilakala area as one of preferred specie.

Figure 3: *Polyalthia longifolia* (*Ashok tree)* in Msasani area as one of preferred specie.

Furthermore, the third preferred tree specie to plant was a mango tree M*angifera indica* locally known as "Mwembe". Of the 120 respondents households 49 (40.8%) indicated to planted *Mangifera indica* (mango tree) in their compounds, and there was a significant difference at $p<0.05$ between compounds that had planted mango tree and those that had not. In Morogoro, urban dwellers bought grafted mango trees seedlings from Sokoine University of Agriculture (SUA) Horticulture Unit, while those in Kinondoni municipality got theirs from Kinondoni Municipal nurseries in Magomeni

and Kawe wards. Some get from privately owned nurseries. According to the FGD results and observations a grafted mango seedling was sold for Tsh. 3000 and seller got them either from other producers located in Masaki and Msasani areas. At SUA, a grafted mango seedling was sold for Tsh. 2000.

The fourth preferred tree specie was the *Polyalthia longifolia* commonly known as *Ashoki* and locally in Kiswahili known as "*Muashoki*". Out of the 120 respondents 43 (31.7%) indicated that they had planted the tree and there was no statistical significant difference at $p< 0.05$ between compounds with *Ashok* and those without it (Table 3). Based on the FGD results with staff in Kinondoni municipality, it was known that the major reasons for preferring Ashok was its beauty and good shade it could provide, the specie required relatively small ground space when grown to maturity, having deep root, evergreen nature throughout the years, and its ability tolerate for urban smoke and soot from industries and vehicles.

Observations by researcher revealed that most *Ashoki* trees were planted on compounds of urban dwellers of high socio-economic status, probably because of the high knowledge and skills to choose the tree specie owners of these compounds have. Based on the FGD with seedlings sellers' at Ubungo and Msasani areas Ashoki seedlings were sold at Tsh 3 000 to Tsh 3 500 per seedling depending on the size of container used to raise it i.e. larger the containers cost more. For example, a researcher observed one UWAMU member saying "*Miashoki ni miti ya nyumba za watu wenye uwezo kifedha*"

meaning that Ashoki trees were for urban dwellers who were relatively rich. Probably, this perception affected people's choice for urban tree in Kinondoni municipality.

The fifth preferred species was *Cocos nucifera* commonly known as coconut palm or locally *"Mnazi"*. Out of the 120 respondents, 38 (31.7%) indicated that they had planted coconut palm and a there was no statistical significant difference at $p<0.05$ between respondents who had planted coconut palm trees and those who had not (Table 5). FGD results showed that the reasons for planting coconut palm trees were to get fruits (nuts) and to beatify compounds. The sixth preferred tree specie was *Citrus aurantium,* commonly known as "Sweet orange" or locally known as *"Michungwa"*. Out of the 120 respondents 38 (31.7%) indicated that they had planted "Sweet orange, and there were no statistical significant difference at $p<0.05$ between respondents who had planted Sweet orange and those who had not.

Choice of fruits trees to plant in urban areas was associated with the then on-going political campaign of planting trees in Kinondoni and Morogoro municipality. The slogan governing the choice of a tree to plant read: "if you want to plant a tree for shade on your compound, choose a fruit tree because you could get both fruits and shade." Such a slogan may be criticized as unscientific since not all fruit trees were suitable for urban areas in the two municipalities, and many technical considerations may be ignored when choosing a tree to plant in urban areas. According to FAO (1999), most well known examples of urban tree planting efforts in cities of developing countries has a

focus on aesthetic improvement. Not all fruit trees had good amenities considered by urban dwellers as good aesthetically. Nevertheless there were no location specific lists of recommended fruit tree species in either of the two municipalities.

The seventh preferred tree specie was a shade tree known as *Terminalia spp.* commonly known as "Terminalia" and locally known as *Mkungu.* Out of the 120 respondents, 32 (26.7%) indicated that they had planted *Terminalia catapa* and there was no statistical significant difference at $p< 0.05$ between respondents who had planted the tree and those who had not (Table 3). FGD results showed that reason for its preference was its umbrella type, unique branching or stage wise and systematic branching pattern. Others said that *Terminalia catapa* was used as a medicine in family planning through its leaves. This indigenous knowledge claim is warranting further investigation.

The eighth preferred tree species was *Annona reticulata* commonly known as "Custard apples" or locally known as *Mstafeli.* Of the 120 respondent 29 (24.2%) indicated to had planted the tree, and there was no statistical significant difference between respondents who said they had planted *Annona reticulate* and those who had not. Comparing the respondents in the two study areas, of 60 respondents who had planted *Annona reticulate,* 19 (31.7%) were in Morogoro, while 10 (16.7%) were in Kinondoni municipality (Table 5).

The ninth preferred tree was the *Dovyalis caffra* locally known as *Mchongoma* in Kiswahili. Out of the 120 respondent 26 (21.7%) indicated that they planted the tree, and there was no significant difference at $p<0.05$ between respondents who indicated that they had planted the tree and those who had not. The tenth planted tree species was *Psidium guajava* commonly locally known as *Mpera*. Out of the 120 respondents 23 (19.2%) indicated that they had planted *Psidium guajava*. However there was a statistical significant difference at $p<0.05$ between respondents who indicated that they had planted this *Psidium spp* and those who had not. Other identified tree species in household compounds of Morogoro and Kinondoni municipalities were as shown in Appendix 12.

4.3 Importance of Trees in Urban Areas

Table 6 shows the importance of trees in urban areas of Morogoro and Kinondoni municipalities as indicated by 120 respondents. The first important reason that compelled urban dwellers to plant trees was shade provision. More than one third (30.8%) of all respondents indicated that shade provision was the reason that compelled them to plant trees in their compounds (Table 6). Comparing the two study areas it indicated that 32.3 percent and 29.3 percent of respondents planted trees for shade provision the respondents being from Kinondoni and Morogoro municipalities respectively. It seem relatively more respondents from Kinondoni planted trees for shade than in Morogoro. Possible reason for this different could be associated with levels of awareness on role of trees for cooling between the two towns and climatic differences in

particular temperature between the two towns. Dar es Salaam city is always hotter than Morogoro town.

The second important reason that compelled urban dwellers to plant trees in their homesteads was provision of fruits (human food) and about 25.3 percent of respondent planted trees for fruits provision (Table 6). Probably fruits provision is important reason for urban dwellers to plant trees due to on going political campaigns on tree planting with its slogan which over emphasis the choice of fruit trees.

Table 6: Importance of trees in urban areas of Morogoro and Kinondoni municipalities (N=120) in (%).

Reason for planting trees in homesteads	Morogoro (n=60)	Kinondoni (n=60)	Total (N=120)
Livestock feeding	0.35	1.34	0.85
Human food supply	30.39	20.27	25.33
Timber provision	2.12	1.34	1.73
Fuel wood provision	2.83	3.02	2.92
Shade provision	29.33	32.33	30.83
Poles provision	0.71	0.67	0.69
Area beautification	14.49	21.27	17.88
Wind break provision	12.01	9.21	10.61
Medicine provision	3.18	7.20	5.19
Charcoal making	0.35	0.17	0.26
Enhancing water	0.71	0.84	0.77
Erosion prevention	2.12	1.68	1.90
For boundary marker	1.41	0.67	1.04
Total	**100.00**	**100.00**	**100.00**

Source: Survey data, 2004; analysis was based on multiple responses.

Aesthetic or area beautification was the third reason to let urban dwellers plant trees around their homestead aesthetics and about 17.8 percent of respondents planted trees for area beautification Comparing the two study areas it was indicated that aesthetics reasons were more important in Kinondoni (21.2%) than in Morogoro (14.4%). Probable

reasons for this difference could be based on the fact that Kinondoni is within a large city (Dar es Salaam) where many dwellers are "westernized" and more aware of the value of trees for beatifying their compounds. This difference could be due to differences on the level of education discussed earlier as more illiterate respondents were from Morogoro municipality while more literates were from Kinondoni. Out of 8 (6.7%) illiterate respondents, 6 (10%) were from Morogoro while 2 (3.3%) were from Kinondoni municipality (Table 6).

The fourth reason compelled urban dwellers to plant trees was wind break provision and about 10.6 percent of respondents planted trees for windbreak. Other reasons mentioned as responsible for trees planting in urban areas were provision of fodder for livestock, timber, and fuel wood, poles, medicine and charcoal, boundary makers. Yet enhancing water sources and soil erosion prevention was also other reasons (Table 6).

4.4 Knowledge Skills and Perception of Urban dwellers on Urban Trees

For convenient of this study knowledge, skills and perception of people on trees were measured through: media used to learn urban trees planting, information source used to lean about urban trees for the past six months, last date a respondents heard about tree planting, type of urban forestry community based information received, distance interval between planted tree and home compounds, place where respondent think that people enjoy to see planted trees; if respondent received enough information on urban trees

planting, if advised on choosing a tree for his homestead and if think that distance from central business district (CBD) affected choice of tree specie planted (Table 7).

The study findings indicated that the first main media to bring awareness of people on urban trees planting was Television (55%), followed by radio (33%) and news paper (4%). Yet other media used to learn urban trees included: wells poster, notes board posters, live drama plays, road signs posters and public meetings (Table 7). The socio-economic implication derived from this study was that more emphasis be given to both public media to attain a coordinated effort of channelling urban forest information. Also this data was calling for less utilized media like public meetings, road signs, poster, live drama show, and notes board posters to be given priority in conveying urban forestry information.

Table 7: Percentage distribution of communication media used to study urban trees in Kinondoni and Morogoro municipalities for past six months (N=120).

Media used to learn about urban tree planting	**Morogoro (n=60)**	**Kinondoni (n=60)**	**Total (N=120)**
Radio	31.9	34.5	33.2
Television	58.8	52.5	55.6
News papers/magazine	3.4	4.2	3.8
Notes board Posters	2.1	1.4	1.7
Walls posters	1.1	4.2	2.7
Road signs posters	0.5	1.5	1.0
Public meetings	1.0	0.6	0.8
Live drama plays	1.3	1.2	1.3
Total	**100.0**	**100.0**	**100.0**

Source: Survey data, 2004; analysis was based on multiple responses.

Accounting community based information sources, findings indicated that government officials was taking the leading role in sensitizing the community on the role of urban forests (Table 8). Most respondent 90 (75.0%) had received urban forestry information from government officials, and there was a significant different at $p< 0.05$ between respondents who received urban forestry and those who did not. Tree seedling sellers were the second important community based information source as of 120 respondents 61 (50.8%) had received trees information from seedling seller. Relatives and or friends also were playing a role as urban forestry community based information conveyor. Study indicated that out of the 120 respondents, 59 (49.2%) had received urban forestry through his relative and or friend. Other media used to learn about urban trees included municipal staff, religious leaders, peer educators, and extension agents.

Table 8: Urban forestry source of information for the past 6 months in Morogoro and Kinondoni municipalities (N=120).

Information source for past six months.	Morogoro (n=60)	Kinondoni (n=60)	Total (n=120)	χ^2-value	p-value
Trees seedling sellers	11 (18.3)	50 (83.3)	61 (50.8)	50.714	0.000
Relatives/friends	28 (46.7)	31 (51.7)	59 (49.2)	0.300	0.584
Religious leaders	15 (25.0)	4 (6.7)	19 (15.8)	7.566	0.006
Government officials	38 (63.3)	52 (86.7)	90 (75.0)	8.711	0.003
Municipal officials	16 (26.7)	19 (31.7)	35 (29.2)	0.363	0.547
Extension agents	5 (8.3)	6 (10.0)	11 (9.2)	0.100	0.752
Workplace	8 (13.3)	9 (15.0)	17 (14.2)	0.069	0.793
Peer educators	1 (1.7)	0 (0.0)	1 (0.8)	1.008	0.315

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

The policy implications drawn from these finding is that, extension services for urban dwellers is almost negligible hence, there is a need to reactivate extension services in urban areas as it was done in rural areas. Data indicated that extension service was very poor in urban areas as of 120 interviewees only 11 (9.2%) had received information about urban tree from extension agent. Probable reasons for extension services set back in urban areas could be associated by nature of occupations among urban dwellers which vary from one dweller to another, however under planned urban scheme extension service can be delivered to needy group of urban dwellers who planted trees in their homesteads. Another socio-economic implication derived from this data was that religious leaders were not participating adequately in trees planting activities; hence there is a need to involve them in fostering tree planting efforts at community level as experience had revealed that religious leader had a strong influence and acceptance by local community. More than one third of respondents received information on urban tree planting after every one week 35 (30.7%), followed by those who received urban forestry information after one month 34 (29.8%) and there was no significant difference at $p<0.05$ between respondents who received urban forest information in either duration (Table 9).

Table 9: Type of information received by urban dwellers on trees planting in Morogoro and Kinondoni municipalities (N=120).

	Morogoro	Kinondoni	Total	χ^2-value	P-value
Last date heard about tree planting in urban areas	**(n=56)**	**(n=58)**	**(n=114)**	7.431	0.115
Today	0 (0.0)	2 (3.4)	2 (1.8)		
Yesterday	7 (12.5)	11 (19.0)	18 (15.8)		
> one week	23 (41.1)	12 (20.7)	35 (30.7)		
> one month	16 (28.6)	18 (31.0	34 (29.8)		
> six months	10 (17.9)	15 (25.9)	25 (21.9)		
Urban forestry information received for the past 6 months.	**(n=50)**	**(n=57)**	**(n=107)**		
Choice of specie to plant	20 (40.0)	19 (33.3)	39 (36.4)		
How to water trees	28 (56.0)	56 (98.2)	84 (78.5)		
Tree planting in social infrastructures	22 (44.0)	20 (35.1)	42 (39.3)		
Control of tree diseases	6 (12.0)	7 (12.3)	13 (12.1)		
Control of tree pests	12 (24.0)	7 (12.3)	19 (17.8)		
Control of tree fires	33 (66.0)	16 (28.1)	49 (45.8)		
Acquisition of seeds	17 (34.0)	6 (10.5)	23 (21.5)		
Source of planting material	15 (30.0)	21 (36.8)	36 (33.6)		
How to prune trees	4 (8.0)	7 (12.3)	11 (10.3)		

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

This finding on time duration for receiving urban forestry information suggest extension services on urban forest issues, particular how to choose right tree species for the right site in order to minimize unnecessary cost of removing undesirable trees and social infrastructure destruction in urban areas.

