GENDER ROLES IN SUSTAINABLE USE AND PRACTICES OF MEDICINAL PLANTS IN URBAN DISTRICTS OF MOROGORO AND IRINGA TANZANIA

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ABSTRACT

This study was designed to assess the role played by gender in sustainable use and practices of medicinal plants, in urban districts of Morogoro and Iringa, Tanzania. Data were collected through social survey methods through interviews with herbalists (traditional healers and medicinal plant sellers) and key informants such as Forest extension officers and botanists. A list of medicinal plants given by each informant was compiled. The information gathered included local plant names, type of disease treated, parts of plant used, preparation methods, dosage and other aspects of medicinal plants including practices. The Statistical Package for Social Science Programme (SPSS) including content analysis, chi-square and logistic regression were used in data analysis. The results indicated that out of 246 and 177 medicinal plants recorded in Morogoro and Iringa urban districts respectively, only 108 and 88 were botanically identified. The recorded medicinal plants cure about 72 and 57 diseases and other complications in Morogoro and Iringa urban districts respectively. Male herbalists from the two districts prefer to use roots while female herbalists prefer to use barks. Most male and female herbalists usually harvest parts of medicinal plants outside their districts and traditionally prepare plant medicine using variety of methods like mixture of boiling and grinding. Dosages were not specific for most male and female herbalists and side effects were unknown. Significant differences were observed in the roles played by gender in sustainable use of medicinal plants. Most female than male supported much the idea of training in domestication of medicinal plants or establishment of community based woodlots and involvement in different research on medicinal plants. The medicinal plant practices were found to be gender dependent. While in Morogoro urban District men dominated the practice, in Iringa urban District women were dominant.

dependent. While in Morogoro urban District men dominated the practice, in Iringa urban District women were dominant. From the results it is concluded that male and female herbalists are very important people in providing primary health care to the urban societies. However, medicinal plant practices do not always depend on gender but are rather influenced much by social-economic and cultural factors that discourage women to participate fully. In order to integrate medicinal plants practices with the health care system in Tanzania it is recommended to; organize public awareness programmes to all herbalists to improve their understanding in aspects connected with medicinal plants and ensure sustainable use of the resources, sensitize most herbalists to change their altitude, start cooperating and pass their knowledge to young generations to sustain their traditional knowledge. Further studies are recommended to domesticate the potential medicinal plants in home gardens, determine their efficacy and safe ways of administering medicinal plant.

DECLARATION

I, Suzana Augustino, do hereby declare to the SENATE of Sokoine University of Agriculture (SUA) that the work presented here is a result of my original work, and that it has never been submitted for a higher degree award in any other University.

Signature: .....

Date: 7th NOVEMBER 2002.

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DEDICATION

To my dear parents Augustino and Angelina who, tirelessly invested in my education

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LIST OF ABBREVIATIONS AND ACRONYMS

APGEST	=	Asia Pacific Gender Equity in Science and Technology
COSTECH	=	Commission for Science and Technology
DANIDA	=	Danish International Agency
ELCI	=	Environmental Liason International Centre
FAO	=	Food and Agriculture Organization
GDP	=	Gross Domestic Product
HFA	=	Health For All
IUCN	=	International Union for Conservation of Nature and Natural Resources
LDCs	=	Less Developing Countries
MIAD	=	Mayalla Integrated Approach to Diseases
MNRT	=	Ministry of Natural Resources and Tourism
MTMRC	=	Muhimbili Traditional Medicine Research Centre
NORAD	=	Norwegian Agency for Development Cooperation
NTFPs	=	Non Timber Forest Products
NTSP	=	National Tree Seed Programme
SIP	=	Sustainable Iringa Project
SPSS	=	Statistical Packages For Social Sciences
SUA	=	Sokoine University of Agriculture
TAFORI	=	Tanzania Forestry Research Institute
UNESCO	=	United Nations Educational, Scientific and Cultural Organization

URT	=	United Republic of Tanzania
WCMC	=	World Conservation and Monitoring Centre
WEO	=	Ward Executive Officer
USAID	=	United State Agency for International Developments
WHO	=	World Health Organization
WHOs	=	Ward Health Officers
WWF	=	Worldwide Funds for Nature

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information

The world forest cover is estimated to be 3.8 billion hectares of which 2.04 billion ha are found in tropical countries (Openshaw, 1984). Tanzania mainland has a total land area of about 88.6 million hectares of which 33.5 million hectares are covered by forests and woodlands (about 37 % of Tanzania's land area). Forests and woodlands further include 150,000 hectares of plantation forests out of which 90,000 hectares are industrial plantations in reserved land, representing only about 0.3 % of the total forest area (MNRT, 1998). It is in these forests where several interesting plant species for medicine and other products occur (DANIDA, 1989).

The use of medicinal plants in most developing countries as a traditional base for maintenance of good health has been widely observed (Last and Chavunduka, 1986; UNESCO, 1996). Medicinal plants have been used since the pre-historic times. The evidence for man's dependence on plants for survival has been demonstrated by findings from prehistoric archeological investigation (Renfrew, 1976; Smith, 1986). The art of traditional medicine has been practiced for many years in the third world countries and the use of medicinal plants began as a magical or religious act (Kokwaro, 1993). It is unlikely that the situation has changed today since the use of traditional medicine will most likely continue to increase as the population grows (Medius, 1998).

Traditional medicine plays a significant role in the health care system since it is the only affordable and accessible health care in many parts of Tanzania (Hines and

Eckman, 1993). The World Conservation and Monitoring Centre (WCMC, 1992) estimated that more than 80 % of people in Less Developing Countries (LDCs) rely on traditional medicines for primary health care. In Tanzania the reliance of most urban and rural poor to medicinal plants might be amplified by the introduction of the policy of cost sharing in medical services in 1992, where majority fail to afford paying for the services (Urio *et al.*, 1996). Furthermore, Minja (1992) observed that the heavy reliance on plant medicines was attributed to their relative accessibility, low prices, local availability and acceptance by local communities as well as low number of dispensaries and doctors for health care especially in rural areas.

Although medicinal plants contribute directly to income generation and health services for the urban and rural poor, the traditional medicinal practices do contribute to deforestation of valuable tree species. As pointed out by Urio *et al* (1996) harvesting of medicinal plants may be as destructive as pit sawing, logging and other destructive forest activities.

1.2 Problem Statement and Justification

As far as utilization of medicinal plants is concerned, Tanzania has not been lagging behind. The use of medicinal plants for quite some time now has been given serious attention (Wondergem *et al.*, 1989). Tanzania is one of the developing countries where the regional support office for Africa in traditional medicine research established in 1982, exists. The establishment could partly be due to the wide spread medicinal plant practices in this country, evidenced by a large number of traditional healers and medicinal plant sellers. Cunningham (1995) reported the ratio of a traditional healer to patients to be 1:1400. COSTECH (1999) reported the

ratio of a doctor to patients for Tanzania to be 1: 26,000 higher than Zambia and Uganda where the ratios were reported to be 1:11,000 and 1:8,000 respectively. Mhame (2000) also reported a ratio of 1:20,000 for doctor to patients, a figure, which is also high, compared to that of Zambia and Uganda. In Mozambique, however, the case is a bit different, where in 1994 the ratio of traditional healers to patients was estimated at 1:2000 and that of conventional doctors to patient ratio was an astonishing 1:50,000 (Marshall, 1998).

Mahunnah (1987) reported that little efforts have been made to conduct ethnobotanical studies in Tanzania. Medicinal plants have not been well studied, tested or documented in Tanzania, due to little information available (Urio *et al.*, 1996). However, as pointed out by FAO (1986) and Ayensu (1983) most of the information on medicinal plants is still in the hands of traditional healers. Medius (1998) commented that, with time the contribution of ethnobotanical knowledge to western medicine would continue to decline if the need to document local medicinal plants knowledge is not treated with seriousness. Furthermore, according to (Chhabra *et al.*, 1984; Ruffo *et al.*, 1989; Hines & Eckman, 1993; Luoga *et al.*, 2000a) medicinal plants are now gaining a wide recognition and utilization as both a primary health care and source of income due to the following reasons; tribal beliefs in the power of herbs or tree parts to bring fortunes or misfortunes, good health, success, easy access to traditional cure, inadequate modern medical facilities and qualified personnel in hospitals, emergence of new and incurable diseases such as some viral diseases and for the case of Tanzania the recently introduced cost sharing in public hospitals.

Although traditional medicine has been reported by Mhame (2000) to play a great role in the primary health care, to date there is no effective utilization of the practice and medicinal remedies through science and technology. Furthermore, despite the potential role of medicinal plants and practices by local people in Tanzania health care system, little has been done to assess the gender roles in sustainable use and practices of these resources. It is well known that traditional healers have been only men dominating the practices of medicinal plants and women have been left behind. Few studies including that by Urio *et al.* (1996) showed that, women are not very much involved in the use and practices of medicinal plants. However, it is obvious that women have their own role to play on the use and practices of medicinal plants. ELCI (1999) reported that even women have got specialized knowledge of medicinal plants used during prenatal and post-natal delivery for care of women and children. At the same time in developing countries women were reported by Srivastava (1996) to play vital role in the conservation of the natural resources including medicinal plants especially during cultivation and collection of medicinal plants. The role they play is crucial for future integration of traditional knowledge and western medicinal practices.

Results from this study on gender roles in sustainable use and practices of medicinal plants will stimulate the official recognition of the importance and value of medicinal plants as practiced within the gender context. The study will also add some information to the Tanzania data bank on the useful medicinal plants and gender as well as encourage use of local available effective plant/herbal remedies to treat the most common ailments.

1.3 Objectives and Hypotheses

It has been postulated that men and women (gender) play different roles in sustainable use of natural resources particularly the medicinal plants. Furthermore, men in both rural and urban areas have mostly dominated the art of practicing medicinal plants and the involvement of women has been very minimal. According to Tutuariana and Tauran (1997) women rather than men, are active participants in non-wood forest products harvesting and gathering of specialized resources such as medicinal plants for the welfare of their families.

1.3.1 Overall objective

The main objective of this study was to assess the role played by both men and women in sustainable use and practices of medicinal plants in urban districts of Morogoro and Iringa in Tanzania.

1.3.2 Specific objectives

The study had the following objectives:

i. To investigate, identify and document the available medicinal plants in the study areas, diseases treated, parts of plant utilized, preparation and methods of administering various remedies (dosage).
ii. To investigate and identify the roles played by men and women in the context of sustainable use and practices of medicinal plants.
iii. To investigate, identify and recommend measures to be taken to promote men and women in sustainable use of medicinal plants in Tanzania.
iv. To recommend ways of incorporating sustainable use of medicinal plants with the health care system of Tanzania.

1.3.3 Hypotheses

The study had the following assumptions:

1. There is no significant difference in the roles played by both men and women in sustainable use of medicinal plants.
2. The medicinal plant practices are gender dependent.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Status and Importance of Forests in Tanzania

Out of 88.6 million ha that make up Mainland Tanzania, forest resources supporting the environment and economic needs occupy about 33.5 million hectares (about 37 % of Tanzania's land area) (FAO, 1994; MNRT, 1998). Closed forests occupy 1.1 million hectares while mangrove and woodlands occupy 0.11 and 32.3 million hectares respectively. Forests and woodlands further include 150,000 ha of plantation forests out of which 90,000 ha are industrial plantations in reserved land, representing about 0.3 % of the total forest area (MNRT, 1998).

Ahlback (1986) broadly categorized forests in Tanzania into natural forests, catchment forests and plantation forests. Broadly, the natural forests are classified into savanna woodlands, closed or high forests and mangrove forests. Savanna woodland is the most dominant. It is characterized by sparse cover of usually small size, slow growing tree species of varying utility values and understorey of grass mixed with herbs and shrubs. Forest reserve covers a total of 12.5 million ha while catchment forests occupy an area of 1.6 million ha (MNRT, 1998). Most forests and woodlands have been gazetted for production purposes and the rest mainly for protection purposes including catchment areas. It is in these forests where timber and non timber forest products, including medicinal plants are obtained.

Forests offer a wide range of both material and intangible benefits, all of which have values. The values include products for domestic and economic use at household level, contribution to Gross Domestic Product (GDP) at the national and

global levels and environmental stability through protection of soil and water resources as well as conservation of biodiversity (URT, 1997).