The study indicates that 84 (78.5%) of respondents were aware of how to water planted seedlings while 49 (45.8%) of respondents indicated to have received information on tree fire control. More than one third 42 (39.3%) of respondents had received information regarding choice of tree species to plant on social infrastructure. This data is very interesting as it calls for more education and extension services be provided to

urban dwellers to guide them decide wisely which tree species they are to plant on their compounds, how to plant, and how much to plant.

About intervals to leave between a house and a tree, the study indicated that most (82.10%) respondents planted their trees between intervals of below five meters. Out of 120 household, 74 (69.8%) planted trees with an interval of between five and 10 meters. The data on intervals to leave between a tree and an infrastructure was threatening as it intensified the problem of social infrastructures destruction. A researcher observed some house foundations, septic tanks, and drainage systems which were damaged by trees in both Morogoro and Kinondoni municipalities (Figure 4)

Figure 4: Cracked house floor due to growing *Azadirachta indica* (Neem) in Kinondoni municipality.

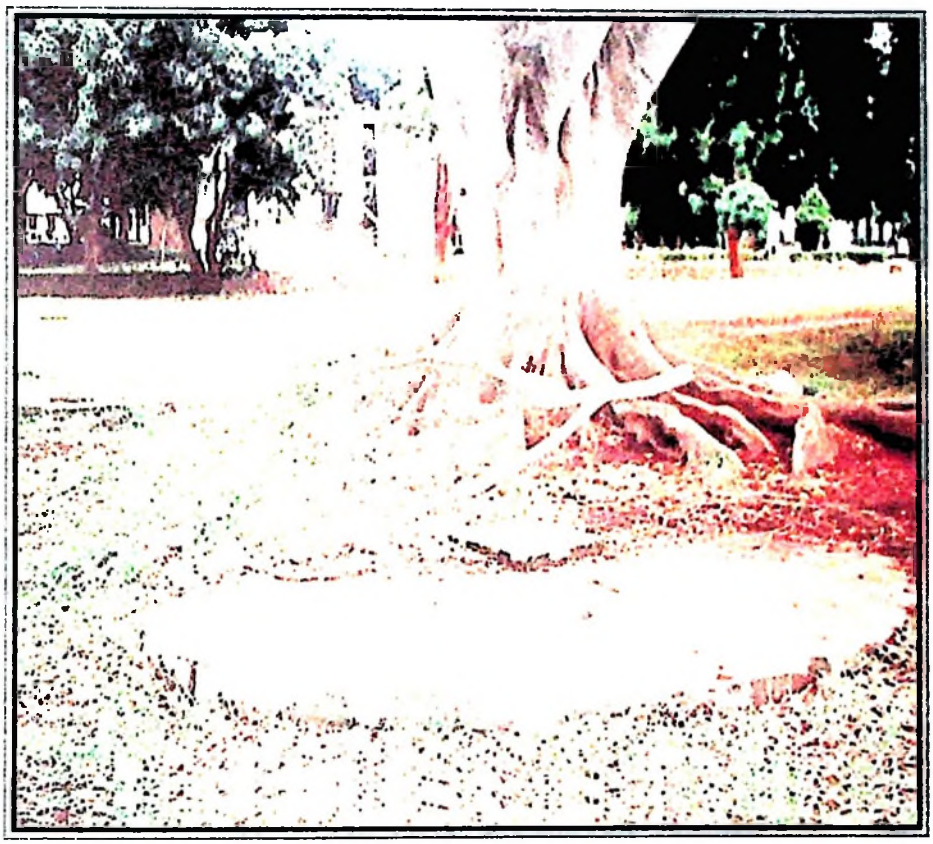

Figure 5: Broken septic tank due to growing *Ficus benjamina at* Sokoine University of Agriculture (SUA), main campus in Morogoro municipality.

According to Akbar (1992), there is an increasing concern that data on tree root spread in tree roots and buildings are needed by insurers, homeowners and arboriculturists to minimize tree-building conflicts. According to Sydnor (1994) spacing determination for urban trees vary from specie to specie another; however the author suggests that to minimize conflict between trees and buildings in urban areas very different figures are

appropriate as safe planting distance but the distance which includes 75 percent of damage attributed to a particular species is recommended.

For smaller species the 50 percent boundary is more appropriate whilst for particularly large growing species the 90 percent figure is sufficiently cautious. According to Sydnor (1994), to minimize danger of tree limbs blocking visibility of street or traffic lights and signs, drive ways, and side walks, new trees should be planted at least 35 feet from intersection. Therefore, there is a need to study our urban tree before establish such operational guideline for spacing in towns of Tanzania.

According to Sydnor (1994) the recommended spaces to leave between a tree and a building differs depending on species to be planted and normally respective municipal authorities are supposed to have a specified guideline to guide people decide what space to leave between a planted tree and their building, direction of planting. Recent finding show that space available below ground could be restricted by utility lines, building basements, vertical retaining walls or heavily compacted soils (MTC, 2003).

Sydnor (1994) argue that, trees that are too large and too close to the house or are not kept properly pruned will cause damage to gutters point or roofing. Therefore it is advisable to select trees that will not litter the out door living areas or clog gutter with twigs, fruits or other debris. The author also advice on avoiding trees with spreading branches, which may cause damage to buildings and removing low hanging and dead or

weakened branches that might break during a storm and that trees that over hang buildings should be inspected every 3-5 years by a profession arborist so that declining trees be removed or pruned to enhance structural stability.

Nevertheless the data call for immediate policy interventions at both Kinondoni and Morogoro municipal level is highly needed to establish specific tree planting guideline for people to decide what tree species to plant around their houses, which spacing to leave for each species and which direction of the house should a tree be planted. In practice Dar es Salaam city had prepared master plan for trees planting in her municipalities (Appendix 3) however this master plan is inadequate as it failed to explicitly recommend tree-building planting interval for different preferred species. Therefore the issue of amending this master plan is crucial and need not to be intervened or delayed by respective municipal authorities for political reasons.

The study indicated that most urban dwellers enjoy most when they see trees in high way road pavements than other urban areas as of 120 respondents, 75 (62.5%) said that they enjoy viewing the planted trees on road pavement and there was a statistical significant different at $p < 0.05$ between respondents who enjoy viewing trees on road pavements and those who had not (Table 10). Possible reason for this difference could base on quality and quantity of trees on high ways. Through observation it was revealed that in planted trees in Kinondoni municipalities are aesthetically in particular *Peltophorum pterocarpum* locally (*Mkenge mwekundu)* literally known as *Mkonoike*

were more pleasing than Morogoro municipalities and more trees on road pavements of Morogoro were still young to produce attractive flowers. FGD results indicated that most trees in Kinondoni municipality highways were planted during reconstruction of city highways by Japanese road construction company known as Konoike as a result the species has locally called after *Mkonoike* instead of *Mkenge mwekundu* as it used to produce attractive large and bell like flowers.

Table 10: Tree-building intervals and places where urban dwellers enjoy most while viewing urban trees in Kinondoni and Morogoro municipalities (N=120).

	Morogoro	Kinondoni	Total	χ^2value	P-value
Distance from the building to a tree	**(n=48)**	**(n=58)**	**(n=106)**		
(0-5)	39 (81.3)	48 (82.8)	87 (82.1)		
(5-10)	31 (64.6)	43 (74.1)	74 (69.8)		
(10–15m)	14 (29.2)	22 (37.9)	36 (34.0)		
(15–20)	6 (12.5)	3 (5.2)	9 (8.5)		
(20 <)	5 (10.4)	5 (8.6)	10 (9.4)		
Places urban dwellers wanted to see trees planted	**(n=60)**	**(n=60)**	**(n=120)**		
In homestead	9 (15.0)	36 (60.0)	45 (37.5)	25.920	0.000
In open gardens	22 (36.7)	32 (53.3)	54 (45.0)	3.367	0.067
In school	13 (21.7)	23 (38.3)	36 (30.0)	3.968	0.046
In street roads	18 (30.0)	20 (33.3)	38 (31.7)	0.154	0.695
In road pavements	23 (38.3)	52 (86.7)	75 (62.5)	29.902	0.000
In recreational places	4 (6.8)	8 (13.3	12 (10.1)	2.363	0.307
In churches/ mosques	0 (0.0)	1 (1.7)	1 (0.8)	1.008	0.315

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

Based on DCC (2001), trees species recommended to plant on side roads included: *Azadirachta indica (Mwarobaini), Senna siamea/spectabilis (Mijohoro); Spathodea nilotica (Kifabakazi); Peltophorum pterocarpum (Mkonoike); Trichilia ametica (Mkungwina); Khaya anthotheca (Mkangazi); Jacaranda Mimosifolia; Acacia*

auriculiformis (Mkesia); Saraca longifera (Muashoki); Cordia sebastina (Mringaringa). Most of these species in this master plan have a tendency of hindering visibility. It seems Sydnor (1994) and McPherson (2004) recommendations were not considered during preparation of DDC master plan for trees planting.

The second area where people liked to see tree was in opened gardens as out of 120 respondent, 54 (45.0%) liked seeing planted trees in open gardens and there was no statistical significant different at $p < 0.05$ between those who liked and who had not. More than one third 45 (37.5%) of respondents enjoyed viewing planted trees on home compounds and there was a significant difference at $p< 0.05$ between those who enjoyed and who had not However study indicated that all (100%) respondent said that tree planting in household compound is a good think. That implied that most people were aware of importance of urban trees in their homesteads what was lacking was correct guidelines and education to ensure smooth tree planting in their homes. Probably immediate policy intervention is needed to ensure urban people get correct guidelines and education on urban trees planting. Recommended trees for residential areas of Kinondoni included: *Mangifera indica, Citrus spp, Psidium guajava, Persia americana, Annona squamosa, Heteroferus carpus* and *Azadirachta indica* (DCC, 2001).

Table 11: Knowledge, skills and perceptions of urban dwellers on urban trees planting in Kinondoni and Morogoro municipalities (N=120).

Variable	Morogoro		Kinondoni		Total		χ^2-value	P-value
	Yes	No	Yes	No	Yes	No		
If received enough information on tree planting	(n=60) 7 (11.7)	53 (88.3)	(n=57) 5 (8.8)	52 (91.2)	(n=117) 12 (10.3)	105 (89.7)	0.266	0.606
If advised on choosing the correct tree species	(n=59) 12 (20.3)	47 (79.7)	(n=57) 7 (12.3)	50 (87.7)	(n=116 19 (16.4)	97 (83.6)	1.374	0.241
If had other place to plant trees	(n=56) 30 (53.6)	26 (46.4)	(n=59) 22 (37.3)	37 (62.7)	(n=115) 52 (45.2)	63 (54.8)	3.075	0.079
If thought that distance from CBD affects choice of tree specie to plant in her/his compound.	(n=39) 30 (76.9)	9 (23.1)	(n=59) 45 (76.3)	14 (23.7)	(n=98) 75 (76.5)	23 (23.5)	0.006	0.941
If had enough plots to plant all the preferred tree species	(n=39) 6 (15.4)	33 (84.6)	(n=59) 0 (0.0)	59 (100.0)	(n=98) 6 (6.1)	92 (93.9)	9.669	0.002
If there was other plot he/she can plant trees	(n=59) 21 (35.6)	38 (64.4)	(n=60) 8 (13.3)	52 (86.7)	(n=119) 29 (24.4)	90 (75.6)	7.998	0.005
If thought that tree planting on homestead compounds was a good think	(n=30) 50 (100.0)	0 (0.0)	(n=60) 50 (100.0)	0 (0.0)	(n=110) 100(100.0)	0 (0.0)	0.000	1.000

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

Table 11 summarizes knowledge, skills and perceptions of urban dwellers on urban trees in Kinondoni and Morogoro municipalities. Study findings indicated that only 19 (16.4%) of 116 respondents agreed to had advised on choosing the correct tree species. This implied that the remaining 97 (93.3%) who not been advised on how to choose a tree for urban areas (Table 11). These data on number of urban dwellers who had adequate knowledge and skill on choosing urban tree is in agreement with results from FGD which indicated that people are planting tree basing on their own experiences and interest and they don't know the existence of trees planting bylaws and master plans. Policy implication from the finding is that most municipal staff particularly the planners, extension agents and nursery attendants need special training in form of seminars and short courses so that they can be able to properly advice people on issues pertaining to choice of trees to plant in urban areas.

Yet, the study showed that of 117 respondents only 12 (10.3%) had received enough information on trees planting, the rest 105 (89.7%) had not and there was no statistical significant difference at $p<0.05$ between those who said had received enough information and who had not (Table 11). This data implied a threat as the quality of future urban trees will depend on today's initiatives and plans and may be too late and expensive to remove the haphazardly planted urban trees in the years to come. According to McCurdy (2004) when installing a tree for planting many important considerations need to be taken as trees planting are long-term initiatives, which warrant pre-planting, planning. It is difficult for a mere normal lay person could hardly

understand and take into practical all these pre-requisites before planting his/her tree without any guideline or training in form of seminar and or short courses to impart the required skills and knowledge.

4.5 Cadastral and Socio-economic Factors Affecting the Choice of Trees Species to Plant in Urban Areas

4.5.1 Cadastral factors and other limitations of choosing a tree for urban areas

Table 12 summarizes the cadastral factors affecting choices of tree specie to plant in urban areas. The assessed cadastral factors included: ways in which people acquire residential plots, distance intervals observed between a household and central business district (CBD), number of plots owned, condition of the plots, size of the plots, ownership patterns of residential plots, and prices involved in acquiring plots.

The Study indicated that of the 120 respondents, 77 (64.7%) acquired their residential plots through legal buying either from respective urban authorities or from other individuals who were former owner of these plots. A total of 22 (18.5%) respondents acquired their plots through inheritance, yet 20 (16.8%) of respondents hired their plots, particularly from Tanzania National Housing Cooperation (NHC) and individuals house owners. However there was no statistical significance difference at $p< 0.05$ between the three groups.

Table 12: Cadastral factors affecting the choice of tree species to plant in Kinondoni and Morogoro municipalities (N=120).

Variable	Morogoro (n=60)	Kinondoni (n=59)	Total (n=119)	χ2-value	P-value
Ways of acquiring building plots					
Inherited	14 (23.3)	8 (13.6)	22 (18.5)	16.001	0.000
Rented	2 (3.3)	16 (30.5)	20 (16.8)		
Bought	44 (73.3)	33 (55.9)	77 (64.7)		
Plot-CBD interval (km)	**(n=47)**	**(n=59)**	**(n=106)**	19.679	0.001
0 – 1	5 (10.6)	0 (0.0)	5 (4.7)		
1 – 5	19 (40.4)	10 (16.9)	29 (27.4)		
5 – 10	19 (40.4)	29 (49.2)	48 (45.3)		
10 – 20	4 (8.5)	18 (30.5)	22 (20.8)		
> 20	0 (0.0)	2 (3.4)	2 (1.9)		
Factors limiting choice of selecting urban tree	**(n=60)**	**(n=60)**	**(n=120)**		
Number of plots owned	35 (58.3)	41 (68.3)	76 (63.3)	1.292	0.256
Condition of plot	16 (26.7)	11 (18.3)	27 (22.5)	1.195	0.274
Size of plot	41 (68.3)	50 (83.3)	91 (75.8)	3.683	0.055
Distance from CBD	7 (11.7)	6 (10.0)	13 (10.8)	0.086	0.769
Ownership pattern	12 (20.0)	8 (13.3)	20 (16.7)	0.960	0.327
High price of plots	2 (3.3)	2 (3.3)	4 (3.3)	0.000	1.000

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

The study results indicated that more than third 48 (45.3%) respondents were residing between five and 10 km from CBD while 29 (27.4%) respondents were residing between one and five km from CBD (Table 12). However there was a significant difference between respondents from the two study sites at $p<0.05$.

Size of the plot was a major limiting factor in choosing a tree specie to plant in urban areas as of 120 respondents, 91 (75.8%) said that size of their plot was constraining their decision to choose species of their choice for their homestead and there was no significant difference at $p<0.05$ between those who said that size of their plot limiting their choices and who had not. The second limiting factor with regard to choice of trees

species to plant on home compounds was number of plots as out of 120 respondents 76 (63.3%) said that number of plots are limiting their decision to choose some species for their homesteads and there was no statistical significant different at $p<0.05$ between respondents who said and who had not. Other mentioned factors as they are affecting urban dwellers choice of selecting a tree species for their homes included, ownership pattern and high prices involved in acquiring plots.

4.5.2 Damage caused by urban trees to infrastructure and seeds and seedling sources in Kinondoni and Morogoro municipalities

In this section discussed factors affecting the choice of trees species to plant in urban areas included seed and seedling sources, damages caused by urban trees, people to encourage tree planting.

4.5.2.1 Damage caused by urban trees to infrastructure in Kinondoni and Morogoro municipalities

Damage caused by urban trees included: tarmac roads, buildings, TTCL telephone wires, TANESCO electrical wires, road signs, water and sewage pipes destructions, and production of litter Table 13 and figure 7 summarizes the damage caused by urban trees on infrastructures in Morogoro and Kinondoni municipalities.

Table 13: Damages caused by urban trees on infrastructure in Kinondoni and Morogoro municipalities (N=120).

Type of damage	Morogoro (n=60)	Kinondoni (n=60)	Total (n=120)	χ^2value	P-value
Tarmac road destruction	3 (5.0)	14 (23.3)	17 (14.2)	8.292	0.004
Building's floors	39 (65.0)	32 (53.3)	71 (59.2)	1.690	0.194
Telephone wires	8 (13.3)	1 (1.7)	9 (7.5)	5.886	0.015
Electric wires	24 (40.0)	24 (40.0)	48 (40.0)	0.000	1.000
Interference with road signs	2 (3.3)	2 (3.3)	4 (3.3)	0.000	1.000
Water pipes	8 (13.3)	37 (61.7)	45 (37.5)	29.902	0.000
Over shading	2 (3.3)	3 (5.0)	5 (4.2)	1.235	0.539
Too much litter (leaf falling)	37 (61.7)	26 (43.3)	63 (52.5)	4.043	0.044
Too much fruits (fruit falling)	33 (55.0)	7 (11.7)	40 (33.3)	25.350	0.000

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

Study findings indicated that the most threatening problem of urban trees was the damage caused on buildings, particularly lifting of house foundations, cracking of septic tanks, breaking roofs and cracking sewage systems. Out of the 120 respondents, 71 (59.2%) agreed that they had encountered tree damages on their buildings, and there was no statistical significant difference at $p<0.05$ between respondents who had encountered damages and those who had not (Table 13). This finding agreement with those of Sydney (1994) who found that too large trees that were too close to the houses or were not properly pruned damage gutters and or roofs.

The second damaging effects of urban trees are litter from falling leaves. Study findings indicated that out of the 120 respondents 63 (52.5%) indicated that this was a problem and there was a statistical significant difference ($p<0.05$) between those indicated that produce litter and those who did not. This finding supported those of Miller (1988), who commented that falling tree leaves increased the cost of institutions and households'

premises in removing them. Also, Sydnor (1994) had argued that urban trees clogs storm sewers, drains, and sewage systems from tree flowers, fruits, leaves or roots. The third damaging effects of urban tree are on the overhead electrical power lines. Of the 120 respondents, 48 (40%) indicated that they had experienced electric power outage because of trees interferences and there was no statistical significant difference at $p<0.05$ between respondents who agreed to experience and those who had not (Table 13). It was observed that some trees were about to contact TANESCO wires (Figure 6).

Figure 6: Effects of planting *Polyalthia longifolia (Ashoki)* on TANESCO power lines at Msasani area.

Figure 7: People who were hired by SUA to remove overgrown *Azadirachta indica (Mwarobaini)* opposite Faculty of Agriculture building.

It is advised that trees be planted in areas where they will not interfere with utility services and to choose only trees with mature heights of less than 25 feet and not adjacent to power lines. Mhagama (2002) reported that the problem of over pruning or topping of trees by TANESCO was a problem to development of urban and peri-urban trees. Damages of trees on tarmac roads was indicated 17 (14.2%) of the 120 respondents as a problem, and a statistical significant difference at $p<0.05$ between respondents who admitted it as a problem and those who did not. According to Bradshaw *et al.* (1995), McPherson (2004), and Sydnor (1994) there should be careful consideration to the space available for the tree and their ultimate height and spread.

Sydnor (1994) recommended that a six foot square planting area be used to accommodate a tree with a mature height of 20-35 feet, and that when trees are planted in narrow places, larger trees will damage pavements and side walks.

4.5.2.2 Lack of stakeholders to encourage urban tree planting

Table 14 shows stakeholders to encourage urban tree planting in the two study areas. Of the 120 respondents, 68 (84%), 67 (82.7%), 17 (21%), 11 (13.6%) and 5 (6.2%) indicated that forest officers, agriculture extension officers, NGOs, and seedling distributors were key stakeholders for promoting tree planting in urban trees, respectively. The data implied that there is a need to intensify the participation of more NGOs and seedling distributors and other stakeholders addressing tree-planting issues.

Table 14: People who encourage tree planting in Kinondoni and Morogoro municipalities (N=120).

People to encourage tree planting in municipalities	Morogoro (n=60)	Kinondoni (n=60)	Total (n=120)
Forest officers	25 (80.6)	42 (84.0)	67 (82.7)
Extension agents	9 (29.0)	8 (16.0)	17 (21.0)
NGO's facilitators	6 (19.4)	5 (10.0)	11 (13.6)
Municipal nurseries, attendants	23 (74.2)	45 (90.0)	68 (84.0)
Seedling distributors	2 (6.5)	3 (6.0)	5 (6.2)

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

4.5.2.2 Inadequacy of seedlings

Table 15 shows the various seedling sources in Morogoro and Kinondoni municipalities, which were individual, municipal, academic institutions nurseries (universities, colleges, and schools), seedling vendors, and household nurseries.

Table 15: Seedling sources in Morogoro and Kinondoni municipalities (N=120).

Trees seedling sources	Morogoro (n=60)	Kinondoni (n=60)	Total (n=120)	χ2-value	p-value
Municipal nurseries TTSA	23 (38.3)	34 (56.7)	57 (47.5)	4.736	0.094
Local institutions	5 (8.3)	1 (1.7)	6 (5.0)	2.807	0.094
Seedling vendor	2 (3.3)	0 (0.0)	2 (1.7)	2.034	0.154
Forest ext. agents	8 (13.3)	12 (20.0)	20 (16.7)	0.960	0.327
Own nurseries	0 (0.0)	1 (1.7)	1 (0.8)	1.008	0.315
NGOs	7 (11.7)	8 (13.3)	15 (12.5)	0.076	0.783
Individual nurseries	0 (0.0)	1 (1.7)	1 (0.8)	1.008	0.315
Workplaces	20 (33.3)	42 (70.0)	62 (51.7)	16.151	0.000
Relatives/friends	5 (8.3)	2 (3.3)	7 (5.8)	1.365	0.243
Schools/colleges	8 (13.3)	11 (18.3)	19 (15.8)	0.563	0.453
Churches/Mosques	19 (31.7)	1 (1.7)	20 (16.7)	19.440	0.000
	1 (1.7)	0 (0.0)	1 (0.8)	1.008	0.315

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies; TTSA = Tanzania Tree Seed Agency.

Study findings indicated that of the 120 respondents, 62 (51.7%) agreed that they bought a tree seedling from individual nurseries, while 57 (47.5%) bought from municipal nurseries, 20 (16.7%) from academic institutions and seedling vendors respectively. There was no statistical significant difference at $p<0.05$ between respondents who indicated to had bought seedlings from either source. Tanzania Tree Seed Agency (TTSA) formally known as the National Tree Seed Programme (NTSP) was ranked minor by only 6 (5.0%) as seedling source. FGD results indicated that TTSA is minor seedling source in Morogoro because they put much emphasis on seed issues particularly the collection, storage and selling and supply of seeds inside and outside the

country hence have little time to deal with seedling production. Other seedling sources that respondents mentioned were government local institutions, particularly Ward Executive Officers (WEOs), seedling vendors, NGOs nurseries and relatives or friends.

TTSA harvested and supplied more than 10 tones of tree seed per year from about 150 species to more than 500 customers within and outside the country (URT, 2004a). The agency's customers included ministries, government departments, research organization, private companies, NGOs, Aid organizations, and smallholder farmers. Supplied species included trees for fuel, timber, poles agro-forestry, shade, and shelter. Among trees supplied by the agency included valuable indigenous tree species such as *Cordia africana* (Mringaringa), *Afzelia quanzesis, (Mkongo), Dalbergia melanoxylon (Mpingo), Milicia excelsa (Mvule), Ocotea usambarensis (Mkulo), Pterocarpus angolensis (Mninga),* and *Podocarpus usambarensis (Mpodo),* and *Khaya anthotheca* (Mkangazi).

FGD results revealed that major tree seed sources for Kinondoni municipality were various centres of TTSA including Morogoro, Lushoto, and Iringa, Capital Development Authority (CDA) in Dodoma, and local sources in Kinondoni municipality, and Morogoro town. Other sources included the Kinondoni municipal nurseries situated at Magomeni and Kawe (wards) and individual (private) nurseries scattered along main roads and the privately owned nurseries in Morogoro. Two ways were used to get seeds: by paying the real price or the subsidized one. Some of the seeds purchased by the municipal authorities with their prices are as shown in Table 16 below.

Table 16: Prices of tree seed supplied by CDA and TTSA to Kinondoni municipality in November 2003

Tree species scientific name	Local (Kiswahili) name	Price (Tsh/kg)
Trichilia ametica	Mgolimasi	9 600
Spathodea campanulata	Mkifabakazi	28 800
Eucalyptus species	Mkaratusi	25 000
Casuarinas equisetifolia	Mvinje	30 000
Tectona grandis	Mtiki	5 500
Khaya anthotheca	Mkangazi	17 200
Terminalia ivorensis	Mkungu	12 000
Terminalia mentally	Mkungu	20 000
Brachystegia speciformis	Myombo	10 100
Brachystegia bussei	Mhondolo	10 100
Senna siamea	Mjohoro	7 200
Senna spectabilis	Mjohoro	7 200
Pithecelobium dulce	Mchongoma	3 200
Grevillea rubusta	Mgrevillea	40 000
Jacaranda mimosifolia	Mjakaranda	16 8000
Schinus molle	Mpilipili	7 200

Source: Kinondoni Municipal Council Office, 2004.

FGD results with Kinondoni municipal staff showed that non-government organization (NGO's) also supporting seedling production for urban dwellers. The only well known NGO that worked with Kinondoni municipality was the Tanzania Forest Conservation Group (TFCG) which operated under the umbrella of CARE International.

In 2004, the Kinondoni municipality goal was to raise 400 000 tree and flower seedlings, of which 200 000 were to be from Magomeni nursery and 200 000 from Kawe nursery. The FGD results with KMC staff showed that seedlings from the municipal nurseries were provided free of charge to primary schools, secondary schools, hospitals, dispensaries, and Ward Executive Offices (WEOs). Data in Table 17 shows that for past four years there had been targets set by that municipal authority had set on the number of tree seedlings to produce and plant per year. However for year 1999/2000 the target

was not met and about 25% of all planted trees died and the survival rate was 75 percent and the only 41 percent of target was met. Major reason for low achievement was lack of seedlings from the municipal nurseries.

Table 17: Number of trees planted in the past four years (1999 to 2003) in Kinondoni municipality.

Year	Set target	Implementation		Seedlings survived	Survival rate (%)
		Planted seedlings	Percentage of target met		
1999	460 000	191 068	41.5	143 301	75.0
2000	600 000	569 349	94.9	470 282	82.6
2001	300 000	482 238	160.74	361 678	75.0
2002	300 000	305 378	101.79	229 033	75.0
Total/Average	1 660 000	1 548 033	93.3	1 204 294	77.79

Source: Kinondoni Municipal Council Office, 2004.

Also FGD results showed that prices of seedlings from these two municipal seedling sources differed with those charged by individual nurseries. KMC nurseries sold seedlings at subsidized prices, while privately owned nurseries sold them at a relatively higher price to cover cost such as buying seeds, and seedling establishment, and maintenance cost. An FGD was conducted with officials of UWAMU-a private tree selling organization, officially registered with the KMC in Ubungo ward *Umoja wa Wauza Miche Ubungo* (UWAMU), showed that most of seedling sellers were unemployed youth (Figure 8 & 9).

Figure 8: Privately owned tree seedling nursery along Morogoro road in Ubungo area as one of seedling sources in Kinondoni municipality.

Figure 9: A researcher making observations on type of established seedling at Ubungo area, in Dar es Salaam city.

FGD conducted with KMC staff showed that the major problems for planting trees in the municipality were low rainfall, destruction by roaming livestock, presence of termites, aphids, and fungus, destruction of seedlings by human beings, destruction of trees by motor vehicles, and burning of tree seedlings, especially when burning wastages. Others included lack of transport to municipal nurseries, haphazard trees cutting by TANESCO staff, especially in the main gridlines and on compounds as one women lamented that her mango and yellow cassia trees were uprooted by TANESCO staff in Kiswahili *"Wameng'oa mijohoro na miembe yangu kwa ajili ya nyaya zao za umeme"* Also, participants complained that trees such as *Peltophorum spp.(Mkonoike)* and *Adansonia digitata (Mibuyu)* fell on house roofs causing some damages and peoples' accidents.