Generally, forests contribute to the livelihood of mankind by providing products such as timber, woodfuel, building materials and forms habitat for wildlife, natural ecosystems, valuable genetic resources and provide employment (MNRT, 1989). Besides wood, the forests provide variety of non-wood products including food and herbal medicines (Pocs, 1988). It has been pointed out that the majority of plant materials used for medicinal purposes are gathered from the wild mainly from forests for household use (ELCI, 1999).

A study by Talhouk *et al.*, (2001) revealed that forests play vital roles in global food security by providing food, fodder, fuel as well as medicines; and women have historically been the ones using these resources for subsistence. At the same time, people throughout the world are increasingly recognising the importance of forests and trees for improving human welfare (Sharma, 1992). Forests have been reported to be the only resources, which provide medicine to a large proportion of the world's population (FAO, 1989).

2.2 Species Diversity and Sustainable Use of Forest Resources

Tropical rainforests represent the world's richest ecosystem whose biological diversity is incomparable (Kaay, 1998). Tanzania is consequently one of the world's mega diversity nations ranking very high in the number of species (Kaiza-Boshe *et al.*, 1998). Stuart *et al.* (1990) observed that out of 15,000 numbers of higher plants in East Africa, nearly 11,000 distinct species are found in Tanzania. Furthermore, there are 600 endemic forest plant species in East Africa where out of

Furthermore, there are 600 endemic forest plant species in East Africa where out of these, over 25% are in the Eastern Arc Mountains located in Tanzania.

Tanzania is among many other countries of the world endowed with vast forest resources all of which contribute to the livelihood of mankind by providing timber and non timber forest products (Monela, 1989). The rich tree flora results from varied physical and climatic conditions (Mbuya *et al.*, 1994). However, according to MNRT (1998), forests are estimated to disappear fast at a rate of 0.13 million ha per annum. This has been reported to be due to lack of funds and manpower to manage the resources, development of infrastructures and settlements, high population growth rate where the demand for fuelwood, timber and other products is high as well as the use of medicinal plants and its practices (MNRT, 1989). Dery *et al.* (1998) expressed worries that the booming trade in medicinal plants and herbs in Tanzania would further diminish their supply and thus, endanger their sustainability.

Development of forest resources has connotation of sustainability. Sustainability is a broad term that is difficult to define, and is used differently by different people (Stuart *et al.*, 1990). Essentially, emphasis is on production with environmental protection. IUCN (1992) defined sustainable use as the use of an organism, ecosystem or other renewable resources at a rate within its capacity for renewal. Sustainable utilization of forest resources gives emphasis on adapting utilization strategies that ensure continuous production and environmental protection. Forestry being the art and science of managing forest so as to yield on a sustainable basis, a

maximum in quality and quantity of forest products (including medicinal plants) and services (Anderson and Smith, 1976), sustainable utilization need to go hand in hand with sustainable management.

2.3 Medicinal Plants Source and Global Overview on Utilization

The role of plants in medicine began early in history as a magical or religious healing art (Urio *et al.*, 1996). A number of healing traditions that incorporate the use of plants have evolved over the centuries. These traditions, some thousands of years old, have developed a rich collection of herbal-based treatments for a wide variety of conditions. Some of these traditions have produced pharmaceutical agents in use today (Urio *et al.*, 1996).

In East Africa although many people are treated with modern drugs, significant proportion of both literate and illiterate still use herbal medicines to treat different diseases and in many other ways (Kokwaro, 1993; Safowora, 1993). According to Cunningham (1995) a large proportion of the urban African population for example was observed to consult traditional healers due to widely held belief that good health, disease, success or misfortune do not occur as matter of chance, but are due to the action of individuals or ancestral spirits. Traditional medicine is an important part of the health care system in Tanzania. The local traditional healers are still the only medical practitioners available within reasonable distance to many Tanzanians residing in the rural parts of the country (Urio *et al.*, 1996).

Most of the healers use various parts of these plants from the local flora as remedies. In Tanzania, only a small number of these plants have been identified (Hedberg *et al.*, 1982). About 77, 143 and 68 useful traditional medicinal plant

species were identified for the people in Geita, Bagamoyo and Kilosa Districts respectively following a study by Makonda *et al.*, (2000). Bagamoyo was found to have more useful plant species than the other two districts probably due to its forests higher biodiversity. While a study by Herdi (1964) identified about 625 medicinal plants being used by healers in villages around Ifakara town in the central part of Tanzania, Urio *et al* (1996) identified about 150 medicinal plant species being used in Northern Tanzania.

For many decades, all over the world majority of people have been relying on plants and to a lesser extent on animals for their medicines. It is only in the last few decades where the highly complex and scientific synthetics have taken over. However, majority of population in developing countries still rely on traditional medicine either totally or partially for medical care (Hamza, 1997). It was estimated that one third of all the world pharmaceuticals are of plant origin, and if algae, fungi and bacteria were included, then two thirds of all pharmaceuticals were plant based (Eisner, 1988). It was reported by FAO (1991) that there was a growing market in the western world for the use of some specific herbal material in preference to synthetic pharmaceuticals.

The world health organization (WHO) estimated that 80 % of the world population rely on traditional medicine for primary health care, and has a strong feeling that proper utilization of the traditional healing system by developing countries could make significant contribution to the implementation of the WHO's Health for All (HFA) programme that by the year 2000 all people worldwide should lead a sustainable socio-economic productive life (Mahunnah, 1992).

Traditionally, medicinal plants have been considered solely to be part of the health sector in many countries (Urio *et al.*, 1996). These plants deserve serious consideration because they are of high value, uncomplicatedly help poor, conserve natural habitats and enhance health care and rural well being (Lambert *et al.*, 1997). Several studies in South Africa have demonstrated that despite the access to western medicine in many urban areas, still 80 to 85 % of the population continued to use traditional indigenous medicine irrespective of religion, age, education and economic status (FAO, 1998). A study by DANIDA (2000) in Iringa region in Tanzania revealed that the reason for most rural and urban population to rely on traditional indigenous medicine was not motivated by cost of western medicine alone but also the notion that there are ailments that the modern medicines could not cure.