An FGD with Morogoro municipal staff showed that lack of forest extension services was a problem to proper planting of trees in urban areas, as one nursery attendants commented that *"There was no encouragement and advice on how to plant trees in Morogoro town since Hon. Lieutenant Yusufu Makamba had left the Morogoro District Commissioners Office (DCO) for Regional Commissioners Office (RCO) in Dar es Salaam region"*. The FGD results further showed that most urban dwellers were unaware of the guidelines and by laws to follow when planting trees in the three densities in the municipality.

4.5.3 Factors affecting the choice of tree species to plant on urban compounds

Table 18 shows factors affecting the choice of tree species to plant on urban compounds. The study identified small size of plots, low household income, low level of education, shortage of water supply, shortage of labour, shortage of plots, shortage of time, high price of tree seeds, high price of seedlings, unreliable seeds, unreliable seedling, trees pests, trees diseases, out-door livestock keeping, lack of knowledge and skills, lack of extension services agents, TANESCO power lines, TTCL power lines, lack of suitable tree species, negative perceptions for urban forest and inadequacy of by laws as factors affecting choice of tree species to plant on compounds in Kinondoni and Morogoro municipalities.

The first most limiting factor was the size of the plots as out of the 120 respondents, 103 (85.8%) indicated that small plot size was a factor that affected the choice of tree species

to plant on urban compounds in the two municipalities of Kinondoni and Morogoro. There was a statistical significant difference at $p < 0.05$) between respondents in the two municipalities. The second mentioned limiting factor was the shortage of water supply. Of the 120 respondents 84 (70%) indicated that shortage of water supply in the municipalities affected the choice of tree species to plant on compound and consequent care. The third limitation was presence of the presence of TANESCO power lines. Of the 120 respondents 78 (65.0%) indicated that they had seen their trees cause problems of power outage to TANESCO power lines (Table 18). Sydnor (1994) advises that when planting trees in areas served with underground or overhead utilities one should determine the location and depth of the utilities before digging.

In Tanzania, TANESCO was responsible for cutting trees or their branches that touch the power lines to avoid power outage. Similarly DAWASA and MOROWASA did cut trees and uprooted them if they interrupted their water pipe installations. According to Sydnor (1994), trees should be planted 10 feet away from mounted transformers.

Table 18: Factors affecting the choice of selecting tree species to plant on urban compounds in Kinondoni and Morogoro municipalities (N=120)

Factor affecting choice of trees for urban compound	Morogoro (n=60)	Kinondoni (n=60)	Total (n=120)	χ^2-value	P-value
Small plot size	47 (78.3)	56 (93.3)	103(85.8)	5.551	0.018
Low household income	16 (26.7)	13 (21.7)	29 (24.2)	0.409	0.522
Lack knowledge and skills	36 (60.0)	40 (66.7)	76 (63.3)	0.574	0.449
education	37 (61.7)	47 (78.3)	84 (70.0)	3.968	0.046
Shortage of water supply	0 (0.0)	1 (1.7)	1 (0.8)	2.000	0.368
Shortage of labour	16 (26.7)	27 (45.0)	43 (35.8)	4.385	0.036
Shortage of plots	0 (0.0)	2 (3.3)	2 (1.7)	2.000	0.157
Lack of time	6 (10.2)	0 (0.0)	6 (5.0)	6.426	0.011
High prices of seeds	7 (11.7)	1 (1.7)	8 (6.7)	4.821	0.028
High prices of seedlings	2 (3.3)	1 (1.7)	3 (2.5)	0.342	0.559
Unreliable seeds	7 (11.7)	3 (5.0)	10 (8.3)	1.745	0.186
Unreliable seedlings	25 (41.7)	11 (18.3)	36 (30.0)	7.778	0.005
Presence of tree pests	10 (16.7)	9 (15.0)	19 (15.8)	1.093	0.579
Presence of tree diseases	23 (38.3)	7 (15.0)	30 (25.0)	11.378	0.001
Presence of livestock keeping	8 (13.3)	35 (58.3)	43 (35.8)	26.421	0.000
Lack of knowledge and skills	5 (8.3)	5 (8.3)	10 (8.3)	0.000	1.000
Lack of forest extension services	34 (56.7)	44 (73.3)	78 (65.0)	3.663	0.056
Presence TANESCO power lines	9 (15.0)	2 (3.3)	11 (9.2)	4.904	0.027
Presence of TTCL power lines	12 (20.0)	14 (23.3)	26 (21.7)	0.196	0.658
Lack of suitable tree species	0 (0.0	3 (5.0)	3 (2.5)	3.077	0.079
Lack of interest for tree planting	6 (10.0)	16 (26.7)	22 (18.3)	5.566	0.018
Inadequacy of bylaws					

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.

The fourth limiting factor was the low level of education that urban dwellers had. Out of the 120 respondents, 76 (63.3%) indicated that low level of education was a problem that affected the choice of tree to plant in urban compounds. Another factor affecting the choice of tree species to plant on urban compounds in Kinondoni and Morogoro municipalities was the shortage of plots, which was indicated by 43 (35.8%) of the respondents, and there were no statistical significant difference at $p<0.05$) between those who agreed and those who did not (Table 18). The fifth limiting factor was the tree pests. Of the 120 respondents, 36 (30%) indicated that the presence of tree pests on their compounds especially aphids affected their choices of tree species to plant on their

compounds. There was a statistical significant difference at $p < 0.05$ between respondents who agreed and those who did not. The insect pest problem seemed more intense in Morogoro than in Kinondoni municipality. Other factors affecting the selection of tree species to plant in urban areas were as shown in table 18.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter discusses conclusions drawn from the study and give crucial recommendations for immediate policy interventions at respective municipal authorities further researches on the urban areas of Tanzania. The highlighted recommendations are expected to assist changes in respective urban authorities, MNRT and other urban forest stakeholders who are concerned with urban forestry and urban planning. The drawn conclusion and highlighted recommendations is also expected to apply in other areas with similar situations to the study areas. This chapter also provides researcher's views and opinions study findings and observation.

5.1 Conclusion

Proper choices of selection of trees species for urban areas of Morogoro and Kinondoni municipalities were constrained by various a complex socio-political-economic, technical and institutional factors. The study found that trees in urban areas were planted by urban dwellers of varied socio-economic status and occupations. The study revealed that key considerations when selecting a tree for urban areas were not considered by most urban dwellers. Demographic and cadastral factors were also responsible for inappropriate selection of trees to plant on urban areas. The cadastral factors responsible for poor trees species selection includes: density and planning status of residential areas,

ways for acquiring plots, number and size of plots, and cost of buying plots. Furthermore other factors shown to affect choice of tree species for urban areas included shortage of water supply, presence of TANESCO power lines, low level of education, lack of knowledge and skills, tree pests, presence of livestock keeping and low household income. Institutional factors affecting choice of tree species for urban areas included inadequacy of urban trees planting master plans, bylaws and regulations. The study found that main learning media for urban forestry were televisions and radios while public meetings and live drama plays were minor media. Study found that urban dwellers are unaware of recommended planting distance interval between a tree and a house for urban trees.

The study found 49 tree species were planted on household compounds of Kinondoni and Morogoro municipalities' urban areas. And their order of preference were as follows: *Azadirachta indica, Senna siamea, Mangifera indica, Polyalthia longifolia Cocos nucifera, Citrus aurantium* and *Terminalia spp.* Then were *Annona reticulata, Dovyalis caffra, Psidium guajava, Delonix regia, Citrus limonum, Artocarpus heterophyllus, Schefflera actinophylla* and *Persia Americana.* Preferred too were *Grevillea robusta, Callistemon citrinus, Eucalyptus spp, Cordia Africana, Leucaena spp, Sclerocaryia birrea, Syzygium cuminii* and *Ficus benjamina.* Still other preffered trees included *Peltophorum pterocarpum, citrus nobilis, Pinus spp, Araucaria spp, Opuntia spp, Khaya anthotheca, Tamarindus indica, Albizia lebeki, Trichilia ametica, Elaeis guineensis, Annona squamosa* and *Phoenix dactylifera.* Yet trees such as

Prosopis juliflora, Citrus aurantifolia, Malus spp, Cedrella ordorata, Tectona grandis, Acacia spp, Delbergia melanoxylon, Khaya anthotheca, Dracaena spp, and *Pterocarpus tinctorium* were seen in some compounds. However, most of these species were planted haphazardly without following stipulated bylaws and guidelines. The study also found that most urban dwellers lack knowledge, skills and education on issues regarding choice of tree species to plant in urban areas. The Study found that urban dwellers planted trees mainly for shade, fruits, areas beautification, windbreak, boundary marking.

The study found that found that damages caused by urban trees, lack of people to encourage tree planting, shortage of water supply, low level of education, shortage of plots, presence of TANESCO and TTCL wire line, and lack of financial support were limiting factors for urban trees planting in different levels of magnitude. The study indicated that some urban trees were conflicting with infrastructure by destroying house foundations, roofs sewage systems, and septic tanks. Immediate policy intervention is needed to curb trees-infrastructure conflict in Tanzania.

5.2 Recommendations

Based on generated study findings, and drawn conclusion, the study recommends the following be done to assist changes in respective municipal authorities. The study also recommend that these finding be basis for immediate ministerial policy intervention

from MNRT to ensure that municipal authorities master plan for trees planting are prepared and approved accordingly for the betterment of today and future urban trees.

1. The study recommends that to abolish haphazard tree planting in urban areas urban dwellers need to follow the set bylaws and there be a technical guide to urban and community forestry in Morogoro municipality.
2. The existing master plans and bylaws for trees planting which serve as a technical guide for Kinondoni and Morogoro municipalities be amended to take care of key issues when selecting tree species to plant in urban areas. In preparing this bylaw, municipal authorities are argued to make thorough investigations including inventories and soil analysis. It is necessary that professional urban foresters be consulted for technical advises on this issue. The issue of amending tree planting bylaw is crucial and need not to be intervened or delayed by respective municipal authorities for political reasons.
3. The study recommends that the behaviour of highlighted tree species indicated as "the most preferred" be studies probably applying inventories and GIS techniques for more understandings on causes differences in species preferences between the two municipalities and tree species specific usefulness in urban areas, underlying biophysical and cultural factors affecting urban trees.
4. The study recommends that there be urban forestry extension agents to serve different stakeholders in urban areas, such as urban dwellers, TANESCO, TTCL, DAWASA and MOROWASA, environmental based CBOs and NGOs

5. The study recommends that urban forest be considered as area of emphasis within NFP and TFAP, and National Forest Policy since the effects of poorly planned urban trees to urban habitats and infrastructures are deleterious.
6. The study recommends that there be coordinated efforts of different government departments, parastatals, NGOs, CBOs, and multi-lateral international organization in supporting initiatives of trees planting in urban areas particularly those dealing with environmental conservation.