Africa is a rich source of medicinal plants. Perhaps the best known species is *Phytolacca dodecandra* where the extracts of the plants are used as an effective molluscicide to control schistomiasis (Lemma, 1991). Another notable example is the *Securidaca longependuculata*, a tropical plant found almost everywhere in Africa. In Tanzania the dried bark and root of this specie are used as broad-spectrum medicine for nervous system disorders. One cup of root decoction is administered daily for two weeks (ELCI, 1999). Dietary supplements such as vitamin A in poultry feeds in Uganda was found to be supplied through enrichment of *Amanthus* species (Da Silva and Hoareau, 1999).

2.4 Utilization of medicinal plants in Tanzania

Tanzania is one of the countries in Africa reported to be rich in tropical flora, estimated at 10,000 species (Mahunnah, 1992). The flora is potentially rich in medicinal and aromatic plants. The wealth of the traditional ethno pharmacopoeia of the country's tropical flora is indicated by the high utility of indigenous medicinal plants in the traditional healing system.

By the 1990's Tanzania had almost 60,000 traditional healers against 600 western trained doctors who were concentrated in urban areas (Weenen *et al.*, 1990). These traditional healers attended about 80 % of the rural population. Makonda (1997) observed that, in a year, a household member in Geita District had an average frequency of only two visits to a modern medical clinic. Thus, most of the time local people visit traditional healers. Safowora (1993) commented that local people rely heavily on traditional medicines because they are relatively cheap, accessible, locally available and more acceptable as compared to modern medicines. Kayombo (1992) pointed out that the rapid increase in prices of imported industrial drugs, coupled with the removal of Tanzania's free medical services in 1992, forced many people residing in rural as well as urban areas to use local medicines. Minja (1992) argued that in Tanzania many people residing in rural area are located far away from hospitals and clinics and transport facilities are often unavailable.

2.5 Medicinal plants practices and gender

The sustainable use of forest resources requires the participation of all people including women (Talhouk *et al.*, 2001). For many years people have practiced the use of plants for treatment of various diseases as a specific antidote against magic

and for religious ceremonies (Kokwaro, 1993). It has been observed that in Africa and Latin America, women constitute the majority of traditional healers, as well as primary gatherers of medicinal plants for sale to generate income (Lambert *et al.*, 1997). Through their practices, women use traditional approaches in caring for the health needs of their family.

Women rather than men are increasingly involved as non- specialist sellers of traditional medicines and this general pattern was seen throughout Africa (Cunningham, 1995). Furthermore, the traditional rural and urban African communities rely upon spiritual and practical skills of traditional healers whose botanical knowledge on plant species and their ecology and scarcity are invaluable (Cunningham, 1993).

In Tanzania the role of gender in using and practicing medicinal plants is not well documented. Talhouk *et al.* (2001) observed that women uses of forest resources differ from that of men and there is a tendency of overlooking their contribution toward use of natural resources. The author further pointed out that lack of gender awareness in sustainable use of natural resources is a constraint to the development and management strategies of forest ecosystems including non timber forest products (NTFPs). Vineeta (1997) reported that in rural areas where there is migration of men to urban centres for jobs leading to feminization of agriculture, women tend to conserve a wide range of food and medicinal plants for ensuring household food and health security. Wangwe (1996) in Kenya reported that while in some cases women have more knowledge and interest on medicinal, nutritional, and burning properties of plant species, men focus their interest on cash generating

species, marketing and general utilization of woody species. In India, women have been reported to be traditionally conservers of medicinal plants and also possess considerable knowledge not only on plants local names, but also on their use as medicine (APGEST, 2001). Based on experience reported and documented on gender knowledge about NTFPs including the medicinal plants from other developing countries, it is important to carry out a study and document such useful information.

2.6 Medicinal Plant Practices versus Conservation

Conservation is defined as the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet needs and aspirations of future generations. Thus, conservation embraces preservation, maintenance, sustainable utilization and restoration, and enhancement of the natural environment (WWF and USAID, 1993). In the view of medicinal plants use and practices, conservation will simply mean exercising uses and practices of medicinal plants while preserving, maintaining and using sustainably to ensure its availability for future generations.

There is a clear relation between the parts of the plant harvested or the harvesting method used and the impact of harvesting to natural forest resources (Cunningham, 1995; FAO, 1999). Further more it has been pointed out that most users of medicinal plants are not aware of the extent to which the expanding demand in medicinal plants and practices is threatening the survival of several plant species (FAO, 1999).

Extraction of medicinal plants products can be extremely destructive especially where roots and barks are needed (Hamza, 1997). A study by Makonda *et al.* (2000) observed that in the field some species were dying in patches following overexploitation of their roots and barks. Urio *et al.* (1996) observed that the change in policy of free medication from health services in Tanzania from 1994 had encouraged people to continue practicing and using in abundance medicinal plants for curing various diseases and hence causing tremendous damage to natural forests. Furthermore, it has been noted and reported that, medicinal plant practices are as destructive as pit sawing, logging and other destructive forest activities, due to the methods involved in harvesting of the resources such as digging, cutting the roots, debarking of roots and stems of trees, uprooting and defoliating the trees (FAO, 1986; Urio *et al.*, 1996).

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study area description

The study was conducted in urban areas of Morogoro and Iringa Districts of Tanzania. The choice of the study areas was based on the availability of wide diversity of plant species and increased rate of deforestation e.g. Uluguru mountain areas in Morogoro and Ismani in Iringa. Morogoro urban District is also where the Tanzania Forest Research Institute (TAFORI) and National Tree Seeds Programme (NTSP) are located, where a lot of information on non timber forest products including information on medicinal plants is available.

The need to undertake this study specifically in urban areas, is as pointed out by Good and Kimani (1980). They observed that, most traditional healers currently are attracted to urban centers where there is assurance of self employment, more benefits and income is likely to be good compared to rural areas.

3.1.1 Iringa urban District

3.1.1.1 Geographical location

Iringa urban District is located in the Southern Highlands of mainland Tanzania. It lies between 7° latitudes South of the equator and longitudes 35° East of Greenwich. The district covers an area of about 170 square kilometers. The dominant tribe is Hehe. Administratively the District comprises of fourteen (14) wards namely Kitanzini/Miyomboni, Gangilonga, Makorongoni, Mivinjeni, Mshindo, Ilala,

Mkwawa, Mlandege, Mwangata, Kwakilosa, Mtwivila, Kihesa, Ruaha and Kitwilu (Figure 1) (SIP, 2000).