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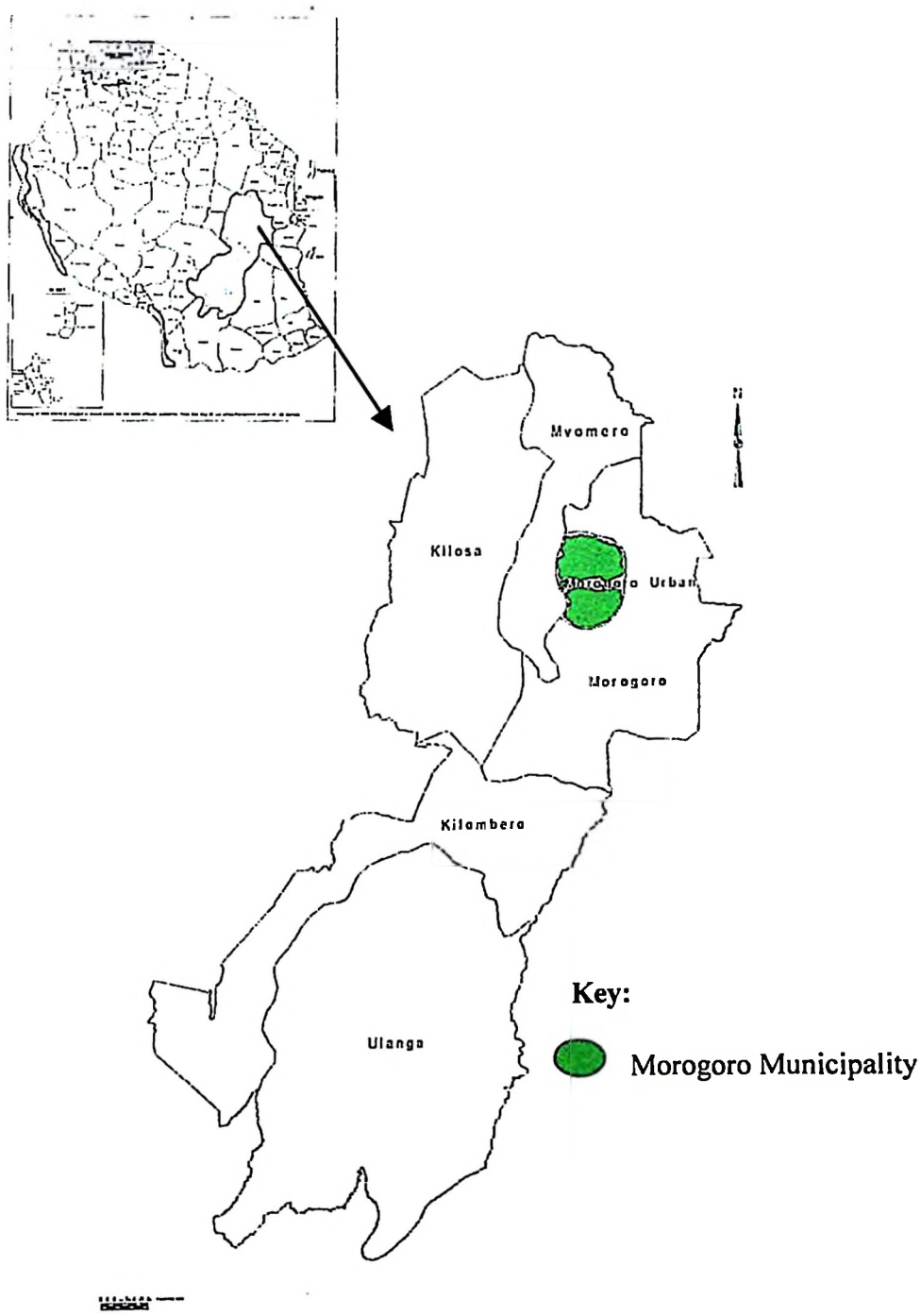
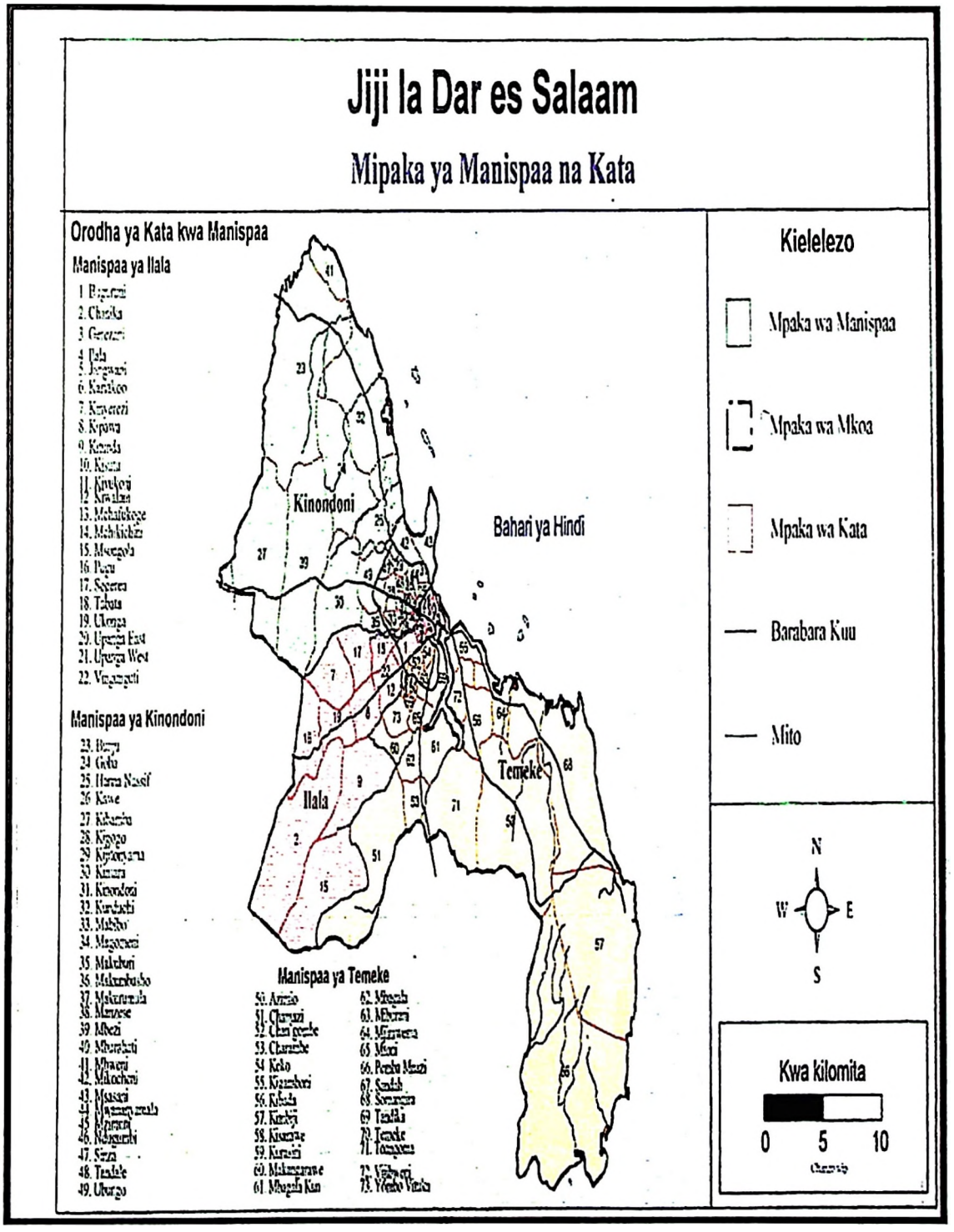
APPENDICES

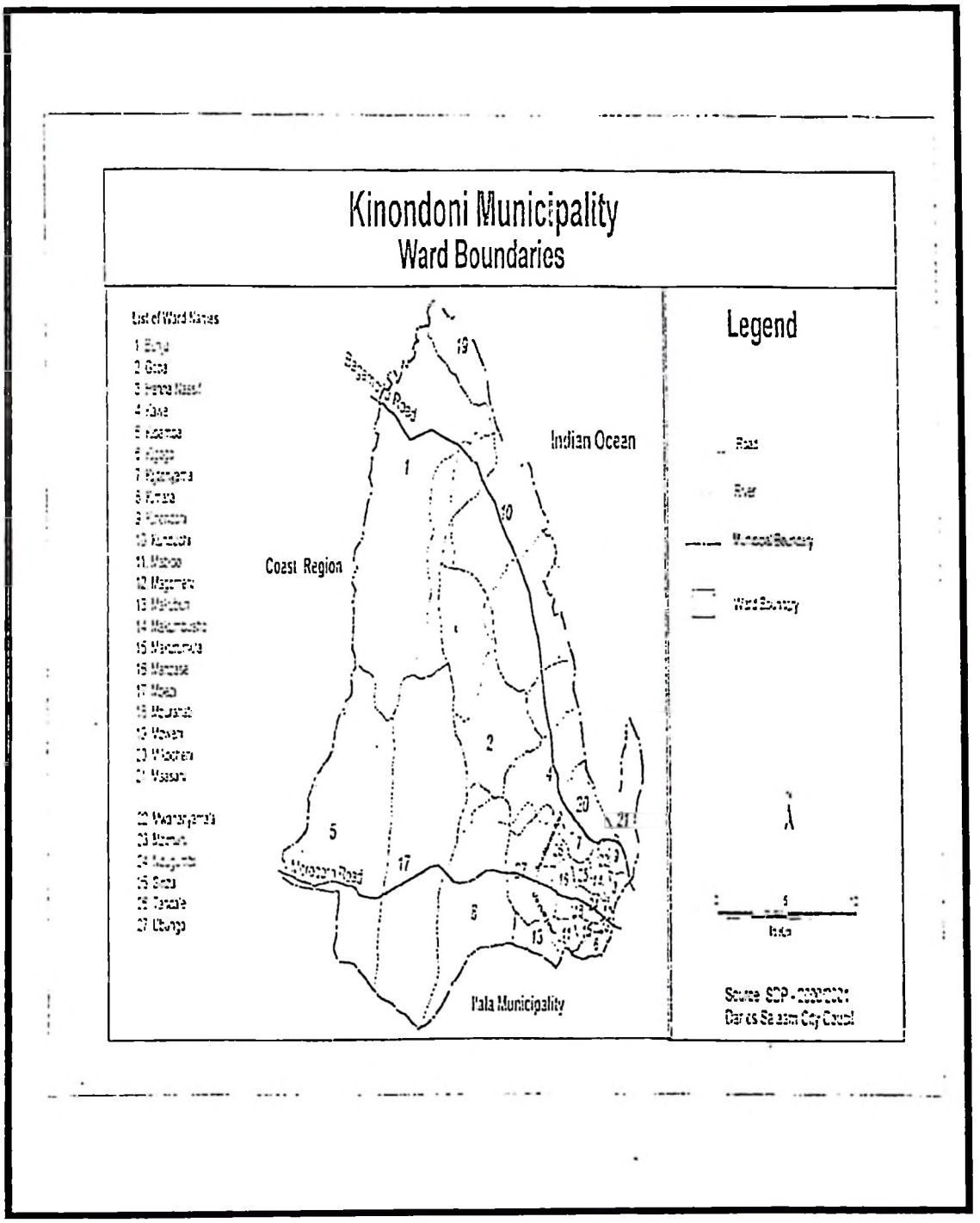
Appendix 1: Map of Morogoro Municipality



Appendix 2. Map of Dar es Salaam City showing municipalities' borders.



Appendix 3. Map of Kinondoni Municipality showing wards' borders



Appendix 4. Household head questionnaire

SOKOINE UNIVERSITY OF AGRICULTURE
DEVELOPMENT STUDIES INSTITUTE
MOROGORO

HOUSEHOLD HEAD QUESTIONNAIRE ON THE SOCIO-ECONOMIC FACTORS AFFECTING THE CHOICE OF TREE SPECIES TO PLANT IN URBAN AREAS OF MOROGORO AND KINONDONI MUNICIPALITIES, TANZANIA.

INTRODUCTION

The purpose of this questionnaire is to assist in collecting data on the socio-economic factors affecting the choice of tree species to plant in urban areas of Morogoro and Kinondoni municipalities. The questionnaire is based on the following specific objectives:

1. To identify tree species that urban dwellers prefer to plant in urban areas.
2. To identify the importance of urban trees in Kinondoni and Morogoro municipalities.
3. To examine the socio-economic factors affecting the choices of tree species to plant in urban areas of Kinondoni and Morogoro municipalities.
4. To identify factors that limits urban dwellers to plant trees in Kinondoni and Morogoro municipalities.

Dear Sir/Madam,

My name is Mr. Madadi, L.M from Sokoine University of Agriculture (SUA) pursuing Master degree. I am carrying out a study to investigate the socio-economic factors affecting choices of tree species that urban dwellers plant in urban areas of Kinondoni and Morogoro municipalities. Kinondoni and Morogoro municipalities have been chosen as case study areas. I am interested in knowing tree species in your municipality, their uses, limitations, and your views regarding urban trees. Therefore, I am asking you to help in providing relevant information on issues related to urban trees. All information that you will give will be confidential.

IDENTIFICATION OF RESPONDENT

Questionnaire number_____
Date of interview_____
Name of interviewer_____
Region: 1=Morogoro [ ] 2=Dar es Salaam [ ]
Municipality: 1=Kinondoni [ ] 2=Morogoro [ ]
Name of Ward_____
Name of street_____
Density: 1=Low [ ] 2=Medium [ ] 3=High [ ]
4=others (specify) _____

SECTION A: SOCIO-DEMOGRAPHIC DATA OF HOUSEHOLD HEAD

1. Sex of respondent
   1=Male [ ]
   2=Female [ ]
2. How old are you? _____(Years)
3. What is your marital status?
   1= Never married [ ]

2=Married monogamously [ ]
3=Married polygamous [ ]
4=Divorced [ ]
5=Widow [ ]
6=Separated [ ]
7=Other (specify)_____

4.What is your religion?
1=No religion [ ]
2=Christian [ ]
3=Moslem [ ]
4=Traditional [ ]
5=Other (specify)_____

5.Where were you born?
1= Urban [ ]
2=Rural [ ]

6. What is region of origin? _____

7. What reasons compelled you to come to town?
1=Inadequate land in area of origin [ ]
2=Inadequate work in area of origin [ ]
3=To look for job [ ]
4=To work [ ]
5=Followed relative(s) here [ ]
6=Followed spouse [ ]
7=Came with parents [ ]
8=To attend school [ ]
9=Others (specify)_____

8. For how long have you lived here in town? _____Years

9.What is your highest level of education attainment?
1=Adult education [ ]
2=Primary education [ ]
3=Ordinary secondary education [ ]
4=Advanced secondary education [ ]
5=University education [ ]
6=Others (specify)_____

10. What is your main occupation?
1=Formal employment [ ]
2=Farming crops [ ]
3=Livestock keeping [ ]
4=Commerce [ ]
5=Manufacturing industry [ ]
6=Food vendor [ ]
7=Do not work [ ]
8=Fishing [ ]
9=Drivers [ ]
10=Sports
11=Others (specify)_____

11. What is your spouse's occupational status? (If married)
1=Formal employment [ ]
2=Farming crops [ ]
3=Livestock keeping [ ]
4=Commerce [ ]
5=Manufacturing industry [ ]

6=Food vendor [ ]
7=Do not work [ ]
8=Fishing [ ]
9=Driver [ ]
10=Sports
11=Others (specify)_____

12. What is your household's size? _____members.
13. Approximately how much money do you earn per month?_____(Tsh/month)
14. Approximately how much of this income goes to the household every month? _____(Tsh/month)
15. What is your average family income per year? _____ (Tsh/Year)
16. Does your household have the following groups of people?

	Yes	No
1=Male children below 18 years	[ ]	[ ]
2=Female children below 18 years	[ ]	[ ]
3=Male adult (above 18 and below 65)	[ ]	[ ]
4=Female adult (above 18 and below 65)	[ ]	[ ]
5=Male elder (above 65)	[ ]	[ ]
6=Female elder (above 65) [ ]	[ ]	[ ]

17. How many individuals in your family are in the following categories?

	Yes/No	Number
1=Children not yet registered for any formal education	[ ]	[ ]
2= Children attending primary schools	[ ]	[ ]
3=Children who dropped out from primary school	[ ]	[ ]
4=Children who completed primary education	[ ]	[ ]
5=Children attending ' O' level secondary education	[ ]	[ ]
6=Adult attending 'A' level secondary education	[ ]	[ ]
7=Adult attending college education	[ ]	[ ]
8= Adult attending university education	[ ]	[ ]

9=Others (specify)_____

18. What other income-generating activities are you engaged with?
1=Operate kiosk [ ]
2=Own bar [ ]
3=Own transportation business [ ]
4=Own retail shop [ ]
5=Own whole sale shop [ ]
6=Others, (specify)_____

19. Do you have any of the following items?

	Yes	Cost (Tsh/item)
1. Radio	[ ]	[ ]
2. Television	[ ]	[ ]
3. Bicycle	[ ]	[ ]
4. Motor cycle	[ ]	[ ]
5. Refrigerator	[ ]	[ ]
6. Car	[ ]	[ ]
7. Telephone	[ ]	[ ]
8. Electricity	[ ]	[ ]
9. Electrical cooker	[ ]	[ ]

10. Diary cattle	[ ]	[ ]
11. Goats	[ ]	[ ]
12. Piped water	[ ]	[ ]
13. Well water	[ ]	[ ]

SECTION B: KNOWLEDGE, SKILLS AND PERCEPTIONS ABOUT TREES PLANTING IN URBAN AREAS

20. Which media of information have you used to learn about tree planting in the past 6 months?

	Yes	Rank them
1=Radio	[ ]	[ ]
2=T.V	[ ]	[ ]
3=Newspapers/magazines	[ ]	[ ]
4=Posters/pamphlets	[ ]	[ ]
5= Walls Posters	[ ]	[ ]
6=Road signs	[ ]	[ ]
7=Public meetings	[ ]	[ ]
8=Plays	[ ]	[ ]

9=Others, (specify)_____

21. Which community-based sources of information have you used to learn about tree planting for the past 6 months? [Please rank them]

1=Community based environmental conservation groups	]
2=Relatives/friends	[ ]
3=Religious leaders	[ ]
4=Other Governmental officials	[ ]
5= Municipal official	[ ]
6= Forest extension agents	[ ]
7=Workplaces	[ ]
8=Peer educators	[ ]

9=Others, (specify)_____

22. When did you last hear about tree planting?	1=Today	[ ]
	2=Yesterday	[ ]
	3=More than a week ago	[ ]
	4=More than a month ago	[ ]
	5=More than six months ago	[ ]

6=Others, (specify)_____

23. What type of information did you last receive about tree planting practices?

1= Choice of tree species to plant in urban areas [ ]

2=Trees tending practices (spacing, watering regimes, weeding, pruning, thinning, tree removals, etc) [ ]

3= Avoiding planting trees in public social infrastructures [ ]

4=Diseases control for planted trees [ ]

5= Pests control for planted trees [ ]

6=Fire protection for planted trees [ ]

7= Where to acquire tree seeds [ ]

8= Seedlings and other planting material [ ]

9= How to prune trees [ ]

10=Others (specify)_____ _____

24. Have you ever been advised on choosing the appropriate tree species to plant on your compound?

1= Yes [ ]

2= No [ ]

25. Would you say that you have received enough information on planting trees on your compound?

1=I have received enough information [ ]

2=I have not received enough information [ ]

26. If you have planted trees on your compound, where are the trees?

1= Very near to the house (0 to 5 m) [ ]

2= Moderately near to the house (5 to 10m) [ ]

3= Far from the house (10 to 15m) [ ]

4=Moderately far from the house (15 to 20m) [ ]

5= Very far from the house (20m and above) [ ]

6=Others (specify)_____ _____

SECTION C: FACTORS AFFECTING THE CHOICE OF TREE SPECIES TO PLANT ON THE COMPOUND

27. How did you acquire this plot(s)?

1=Inherited [ ]

2=Rented [ ]

3=Bought [ ]

4=Others, (specify)_____ _____

28. Do you have any space on your plot on which you can plant trees? 1=Yes [ ]2=No [ ]

29.What is the size of your plot(s)?

1=Low density area (1201-1500m^2) [ ]

2=Medium density area (601-1200 m^2) [ ]

3=High density area (1-600m^2) [ ]

4=Other (specify)_____

30. How far is your plot from Central Business District (CBD)?

1=Near from the CBD (not more than 1km) [ ]

2=Moderately far from the CBD (1 to 5 km) [ ]

3= Far from the CBD (5 to 10 km) [ ]

4= Very far from the CBD (10 to 20 km) [ ]

5=Far away from the CBD (more than 20 km) [ ]

31. Do you think that the distance from CBD affected your choice of the tree species you have planted here? 1=Yes [ ] 2=No [ ]

32. Do you think that the plot you own is enough to plant all the tree species you desire to establish? 1= Yes [ ] 2=No [ ]

33. Is there any other plot you can plant trees? 1=Yes [ ] 2=No [ ]

34. Please, provide a summary of plots you own, their distances from the CBD, year you planted trees, size (m^2) and ownership pattern.

Plot	I: Plot size (m^2)	II: Plot condition	III: Distance from CBD (km)	IV: Planting year	V: Ownership pattern
1					
2					
3					

I: Plot Size (m^2)

1=Low density area (1201-1500m^2) [ ]

2=Medium density area (601-1200 m^2) [ ]

3=High density area (1-600m^2) [ ]

4=Others, (specify)_____

II: Plot conditions

1=Near the river

2=Near the road

3=Near the railway side

4=Under telephone (TTCL) wire lines

5=Under electrical (TANESCO) wire lines

6=Near water pipe lines

7=Within Industrial area

8=Within residential area

9=within commercial area

10=Others, (specify)_____ _____

III: Distance from CBD (km)

1=Very near from CBD (not more than 1km)

2=Moderately near from CBD (1 to 5 km)

3= Moderately far from CBD (5 to 10 km)

4= Far from CBD (10 to 20 km)

5=Very far from CBD (more than 20 km)

V: Ownership patterns

1=Inherited

2=Rented

3=Bought

4=Others, (specify)_____

34. Do you think that trees' planting on your compound is a good think?1=Yes [ ] 2=No [ ]

35. Please, mention the tree species you have planted around your compound, buying prices and the reasons for planting them?

Tree specie	Price (Tsh/ seedling)	Reasons for planting

Reasons for trees planting

1=Livestock feeding

2=Human food supply (fruits)

3=To provide timber

4=To provide fuel wood

5=To provide shade

6= To provide building poles

7=Beautification of the areas (Recreational)

8=Wind breaks provision

9=Medicine provision

10=Biodiversity increase

11=Charcoal making

12=Improvement of water sources

13=Soil erosion prevention

14=Others (specify)_____ _____

36. What factors limit you to plant trees on this compound?

1=Number of plots [ ]

2=Condition of the plot [ ]

3=Size of the plot [ ]
4=Distance from CBD [ ]
5=Ownership pattern [ ]

37. Where do you acquire tree seedlings for your trees?

1=Municipal nurseries [ ]
2=Tanzania Tree Seed Agency (TTSA) [ ]
3=Government local institutions [ ]
4= Seedling vendors [ ]
5= Forest extension agents [ ]
6=Own nurseries [ ]
7= Non Governmental Organizations (NGO) [ ]
8=Privately owned nurseries [ ]
9=Workplaces [ ]
10=Relatives/friends [ ]
11=Academic institutions (schools and colleges) [ ]
12=Religious institutions (mosques and churches) [ ]
13=Peer educators [ ]
14=Others (specify)_____

38. Where do you acquire tree seed for your trees?

1=National Tree Seed Program (NTSP) [ ]
2= Non Governmental Organizations (NGO) [ ]
3=Government local institutions [ ]
4=Forest extension agents [ ]
5= Seeds vendors [ ]
6=Workplaces [ ]
7=Relatives/friends [ ]
8=Academic institutions (Schools and colleges) [ ]
9=Religious institutions (Mosques and churches) [ ]
10=Peer educators [ ]
11=Others (specify)_____

SECTION D: FACTORS LIMITING URBAN TREES PLANTING

39. Do you think that the following affect the trees planting on your compound?

	Yes	Rank
1= Small households plot size	[ ]	[ ]
2=Low households income	[ ]	[ ]
3= Low level of education	[ ]	[ ]
4=Shortage of water	[ ]	[ ]
5=Shortage of labour	[ ]	[ ]
6=Shortage of land (plot size and number)	[ ]	[ ]
7=Shortage of time to tend trees	[ ]	[ ]
8=High prices of seeds	[ ]	[ ]
9= High prices of seedlings	[ ]	[ ]
10=Unreliable seeds	[ ]	[ ]
11= Unreliable seedlings	[ ]	[ ]
12=Pests problems	[ ]	[ ]
13= Diseases problems	[ ]	[ ]
14=Presence of livestock	[ ]	[ ]

15=Lack of knowledge and skills on tree planting [ ][ ]
16=Lack of forest extension services [ ][ ]
17=Presence of electrical wires of TANESCO [ ][ ]
18=Presence of telephone wires of TTCL [ ][ ]
19= Lack of suitable tree species to plant on compounds [ ][ ]
20= Urban dwellers do not like trees on compounds [ ][ ]
21=Lack of by laws on tree planting on compounds [ ][ ]
22=Others, (specify)_____

40. Which of the following infrastructure do you think that have damaged by trees on your compound? Yes No Rank

1=Destroy tarmac road	[ ]	[ ]	[ ]
2=Destroy building concrete floor	[ ]	[ ]	[ ]
3=Destroy overhead telephone wires	[ ]	[ ]	[ ]
4=Destroy overhead electrical wires	[ ]	[ ]	[ ]
5=Interference with road signs	[ ]	[ ]	[ ]
6=Destroyed water (DAWASA) pipelines	[ ]	[ ]	[ ]
7= Create too much shade	[ ]	[ ]	[ ]
8= Produce too much litter	[ ]	[ ]	[ ]
9=Produce too much fruits	[ ]	[ ]	[ ]

10= Others (specify)_____

41. Do you think that the municipality encourages urban dwellers to plant trees on their compounds?

1= Yes [ ] 2=No [ ]

42. Do you think that the municipality has the following people that encourage tree planting?

1= Forest officers [ ]
2=Forest extension agents [ ]
3= On farm farmers training programs [ ]
4=Municipal nurseries [ ]
5= Seedling distributors (Vendors) [ ]
6=Own nurseries [ ]
7= Others, (specify)_____

43. Where would you like to see trees planted in the municipality?

1=Around households compounds [ ]
2= In open spaces [ ]
3=In schools [ ]
4=In the urban streets [ ]
5=In road pavements [ ]
6=In recreational places [ ]
7=Around churches and mosques [ ]
8= Others, (specify)_____

44. What are your recommendations to the following administrative levels in order to improve urban trees planting in this municipality?

(a) At household level:
i. _____

ii. _____

iii. _____

(b) At municipal level:

i. _____

ii. _____

iii. _____

(c) At National level:

i. _____

ii. _____

iii. _____

THANK YOU VERY MUCH FOR YOUR COLLABORATION!!!

Appendix 5. Questionnaire for staff

SOKOINE UNIVERSITY OF AGRICULTURE
DEVELOPMENT STUDIES INSTITUTE
MOROGORO.

TITTLE: INVESTIGATION OF SOCIO-ECONOMIC FACTORS AFFECTING THE CHOICE OF TREE SPECIES TO PLANT IN URBAN AREAS OF MOROGORO AND KINONDONI MUNICIPALITIES.

INTRODUCTION

Dear Sir/Madam,

My name is Mr. Madadi, L.M from Sokoine University of Agriculture (SUA) pursuing Master degree. I am carrying out a study to investigate the socio-economic factors affecting choices of tree species that urban dwellers plant in urban areas of Kinondoni and Morogoro municipalities. Kinondoni and Morogoro municipalities have been chosen as case study areas. I am interested in knowing tree species in your municipality, their uses, limitations, and your views regarding urban trees. Therefore, I am asking you to help in providing relevant information on issues related to urban trees. All information that you will give will be confidential.

A. STAFF IDENTIFICATION

1. Name of staff_____
2. Position held_____
3. Place of work_____
4. Sex: 1= male [ ] 2=female [ ].
5. Age _____Years
6. Highest formal education attained
   1) Certificate [ ]
   2) Diploma [ ]
   3) Advanced Diploma [ ]
   4) B.Sc./B.A. [ ]
   5) M.Sc./M.A [ ]
   6) Other Qualification (Specify) _____
7. Number of years worked in this municipality? _____Years
8. Where previously worked _____number of years_____

B: INFORMATION ON URBAN TREE PLANTING

9. Based on your experiences, what types of tree species are being planted by urban dwellers in their homesteads? [Please rank them in order of importance]

Specie	Rank	Reasons for planting

10. Based on your experiences, what tree specie is being planted on streets in this municipality? [Please rank them in order of importance]

Specie	Rank	Reasons for planting

11. What tree species does the Municipal Council plant in the open spaces? [Rank them in order of importance]

Specie	Rank	Reasons for planting

12. Where do urban dwellers get seedlings of trees that they plant in this municipality?
1=Municipal nurseries [ ]
2=National Tree Seed Program (NTSP) [ ]
3=Government nurseries [ ]
4= Seedling vendors [ ]
5=Forest extension agents [ ]
6=Own nurseries [ ]
7= Non Governmental Organizations (NGOs) [ ]
8=Privately owned nurseries [ ]
9=Workplaces [ ]
10=Relatives/friends [ ]
11=Academic institutions (schools and colleges) [ ]
12=Religious institutions (mosques and churches) [ ]
13=Peer educators [ ]
14=Others, (specify)_____

13. Where do urban dwellers get seeds for trees in this municipality?
1=Municipal nurseries [ ]
2=National Tree Seed Program (NTSP) [ ]
3=Government nurseries [ ]
4= Seedling vendors [ ]
6=Own nurseries [ ]
7= Non Governmental Organizations (NGOs) [ ]
8=Privately owned nurseries [ ]
9=Workplaces [ ]
10=Relatives/friends [ ]
11=Academic institutions (schools and colleges) [ ]
12=Religious institutions (mosques and churches) [ ]
13=Peer educators [ ]
14=Others (specify)_____

14. Currently, which are the reliable sources of tree seed in this municipality?
1=National Tree Seed Program (NTSP) [ ]
2= Non Governmental Organizations (NGO) [ ]
3=Government local institutions [ ]
4=Forest extension agents [ ]
5= Seeds vendors [ ]
6=Workplaces [ ]
7=Relatives/friends [ ]
8=Academic institutions (Schools and colleges) [ ]
9=Religious institutions (Mosques and churches) [ ]
10=Peer educators [ ]
11=Others (specify)_____

15. Currently, which are the reliable sources of tree seedlings in this municipality?
1=Municipal nurseries [ ]
2=National Tree Seed Program (NTSP) [ ]
3=Government local institution [ ]
4= Seedling vendors [ ]
5= Forest extension agents [ ]
6=Own nurseries [ ]

7= Non Governmental Organizations (NGO) [ ]
8=Privately owned nurseries [ ]
9=Workplaces [ ]
10=Relatives/friends [ ]
11=Academic institutions (schools and colleges) [ ]
12=Religious institutions (mosques and churches) [ ]
13=Peer educators [ ]
14=Others (specify)_____

16. How are tree seedlings acquired?
1= Free of charge [ ]
2= Charged full price [ ]
3= Obtained at reduced prices (subsidized) [ ]

17. If charged full price, what is the average price per tree seedling?

Specie	Price (Toss/seedling)

18. How are tree seeds acquired?
1= Free of charge [ ]
2= Charged full price [ ]
3= Obtained at reduced prices (subsidized) [ ]

19. If charged full price, what is the average price per kilogram of seeds?

Specie	Price (Toss/kg)

20. What uses do urban dwellers attach to trees planted on their compounds?
1=Livestock feeding
2=Human food supply (fruits)
3=Timber provision
4=Fire wood provision
5=Shade provision
6=Building poles provision
7=Beautification of the areas (Recreational)
8=Wind breaks provision
9= Medicine provision
10=Biodiversity increase
11=Charcoal making
12=Improvement of water sources
13=Soil erosion prevention
14=Others (specify)_____

21. What should be done by each of the following levels of authority for improving tree planting in urban areas?
(i) Households level

Municipal authority

National level

C: FACTORS LIMITING THE CHOICE OF TREE SPECIES TO PLANT IN URBAN AREAS.