3.1.1.2 Climate

The microclimate of Iringa urban district is to a large extent influenced by its altitude. The mean temperature is about 19 °C, but at times temperatures can go down to as much lower as 11°C. Generally temperatures are low throughout the year. The coolest weather occurs in July when temperatures fall to between 11°C and 22 °C. October is the warmest month with a mean monthly temperature ranging between 15 °C and 28 °C (SIP, 2000). The general rain pattern is unimodal with a single rain season from November to May and dry season during the rest of the year (URT, 1997).

3.1.1.3 Social economic activities

The economic activities in Iringa urban district are mainly industrial activities, urban farming for crop production and livestock keeping as well as informal sector activities such as trade including selling of non timber forest products and handcrafts undertakings (SIP, 2000).

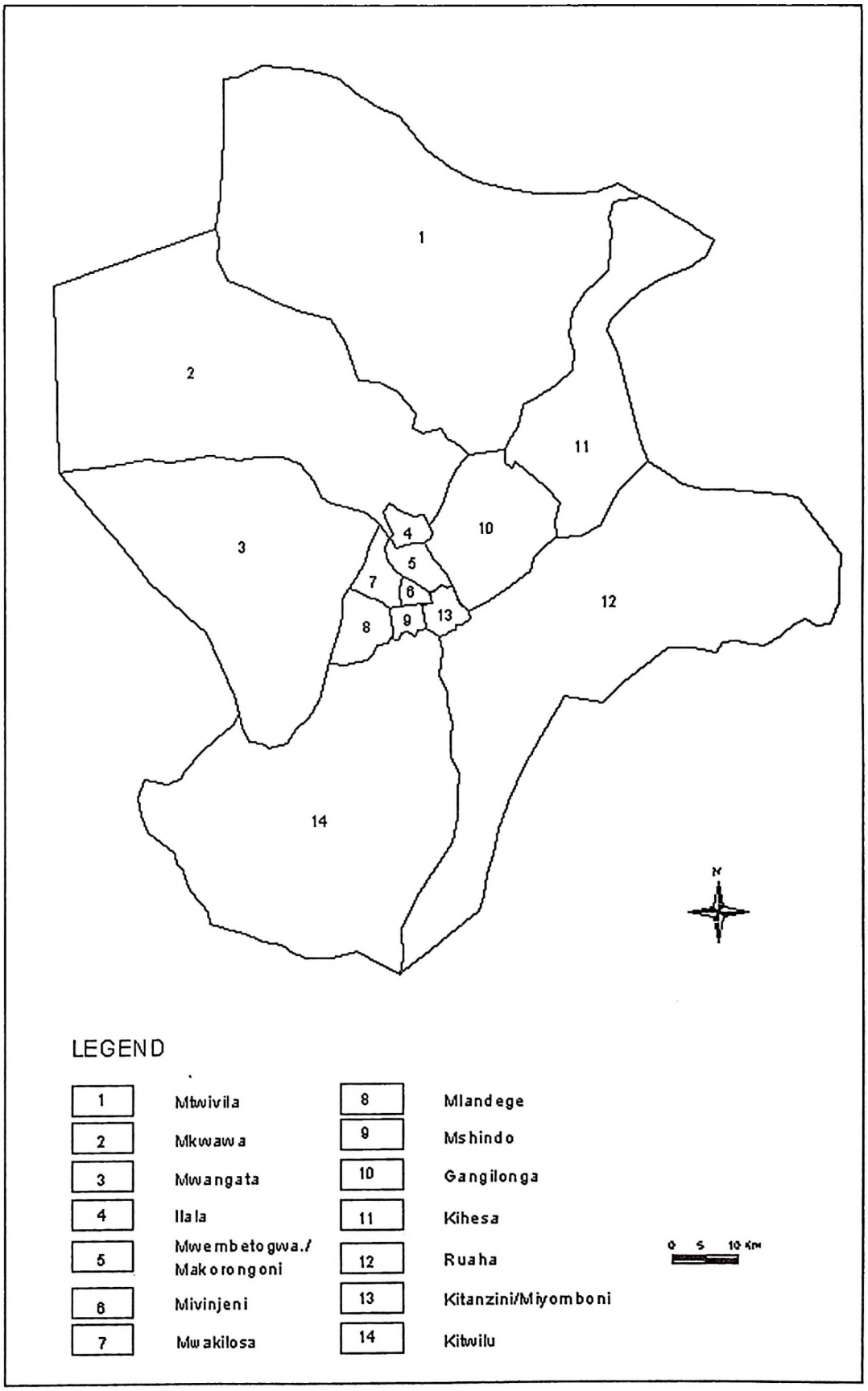

Figure 1 : Location of surveyed wards in Iringa urban district.

3.1.2 Morogoro Urban District

3.1.2.1 Geographical location

The district is located in the eastern zone of mainland Tanzania. It lies between 5° - 7° latitudes South of the equator and 37° – 38° longitudes East of Greenwich. The district covers an area of about 260 square kilometers. Apart from the existence of a large number of mixed tribes, the dominant tribe in the district is Luguru. Administratively the Morogoro urban District comprises of nineteen (19) Wards namely Mwembesongo, Mjimpya, Kichangani, Kilakala, Boma, Mji Mkuu, Kingo, Mlimani, Sultan area, Mafiga, Sabasaba, Uwanja wa Taifa, Kiwanja cha ndege, Mazimbu, Mbuyuni, Mzinga, Bigwa, Kihonda and Kingorwila (Figure 2) (URT, 1997).

3.1.2.2 Climate

The climate of the district is tropical savannah with mean annual rainfall varying between 800 mm at the altitude of 400 m a.s.l to 2300 mm at the altitude of 1500 m a.s.l. The rainfall distribution is bimodal with short season from October to December and long rain season from March to May. The mean annual temperature within the district range between 18 °C on mountains to 30 °C in river valleys, but in most parts the average temperatures are almost uniform at 25 °C (URT, 1997).

3.1.2.3 Social economic activities

The economic activities in Morogoro urban district are mainly industrial and commercial activities, but people do some agricultural crop production and keeping some livestock like goats, pigs, cattle, sheep and selling of timber and non-timber forest products (URT, 1997).