22. What factors limit urban dwellers to plant tree species on their compounds?

	Yes	Rank
1= Small households plot size	[ ]	[ ]
2=Low households income	[ ]	[ ]
3= Low level of education	[ ]	[ ]
4=Shortage of water	[ ]	[ ]
5=Shortage of labour	[ ]	[ ]
6=Shortage of land (plot size and number)	[ ]	[ ]
7=Shortage of time to tend trees	[ ]	[ ]
8=High prices of seeds	[ ]	[ ]
9= High prices of seedlings	[ ]	[ ]
10=Unreliable seeds	[ ]	[ ]
11= Unreliable seedlings	[ ]	[ ]
12=Pests problems	[ ]	[ ]
13= Diseases problems	[ ]	[ ]
14=Presence of livestock	[ ]	[ ]
15=Lack of knowledge and skills on tree planting	[ ]	[ ]
16=Lack of forest extension services	[ ]	[ ]
17=Presence of electrical wires of TANESCO	[ ]	[ ]
18=Presence of telephone wires of TTCL	[ ]	[ ]
19= Lack of suitable tree species to plant on compounds	[ ]	[ ]
20= Urban dwellers do not like trees on compounds	[ ]	[ ]
21=Lack of by laws on tree planting on compounds	[ ]	[ ]
22=Others (specify)_____		

23. What factors limit this municipal to tell people to plant tree species on their compounds?

	Yes	Rank
1= Small households plot size	[ ]	[ ]
2=Low households income	[ ]	[ ]
3= Low level of education	[ ]	[ ]
4=Shortage of water	[ ]	[ ]
5=Shortage of labour	[ ]	[ ]
6=Shortage of land (plot size and number)	[ ]	[ ]
7=Shortage of time to tend trees	[ ]	[ ]
8=High prices of seeds	[ ]	[ ]
9= High prices of seedlings	[ ]	[ ]
10=Unreliable seeds	[ ]	[ ]
11= Unreliable seedlings	[ ]	[ ]
12=Pests problems	[ ]	[ ]
13= Diseases problems	[ ]	[ ]
14=Presence of livestock	[ ]	[ ]
15=Lack of knowledge and skills on tree planting	[ ]	[ ]
16=Lack of forest extension services	[ ]	[ ]
17=Presence of electrical wires of TANESCO	[ ]	[ ]
18=Presence of telephone wires of TTCL	[ ]	[ ]

19= Lack of suitable tree species to plant on compounds [ ] [ ]
20= Urban dwellers do not like trees on compounds [ ] [ ]
21=Lack of by laws on tree planting on compounds [ ] [ ]
22= Others (specify)_____

24. Do you think that, the distance to the plot from the Central Business District (CBD) limits urban dwellers' choices to plant certain tree specie on their compounds?
1=Yes [ ] 2=No [ ].
25. Do you think that the size of household's plot limits urban dwellers to plant tree species on their homesteads? 1=Yes [ ] 2=No [ ]
26. Do you think that livestock keeping limits urban dwellers to plant tree species on their compounds? 1=Yes [ ] 2=No [ ]
27. Do you think that urban crop farming limits urban dwellers to plant trees on their compounds? 1=Yes [ ] 2=No [ ]
28. What tree species do you think that urban dwellers in high-density areas should plant and why?

Specie	Reasons for planting

29. What tree species do you think that urban dwellers in medium density areas should plant and why?

Specie	Reasons for planting

30. What tree species do you think that urban dwellers should plant in low density areas should plant and why?

Specie	Reasons for planting

31. What tree species do you think that the Municipal Council should plant on the streets and why?

Specie	Reasons for planting

32. What tree species do you think that the Municipal Council should plant on open spaces and why?

Specie	Reasons for planting

33. What tree species do you think that Municipal Council should plant on recreation areas and why?

Specie	Reasons for planting

34. What tree species do you think that the Municipal Council should plant on the road pavements and why?

Specie	Reasons for planting

35. What tree species do you think that the Municipal Council should plant in the primary schools' compounds and why?

Specie	Reasons for planting

36. What tree species do you think that the Municipal Council should plant in the secondary schools' compounds and why?

Specie	Reasons for planting

37. How do you assess the trend of trees planting in this municipality for the past 5 years? (1999 to 2003)
1= Has increasing [ ] 2= Is decreasing [ ] 3 =There is no change [ ]

38. Please, provide reasons for the answer above.
1. _____
2. _____
3. _____

39. Is water availability a limiting factor for tree management in this municipality?
1= Yes [ ] 2=no [ ]

40. If answered yes in Q.39 above, what steps are taken by municipal authority to solve the water availability problems?
1=river water [ ]2=tape water [ ] 3=dam water [ ]
4=wells [ ] 5=Others (specify)_____

41. Are there any forestry extension agents in this municipality?
1=Yes; [ ] 2=No. [ ]

42. If answered yes in Q. 41 above what type of knowledge and skills do they offer to urban dwellers?

1= Choice of tree species to plant in urban areas	[ ]
2=Tending tree species (spacing, watering, weeding, pruning, thinning, pruning)	[ ]
3= Avoiding planting trees in public areas	[ ]
4= Diseases control	[ ]
5=Pests control	[ ]
6=Fire protection for planted trees	[ ]
7= Establishing own nursery	[ ]
8=Where to acquire tree seeds	[ ]
9=Where to acquire tree seedling	[ ]

10=Other (specify)_____

43. Are there any bylaws, regulations and guidelines set by the municipal authority to control trees planting activities in this municipality?

	1=Yes	2= No.
1=Bylaws	[ ]	[ ]
2=Regulations	[ ]	[ ]
3= Guidelines	[ ]	[ ]

44. If answered Yes in Q.43, name the bylaws, regulations and guidelines that direct trees planting activities in this municipality?

(a) Bylaws: _____

Regulations: _____

Guidelines:

45. Based on your experiences, what are the damages that trees cause in urban areas?

1=Destroy tarmac road [ ]
2=Destroy building concrete floor [ ]
3=Destroy overhead telephone wires [ ]
4=Destroy overhead electrical wires [ ]
5=Interference with road signs [ ]
6=Destroy water (DAWASA) pipelines [ ]
7= Cause nuisances (unclean atmosphere) due to shading barks, leaves and fruits [ ]
8= Others (specify)_____ _____

46. What suggestions do you give for improving tree planting in this municipality?
1. _____
2. _____
3. _____

THANK YOU VERY MUCH FOR ANSWERING THE QUESTIONS AND CANDID COOPERATION!!

Appendix 6. Introductory letter from Sokoine University of Agriculture (SUA).

CHUO KIKUU CHA SOKOINE CHA KILIMO
OFISI YA MAKAMU WA MKUU WA CHUO
S.L.P. 3000, MOROGORO, TANZANIA
Simu: 4651/4523 TELEX NO. 55308 UNIVMOG TZ TELEGRAMS "UNIAGRIC" MOROGORO

Kumb. zetu SUA/ADM/R.1/8 Kumb. zako ..... Tarehe: 22/8/2003.

MKUU WA MKOA,
DAR ES SALAAM.

UTAFITI WA WAALIMU NA WANAFUNZI WA CHUO KIKUU

Madhumuni ya barua hii ni ~~kowatambulisha~~/ kumtambulisha

Kwako: MADADI, L.M.

~~mbbo~~/ambaye ni ~~watafiti~~/mtafiti wa Chuo Kikuu Cha Sokoine Cha Kilimo. ~~Hao~~/huyo. hivi sasa ~~wamo~~/yuko katika shughuli za utafiti.

Kufuatana na Waraka wa Serikali Kumb. Na. MPEC/R/10/1 wa tarehe 7 Julai 1980 na Kifungu Na. 8 cha Sheria Namba 6 ya 1984 (ya kuanzisha Chuo), Makamu wa Mkuu wa Chuo alipewa madaraka ya kutoa vibali vya kufanya utafiti nchini kwa Walimu. Wanafunzi na Watafiti wake kwa niaba ya Serikali na Tume ya Sayansi na Teknolojia.

Hivyo basi tunaomba ~~uwapatie~~/umpatie/~~Watalamu~~/Mtaalamu/~~waliotajwa~~/aliyetajwa hapo juu ~~misaada~~/msaada/atakaohitaji/ watakaouhitaji ili uchunguzi ~~wao~~/wake uweze kufanikiwa. Gharama za malazi na chakula chao/chake pamoja na usafiri ~~wao~~/wake ~~watalipia~~/atalipia ~~mwenyewe~~/mwenyewe kutokana na fedha walizopewa Chuo Kikuu. Msaada ~~wanaohitaji~~/anaouhitaji zaidi ni kuruhusiwa kuonana na viongozi na wananchi ili ~~waweze~~/aweze kuzungumza nao na kuwauliza maswali ~~waliyo~~/aliyo nayo.

Kiini cha Utafiti wa ~~Wataalamu~~/Mtaalamu ~~waliotajwa~~/aliyetajwa hapo juu ni:

SABABU ZA KIUCHUMI, KISIASA NA KIJAMII ZINAZOATHIRI UCHAGUZI WA JAMII ZA MITI YA KUPANDA KATIKA MAZINGIRA YA MIJI YA MOROGORO NA DAR ES SALAAM.

Sehemu ~~wanazofanyia~~/anazofanyi a huo utafiti ni: MANISPAA YA KINONDONI.
Ikiwa kuna baadhi ya sehemu ambazo zinazuilika, ni wajibu wako kuzuia zisitembelewe.

Muda wa Utafiti huo ni kuanzia tarehe: SEPTEMBER, 2003 hadi AUGUST, 2004

Ikiwa utahitaji maelezo zaidi wasiliana na Makamu wa Mkuu wa Chuo.

Prof. A.B. Lwoga
MAKAMU WA MKUU WA CHUO

MAKAMU WA MKUU WA CHUO
CHUO KIKUU CHA SOKOINE CHA KILIMO
S.L.P. 3000
MOROGORO

Nakala: Watafiti

Appendix 7. Introductory letter from Regional Commissioner's Office, Morogoro.

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA SERIKALI ZA MITAA

Anuani ya Simu: "REGCOM"
Simu: 023 2 604 237/2 604 227
Fax Na: 2 600973
Unapojibu tafadhali taja:

Ofisi ya Mkuu wa Mkoa,
S.L.P. 650,
MOROGORO.

Kumb: A20/32vol.VII/78

10/11/2003

Mkuu wa Wilaya,
Morogoro.

YAH: KIBALI CHA KUFANYA UTAFITI WA WALIMU NA WANAFUNZI WA CHUO KIKUU CHA SOKOINE CHA KILIMO

Ninapenda kumtambulisha kwako **Ndg. MADADI L. M.** mtafiti kutoka Chuo Kikuu cha Sokoine cha Kilimo; ambaye ameruhusiwa kufanya utafiti katika **Manispaa ya Morogoro.**

Kiini cha utafiti wao ni: **SABABU ZA KIUCHUMI, KISIASA NA KIJAMII ZINAZOATHIRI UCHAGUZI WA JAMII ZA MITI YA KUPANDA KATIKA MAZINGIRA YA MIJI YA MOROGORO NA DAR ES SALAAM.**

Utafiti wake ni kuanzia tarehe **SEPTEMBA, 2003 HADI AUGUST, 2004.**

Tafadhali mpatiwe msaada wowote atakao hitaji ili aweze kukamilisha utafiti huo.

H. J. U. MWALUWINGA
Kny: **KATIBU TAWALA MKOA**
MOROGORO

Nakala: - Makamu wa Mkuu wa Chuo
SUA
S.L.P. 3000
MOROGORO.

" Ndg. MADADI L. M.
MTAFITI.

Appendix 8. Introductory letter from Regional Commissioner's Office, Dar es Salaam

Jamhuri ya Muungano wa Tanzania
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

MKOA WA DAR ES SALAAM
Anwani ya Simu:
Simu Namba: 2860081/2863716
Unapojibu tafadhali taja:

OFISI YA MKUU WA MKOA,
S. L. P. 5429,
DAR ES SALAAM.

Kumb. Na. MD/R.20/1 VOL.III/

14 Novemba, 2003

Katibu Tawala Wilaya,
Kinondoni,
DAR ES SALAAM.

YAH: RUHUSA YA KUFANYA UTAFITI

Husika na somo hapo juu.

Namleta kwako mtafiti **Madadi, L. M** kutoka **Chuo Kikuu cha Sokoine cha Kilimo** ambaye ameruhusiwa kufanya utafiti katika Mkoa wetu, Utafiti huo ni juu ya **"SABABU ZA KIUCHUMI, KISIASA NA KIJAMII ZINAZOATHIRI UCHAGUZI WA JAMII ZA MITI YA KUPANDA KATIKA MAZINGIRA YA MIJI YA MOROGORO NA DAR ES SALAAM"**, Ambao utaanza **Septemba, 2003 hadi Agosti, 2004.**

Kwa barua hii unaombwa kumpa msaada na ushirikiano wowote atakaohitaji.

Mnyawami
k.n.y. Katibu Tawala wa Mkoa
DAR ES SALAAM

Nakala: Mkurugenzi wa Manispaa
Kinondoni
DAR ES SALAAM

Prof. A. B. Lwoga
Makamu Mkuu wa Chuo
Chuo Kikuu cha Sokoine cha Kilimo
S.L.P. 3000
MOROGORO – Tafadhali mtumie Katibu Tawala wa Mkoa nakala ya utafiti huo baada ya kukamilika.

Appendix 9. Introductory letter from Morogoro Municipal Council Director.

HALMASHAURI YA MANISPAA MOROGORO

Tel. / Fax 4727
Telegram "Township"

KUMB: L30 MMC 32/146

Ofisi ya Mkurugenzi wa manispaa,
Idara ya Mipangomiji
P.O Box 166
Morogoro,
Tanzania

4 December 2003

Maafisa Watendaji Kata Wote,
MANISPAA YA MOROGORO

YAH:- RUHUSA YA KUFANYA UTAFITI

Ndugu Madadi, L. M. ni mtafiti Mwanafunzi kutoka Chuo cha Sokoine cha Kilimo ambaye ameruhusiwa kufanya utafiti katika Manispaa yetu. Utafiti huo ni juu ya "**Sababu za kiuchumi, kisiasa na kijamii zinazoathiri uchaguzi wa Jamii na miti ya kupanda katika mazingira ya mji wa Morogoro.**" Utafiti huo umeanza tangu Sept. 2003 hadi Agost 2004.

Tafadhali mpatie msaada na ushirikiano wowote pale atakaouhitaji.