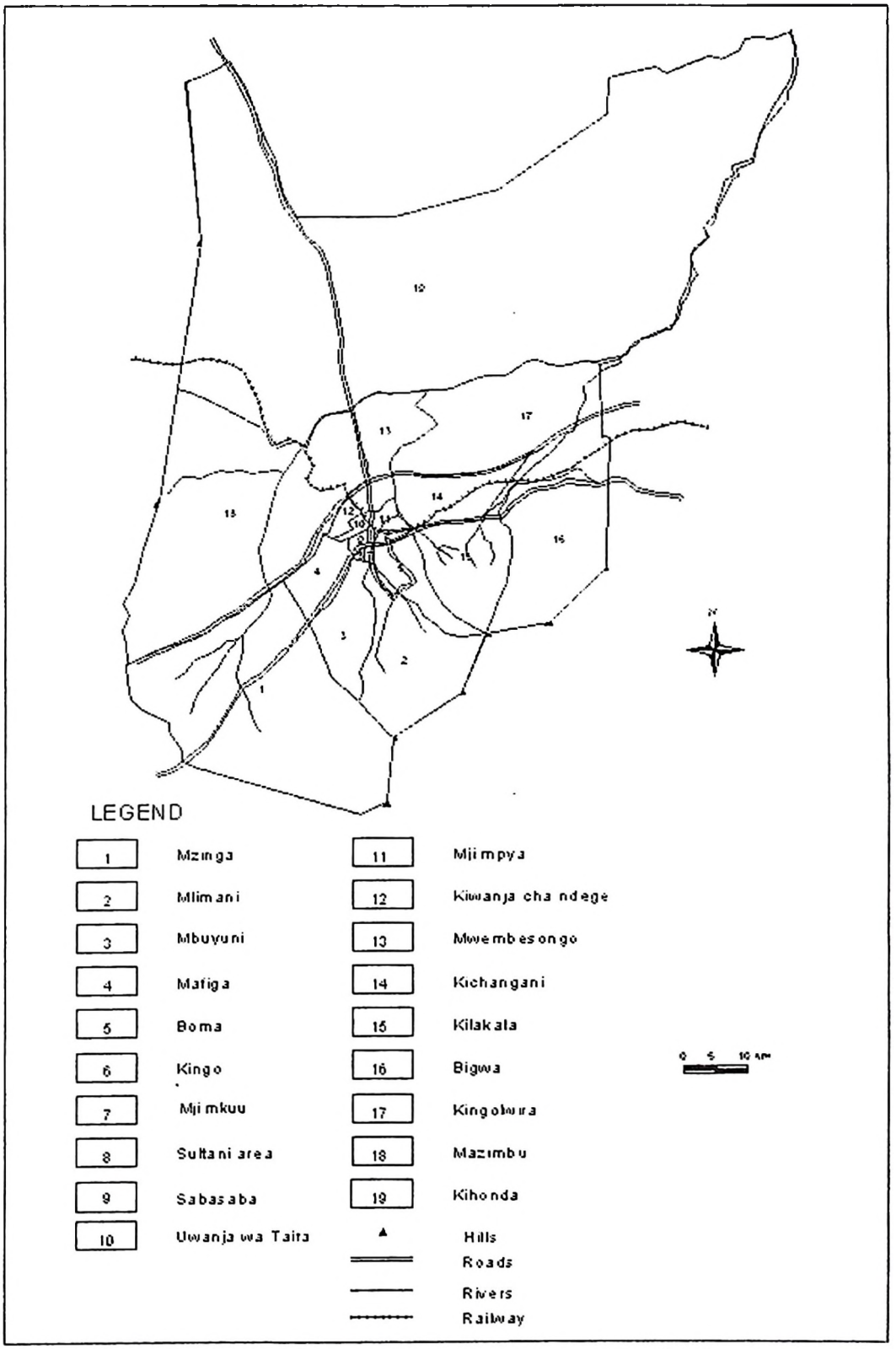

Figure 2 Location of surveyed wards in Morogoro urban district

3.2 Sampling and data collection

3.2.1 Research design

Data were collected using stratified sampling design based on gender from each district administrative wards and markets (both municipal and non-municipal administered markets). Stratified random sampling design according to Temu and Lazaro (2000) increases accuracy without increasing sample size, hence minimum cost and ensures that the sample represents adequately all sections of the population.

3.2.2 Source of data and sampling procedure

3.2.2.1 Source of data

Both primary and secondary data were collected. Primary data were obtained using social survey methods through interviews involving both structured and semi-structured questionnaires and direct field observations. Secondary data were obtained by consulting relevant documents; both published and unpublished from study areas, special collection, libraries and SUA Faculty Records.

3.2.2.2 Sampling procedure

Stratified random sampling was employed to interview herbalists (traditional healers and medicinal plant sellers) and key informants (i.e. botanists, Forest Extension Officers and traditional midwife nurses) based on gender after identifying representative sample numbers. Sampling was in such a way that the sampling fraction (n/N) was greater than 5 % as recommended by Boyd *et al.* (1981) where n = total sample size and N is the population size. The total sample from the two study areas involved seventy five (75) traditional healers, seventeen (17) medicinal plant

sellers and eight (8) key informants. The study in total consisted of 100 respondents from Iringa and Morogoro districts out of which, fifty eight (58) were males and forty two (42) were females.

3.2.3 Data collection methods

The actual data collection was preceded by a preliminary survey to determine the total number of traditional healers, medicinal plant sellers and other key informants available based on variability of the study areas. Information on medicinal plants was collected from traditional healers, medicinal plant sellers and other key informants from both districts.

A list of medicinal plants in local names given by each respondent interviewed in the different wards was recorded. For each of the plants recorded the part(s) used, diseases treated, collection sites, form of medicine used, their preparation methods and dosages were recorded. Other questions related to use and practices of medicinal plants in relation to conservation and sustainable uses were asked and responses recorded.

3.2.3.1 Questionnaire survey

Following preliminary survey, which established sample sizes for traditional healers, medicinal plant sellers and other key informants, questionnaires with both open and close-ended questions were used for actual field survey (Appendices 3 a, b and c). The three types of questionnaires were designed for the purpose of data collection from traditional healers, medicinal plant sellers and other key informants such as botanists, Forest Extension Officers and traditional midwife nurses in each of the wards visited. Information on medicinal plant species was recorded by means of open-ended questions in which the respondents were free to give their own

answers. This was used to avoid yes/no answers and to encourage maximum discussion while in close-ended questions a number of alternative answers were provided for their selection. These were conducted in the local language (Kiswahili) for traditional healers, medicinal plant sellers and other key informants such as traditional midwifery nurses. English language was only used for key informants such as Forest extension officers and botanists.

3.3 Data analysis

The data collected through structured and semi-structured questionnaires were coded to facilitate data entry in the computer. Data analysis was conducted using Statistical Package for Social Sciences (SPSS) computer software. The analysis involved use of descriptive statistics, content analysis, chi-square and logistic regression.

3.3.1 Descriptive statistics

Both qualitative and quantitative information collected through questionnaires were edited, coded and entered into the computer spreadsheet. To summarize the results, statistical analysis was performed to obtain frequencies and percentages for construction of tables and figures.

3.3.2 Content analysis

Content analysis techniques were used to analyse qualitative data and information. Content analysis is a set of methods for analyzing the symbolic content of any communication, and the basic idea is to reduce the total content of communication to a set of categories that represent some characteristics of research interest (Singleton *et al.*, 1993). The information collected through verbal discussion with different respondents (e.g. views/suggestions) was thus analysed in detail where by the recorded

dialogues with informants were broken down into smallest meaningful units of information or themes and tendencies.

3.3.3 Chi-square statistics

Chi-square statistics that is used to test for independence between two categorical data was employed to test the research hypotheses. The chi-square was used to test whether gender roles in medicinal plant practices were dependent to each other or whether an association exists between gender roles and sustainable use of medicinal plants.

3.3.4 Logistic regression

Binary logistic regression similar to a linear regression was utilized to determine the effect of gender roles based on a set of predictor variables including sex, education, age as well as origin of knowledge in medicinal plant practices. The binary logistic regression is suited to models where the dependent variable is dichotomous (Demaris, 1992). The independent variables were tested at 95 % confidence levels to determine the significance of each variable on gender roles. Prior to model development, data from the two study areas were combined to avoid biasness due to differences in size of groups sampled from the two study areas. The model developed was in the form of:

$$Y = f(X_1 + X_2 + X_3 + ...Xn)$$

Where: Y is the independent variables

f represents the function

$X_1 . X_n$ represents the predictor variables like sex, education, age and origin of knowledge in medicinal plant practices.

3.4 Study limitations

Several difficulties were encountered during the phase of this study. However, great efforts were made to make the study successful. The limitations are as explained below:

- Traditional healers and medicinal plant sellers were not very open to disclose their information especially their practices, fearing that the researcher could transfer their technology without authorization or could be a forest extension officer or security person inspecting those without business license.
- Some herbalists especially men were sometimes refusing to answer the questions from the questionnaires claiming that so many researchers have been surveying their work but there has been no feedback and the impact of the process is lacking, thus no need of responding to the questions.

The effect of these problems was rectified by being accompanied by Ward health officers to reduce fears from herbalists. For those who were refusing to answer the question an alternative was made to visit another person to fulfill the objectives.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Characteristics of respondents

4.1.1 Gender

Analysis of results showed that, most herbalists interviewed in Morogoro urban District were found to be males (65%) and only few (35%) were females. In Iringa urban District the case was quite different where most herbalists were found to be females (51%) followed very closely by males (49%) (Figure 3).

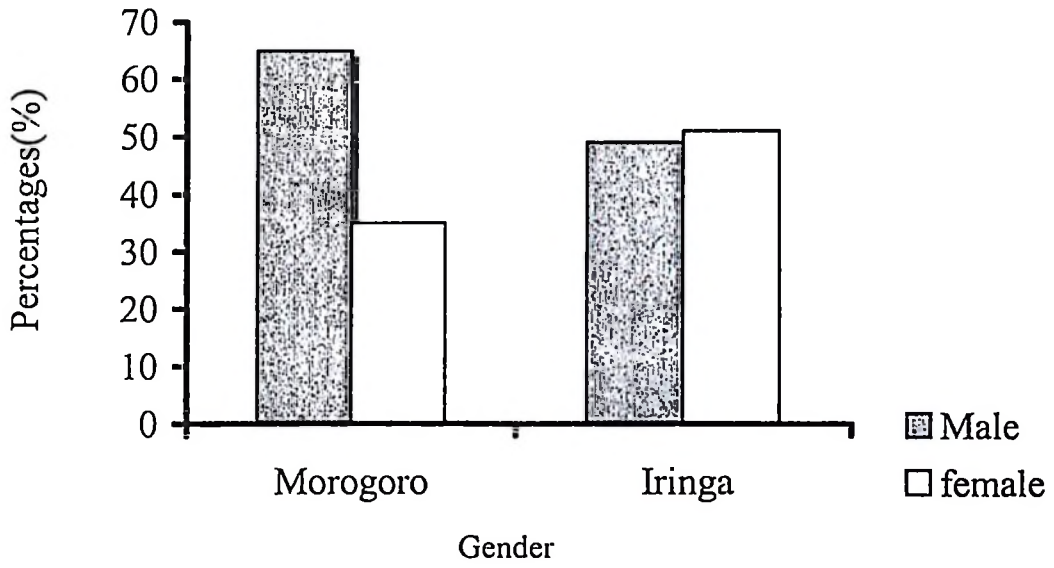

Figure 3: Percentage distribution of herbalists based on gender in Morogoro and Iringa urban districts.

The variations of men and women from the two study areas could be due to inheritance system where males are most favoured to inherit the knowledge than women. For example in Iringa urban district most males migrate to other urban areas to search for jobs and only females remain to acquire the knowledge. The

results are not similar to Kitula (2001) where 95% of herbalists in villages around Zaranige Forest Reserve in Tanzania were found to be males and this was attributed mainly by the way the knowledge of plant medicine utilization is passed to young generation.