J. Nzilorela
Kny:- MKURUGENZI WA MANISPAA
MOROGORO

Nakala :- Ndg. Madadi, L. M.

Appendix 10. Research permit from Kinondoni Municipal Council (KMC)

Appendix 10b. Research permit form Kinondoni municipal council

OFISI YA RAIS

WILAYA YA KINONDONI

DAR ES SALAAM
TANZANIA

Maafisa Watendaji Kata wote,
Wilaya ya Kinondoni.

Yah: RUHUSA YA KUFANYA UTAFITI

Ndugu Madadi, L.M. ni mtafiti kutoka Chuo Kikuu cha Sokoine cha Kilimo ambaye ameruhusiwa kufanya utafiti katika Wilaya yetu. Utafiti huo ni juu ya **"sababu za kiuchumi, kisiasa na kijamii zinazoathiri uchaguzi wa Jamii za miti ya kupanda katika mazingira ya Miji ya Morogoro na Dar Es Salaam"** Ambao utaanza Sept. 2003 hadi Agosti 2004.

Tafadhali mpatie msaada na ushirikiano wowote pale atakaouhitaji.

M. Mkapa
Kny: KATIBU TAWALA WILAYA
KINONDONI

✓ Nakala: Nd. Madadi, L.M.

Appendix 11. Socio-economic and Demographic Information of Respondents interviewed from Kinondoni and Morogoro Municipalities.

	Morogoro	Kinondoni	Total	χ^2-value	P-value
Density status	(n=60)	(n=60)	(n=120)	0.147	0.929
Low density area	19 (31.7)	20 (33.3)	39 (32.5)		
Medium density	19 (31.7)	20 (33.3)	39 (32.5)		
High density	22 (36.7)	20 (33.3)	42 (35.0)		
Planning status	(n=60)	(n=60)	(n=120)	0.037	0.847
Planned	39 (65.0	40 (66.7)	79 (65.8)		
Unplanned	21 (35.0)	20 (33.3)	41 (34.2)		
Sex/Gender	(n=60)	(n=60)	(n=120)	0.000	1.000
Male	30 (50.0)	30 (50.0)	60 (50.0)		
Female	30 (50.0)	30 (50.0)	60 (50.0)		
Age (years)	(n=59)	(n=58)	(n=117)	4.465	0.215
< 30	4 (6.8)	6 (10.3)	10 (8.5)		
30-45	20 (33.9)	27 (46.6)	47 (40.2)		
46-50	17 (28.8)	16 (27.6)	33 (28.2)		
>60	18 (30.5)	9 (15.5)	27 (23.1)		
Marital Status	(n=60)	(n=60)	(n=120)	10.810	0.055
Single	7 (11.7)	1 (1.7)	8 (6.7)		
Monogamy	39 (65.0)	45 (75.0)	84 (70.0)		
Polygamy	2 (3.3)	7 (11.7)	9 (7.5)		
Divorced	5 (8.3)	2 (3.3)	7 (5.8)		
Widow	7 (11.7)	4 (6.7)	11 (9.2)		
Separated	0 (0.0)	1 (1.7)	1 (0.8)		
Religion	(n=60)	(n=60)	(n=120)	0.033	0.855
Christian	29 (48.3)	30 (50.0)	59 (49.2)		
Moslem	31 (51.7)	30 (50.0)	61 (50.8)		
Place of Birth	(n=60)	(n=60)	(n=120)	1.776	6.183
Urban	18 (30.0)	25 (41.7)	43 (71.7)		
Rural	42 (70.0)	35 (58.3)	77 (128.4)		
Zone of origin	(n=60)	(n=60)	(n=120)	9.283	0.233
Eastern zone	22 (44.9)	11 (43.6)	39 (44.3)		
Northern zone	12 (24.5)	10 (25.6)	22 (25.0)		
Lake zone	2 (4.1)	6 (15.4)	8 (9.1)		
Southern highland	4 (8.2)	0 (0.0)	4 (4.5)		
Southern Tanzania	3 (6.1)	0 (0.0)	3 (3.4)		
Outside Tanzania	2 (4.1)	1 (2.6)	3 (3.4)		
Central zone	3 (6.1)	4 (10.3)	7 (8.0)		
Lake zone	1 (2.0)	1 (2.6)	2 (2.3)		
Reason to come to city/town	(n=47)	(n=54)	(n=101)	10.316	0.244
Inadequate land	0 (0.0)	1 (1.9)	1 (1.0)		
Inadequate work	0 (0.0)	2 (3.7)	2 (2.0)		
To look for job	7 (14.9)	7 (13.0)	14 (13.9)		
To work	15 (31.9)	17 (31.5)	32 (31.7)		
Followed relatives	3 (6.4)	6 (11.1)	9 (8.9)		
Followed spouse	16 (34.0)	9 (16.7)	25 (24.8)		

Come to parents	5 (10.6)	10 (18.5)	15 (14.9)		
To attend school	2 (3.7	2 (3.7)	2 (2.0)		
Business	1 (2.1)	0 (0.0)	1 (1.0)		
Years been in city/town	**(n=60)**	**(n=49)**	**(n=109)**	2.359	0.501
<5	5 (8.3)	3 (6.1)	8 (7.3)		
5 – 10	7 (11.7)	9 (18.4)	16 (14.7)		
11 – 15	3 (5.0)	5 (10.2)	8 (7.3)		
>15	45 (75.0)	32 (65.3)	77 (70.6)		
Education level	**(n=60)**	**(n=60)**	**(n=120)**	4.620	0.464
Adult education	6 (10.0)	4 (6.7)	10 (8.3)		
Primary	24 (40.0)	22 (36.7)	46 (38.3)		
O-level	11 (18.3)	11 (18.3)	22 (18.3)		
A-level	2 (3.3)	2 (3.3)	4 (3.3)		
College/University	11 (18.3)	19 (31.7	30 (25.0)		
None (illiterate)	6 (10.0)	2 (3.3)	8 (6.7)		
Main occupation	**(n=60)**	**(n=60)**	**(n=120)**	41.085	0.000
Formal employment	8 (13.3)	16 (26.7)	24 (20.0		
Farming crops	29 (48.3)	3 (5.0)	32 (26.7)		
Livestock keeping	2 (3.3)	0 (0.0)	2 (1.7)		
Commerce	8 (13.3)	31 (51.7)	39 (32.5)		
Manufacturing	2 (3.3)	3 (5.0)	5 (4.2)		
Food vender	1 (1.7)	0 (0.0)	1 (0.8)		
H/H composition	**(n=60)**	**(n=60)**	**(n=120)**		
Male (<18)	92 (47.7)	132 (54.8)	**224 (186.7)**		
Female(<18)	56 (29.0)	55 (22.8)	111(92.5)		
Male (18-65)	26 (13.5)	33 (13.7)	59 (49.2)		
Female (18-65)	11 (5.7)	18 (7.5)	29 (24.2)		
Male (>65)	8 (4.1)	1 (0.4)	9 (7.8)		
Female (>65)	0 (0.0)	2 (0.8)	2(1.7)		
Household income per month (Tsh.)					
<30 000	3 (6.1)	0 (0.0)	3 (2.8)	8.908	0.031
30 000-50 000	10 (20.4)	5 (8.3)	15 (13.8)		
50 000-100 000	14 (28.6)	15 (25.0)	29 (26.6)		
>100 000	22 (44.9)	40 (66.7)	62 (56.9)		

Appendix 12. Full list of preferred tree species planted around household's compounds in Morogoro and Kinondoni municipalities.

Species code	Local/Kiswahili name	Scientific/Botanical name	Common name	Morogoro (n=60)	Kinondoni (n=60)	Total (n=120)	χ^2-Value	P-value
14	Mwarobaini	*Azadirachta indica*	Neem	22 (36.7)	41 (68.3)	63 (52.5)	12.063	0.001
13	Mjohoro	*Senna spp*	Yellow cassia/cassia	25 (41.7)	27 (45.0)	52 (43.3)	0.136	0.715
3	Mwembe	*Mangifera indica*	Mango tree	34 (56.7)	15 (25.0)	49 (40.8)	12.452	0.000
5	Mwashoki	*Polyalthia longifolia*	Ashok tree	23 (38.3)	20 (33.3)	43 (31.7)	0.326	0.582
4	Mnazi	*Cocos nucifera.*	Coconut Palm	24 (40.0)	14 (23.3)	38 (31.7)	3.851	0.050
6	Mchungwa	*Citrus aurantium*	Sweet Orange	19 (31.7)	19 (31.7)	38 (31.7)	0.000	1.000
8	Mkungu	*Terminalia spp*	Terminalia	13 (21.7)	19 (31.7)	32 (26.7)	1.534	0.215
25	Mstafeli	*Annona reticulata*	Custard apples	19 (31.7)	10 (16.7)	29 (24.2)	3.683	0.055
12	Mchongoma	*Dovyalis caffra*	Kei apple	14 (23.3)	12 (20.0)	26 (21.7)	1.165	0.559
9	Mpera	*Psidium guajava*		20 (33.3)	3 (5.0)	23 (19.2)	15.545	0.000
33	Mkrismass	*Delonix regia*	Flamboyant	8 (13.3)	14 (23.3)	22 (18.3)	3.927	0.048
29	Mlimao	*Citrus limonum*	Lemon tree	13 (21.7)	5 (8.3)	18 (15)	4.183	0.041
23	Mfenesi	*Artocarpus heterophyllus*	Jackfruit	8 (13.3)	7 (11.7)	15 (12.5)	0.076	0.783
26	Muavuli	*Schefflera actinophylla*	Umbrella tree	6 (10.0)	9 (15.0)	15 (12.5)	0.686	0.408
7	Mparachichi	*Persia americana*	Avocado tree	8 (13.3)	6 (10.0)	14 (11.7)	0.323	0.570
15	Mgrevilea	*Grevillea robusta*	Silky oak	10 (16.7)	4 (6.7)	14 (11.7)	2.911	0.088
1	Mbrushi	*Callistemon citrinus*	Little john	7 (11.7)	5 (8.3)	12 (10.0)	0.370	0.543
21	Mkaratusi	*Eucalyptus spp*	Gum tree	7 (11.7)	5 (8.3)	12 (10.0)	0.370	0.543
38	Mkodia	*Cordia africana/sebastina*	E.African cordia	2 (3.3)	10 (16.7)	12 (10.0)	5.926	0.015
19	Mleucaena	*Leucaena spp*	Leucaena	7 (11.7)	4 (6.7)	11 (9.2)	0.901	0.343
10	Mng'ongo	*Sclerocaryia birrea*	Marula	7 (11.7)	3 (5.0)	10 (8.3)	1.745	0.186
24	Mzambarau	*Syzygium cuminii*	Java palm	7 (11.7)	3 (5.0)	10 (8.3)	1.745	0.186
30	Mkungu	*Ficus benjamina*	Weeping fig	4 (6.7)	5 (8.3)	9 (7.5)	0.120	0.729
35	Mkenge	*Peltophorum pterocarpum*	Golden flame	2 (3.3)	7 (11.7)	9 (7.5)	3.000	0.083
41	Mchenza	*Citrus nobilis*	Mandarin-	4 (6.7)	5 (8.3)	9 (7.5)	0.120	0.729

			orange tree					
27	Msindano	*Pinus spp*	Pines	5 (8.3)	2 (3.3)	7 (5.8)	1.367	0.505
36	Muaraucaria	*Araucaria spp*	Hoop-Pine	1 (1.7)	5 (8.3)	6 (5.0)	3.746	0.154
32	Mvinje	*Casuarina equisetifolia*	Horsetail tree	2 (3.3)	3 (5.0)	5 (4.2)	1.235	0.539
11	Cactus	*Opuntia spp*	Prickly Pear	3 (5.0)	1 (1.7)	4 (3.3)	2.078	0.354
18	Mkangazi	*Khaya anthotheca*	Red Africa mahogany	3 (5.0)	1 (1.7)	4 (3.3)	1.034	0.309
22	Mkwaju	*Tamarindus indica*	Tamarind	2 (3.3)	2 (3.3)	4 (3.3)	0.000	1.000
40	Mkenge	*Albizia lebeki*	Woman's tongue	0 (0.0)	4 (6.7)	4 (3.3)	4.138	0.042
34	Mtrichilia	*Trichilia ametica*	Cape mahogany	1 (1.7)	2 (3.3)	3 (2.5)	0.342	0.559
39	Mchikichi	*Elaeis guineensis*	Graceful palm	0 (0.0)	3 (5.0)	3 (2.5)	3.077	0.079
50	Mtopetope	*Annona squamosa*	Custard apples	1 (1.7)	2 (3.3)	3 (2.5)	0.342	0.559
2	Mkaburi			2 (3.3)	0 (0.00)	2 (1.7)	2.000	0.157
28	Mtende	*Phoenix dactylifera*	Date palm	2 (3.3)	0 (0.0)	2 (1.7)	2.034	0.154
43	Mkikwajukwaju	*Prosopis juliflora*	Mesquite	2 (3.3)	0 (0.0)	2 (1.7)	2.034	0.154
45	Mdimu	*Citrus aurantifolia*		2 (3.3)	0 (0.0)	2 (1.7)	2.034	0.154
46	Apples	*Malus spp.*	Apple trees	1 (1.7)	0 (0.0)	2 (1.7)	2.008	0.154
51	Mwerezi	*Cedrella ordorata*		0 (0.0)	2 (3.3)	2 (1.7)	2.034	0.154
16	Mtiki	*Tectona grandis*	Teak	1 (1.7)	0 (0.0)	1 (0.8)	1.008	0.315
20	Mkesia	*Acacia spp*		0 (0.0)	1 (1.7)	1 (0.8)	1.008	0.315
37	Mzeituni			1 (1.7)	0 (0.0)	1 (0.8)	1.008	0.315
42	Mpingo	*Delbergia melanoxylon*	African black wood	0 (0.0)	1 (1.7)	1 (0.8)	1.008	0.315
44	Mkangazi	*Khaya anthotheca*	Red Africa mahogany	1 (1.7)	0 (0.0)	1 (0.8)	1.008	0.315
47	Muanzi	*Dracaena spp.*	Lucky bamboo	1 (1.7)	0 (0.0)	1 (0.8)	1.008	0.315
48	Mkulungu	*Pterocarpus tinctorius*	Blood wood	0 (0.0)	1 (1.7)	1 (0.8)	1.008	0.315
49	Muinna		Inna tree	0 (0.0)	1 (1.7)	1 (0.8)	1.008	0.154

Source: Survey data, 2004; figures in parentheses are percentages and those out of parentheses are frequencies.