4.1.2 Gender roles

Most of men and women interviewed in Morogoro and Iringa urban districts were found to be traditional healers (Table 1). This indicates that men and women play the same role in the healing art using medicinal plants. However, Iringa urban district had more women medicinal plant sellers compared to Morogoro urban district (Table 1). This trend could be due to, high level of species diversity in the nearby natural forest and easy accessibility to these forests attracting more women and even men to obtain their supplies. Secondly, could be due to high level of Masai migration in areas surrounding Iringa region to occupy good pasture lands. Their women have good medicinal plants knowledge, and it has been their tradition to sale medicinal plants whichever places they occupy. Thirdly, could be the medicinal plants market is good in Iringa urban district compared to Morogoro urban and that is why more sellers (both men and women) are attracted to do their business there to generate more income. DANIDA (2000) observed several Masai women in Iringa market displaying their medicinal plant products in natural forms for the customers to verify its genuine nature. Formal discussion by one traditional healer in Iringa urban noted that some traditional healers are currently opting to sale medicinal plants in markets due to the fact that people fail to visit their places since they believe its against their religious beliefs hence denying them from generating

more income. Religious beliefs of the society were therefore observed to be one of the factors hindering the traditional healers performance.

Table 1: Percentage distribution of gender roles in Morogoro and Iringa urban districts.

Gender roles	Morogoro urban district		Iringa urban district	
	Male	Female	Male	Female
Traditional healers	83 (30)	74 (14)	68 (15)	70 (16)
Medicinal plant sellers	11 (4)	10 (2)	18 (4)	30 (7)
Key informants	6 (2)	16 (3)	14 (3)	Nr
Total	100 (36)	100(19)	100 (22)	100 (23)

Note: Numbers in the brackets are frequencies Nr = No response

Source: Field data (2001).

4.1.3 Age distribution

The results for age groups distribution of respondents according to gender indicated that most men and women in wards around Morogoro and Iringa urban Districts were in age group of 45 years and above (Table 2). There were no women in Iringa urban District who were between ages 18 – 30 years. The rest of the results are summarized in Table 2. The general trend indicates that most men and women herbalists (i.e. traditional healers, medicinal plant sellers) including key informants were of the age above 45 years. These findings are in agreement with those reported by Anderson and Staugard (1986), Kokwaro (1993) and Kitula (2001) who suggested that an age of 40 years and above symbolise not only status and respect but also experience and wisdom acquired by herbalists. Furthermore field

discussion with key informants reveled that older herbalists are sex selective in passing their knowledge to the young people. However, young people are reluctant in acquiring that knowledge due to exposure to education where medicinal plant practices are viewed not only as primitive activities but also as against religious beliefs. Plotkin (1996) reported that younger generations for similar reasons appear unwilling or unable to serve as the next receptacles of collective oral tradition. This increases a chance for a lot of valuable information being lost or distorted whenever an older man or woman dies without passing his or her knowledge to others.

Table 2: Percentage age groups distributions of respondents by gender in Morogoro and Iringa urban districts.

Age groups	Morogoro urban district		Iringa urban district	
	Male	Female	Male	Female
18 – 30 years	11 (4)	10 (2)	4 (1)	Nr
31 – 45 years	28 (10)	20 (5)	32 (7)	35 (8)
Above 45 years	61 (22)	63 (12)	64 (14)	65 (15)
Total	100 (36)	100(19)	100 (22)	100 (23)

Note: Numbers in the brackets are frequencies Nr = No response

Source: Field data (2001).

Comparing the age distribution trend in Morogoro and Iringa urban districts, results show that the two districts had more women of the age above 45 years involved in medicinal plant activities than men. Studies by Luoga *et al.* (2000a) and Maximillian *et al.* (2001) also found that most traditional healers were of the age

above 50 years, indicating that most of the healing practices are based on long time experience.

4.1.4 Distribution of marital status

Most men and women herbalists (traditional healers and medicinal plant sellers) and key informants interviewed in Morogoro and Iringa urban Districts were of married status. The distribution of marital status of the rest of respondents in the surveyed wards around Morogoro and Iringa urban Districts are summarized in Table 3. The Bureau of Statistics (1996) indicated that more than 50 % of Tanzanians are married and more than two third had children by the time they reach age 20. This could be the reason for most men and women herbalists as well as key informants from the two study areas to be of married status.

Table 3: Percentage distribution of respondents by marital status in Morogoro and Iringa urban districts.

Marital status	**Morogoro urban**			**Iringa urban**		
	THs	MPs	KIs	THs	MPs	KIs
Married	87	67	100	68	91	100
Single	7	Nr	Nr	3	Nr	Nr
Widow	2	16	Nr	19	9	Nr
Divorced	2	16	Nr	10	Nr	Nr

Note: THs = Traditional healers MPs = Medicinal plant sellers

KIs= Key informants Nr = No response

Source: Field data (2001).

Likewise as reported by Kitula (2001) the high involvement of married people in healing and selling of medicinal plants could be contributed by the need to generate income for family care.

Comparatively, more men and women medicinal plant sellers were found to be widow and divorced in Morogoro urban district than Iringa urban district where most were men and women traditional healers (Table 3). This trend could be attributed by high rate of unemployment and low level of education (and thus low chance of access to the formal job market), resulting to majority of people from these group engaging in self employed activities including medicinal plant businesses as source of income generation. Similar observations were reported by Cunningham (1995).

4.1.5 Ethnic background

The main tribe found in Morogoro urban district is the Luguru, which constituted to about 67% of the sampled male and female medicinal plant sellers, 60% key informants and 52% traditional healers. The rest of herbalists and key informants from other tribes sampled are distributed as shown in Table 4. The reason for the higher number of men and women medicinal plant sellers and traditional healers being from Luguru tribe could be associated with a number of reasons. One, Luguru is a dominating tribe in the area. Secondly, the high level of unemployment growth leaves many of those people without jobs, apart from those migrating to town from surrounding areas for jobs. Since as discussed earlier, urban centres have markets for medicinal plant selling and practicing, majority of those people without jobs are

encouraged to engage themselves in medicinal plant businesses for income generation.

Table 4: Percentage distribution of ethnic groups around surveyed wards in Morogoro urban district.

Respondents	Luguru	Sagara	Kaguru	Pogoro	Others
Traditional healers	52	2	2	14	30
Medicinal plant sellers	67	Nr	Nr	30	33
Key informants	60	Nr	Nr	Nr	40

Note: Nr = No response

Source: Field data (2001).

In Iringa urban district, results showed that the main tribe, which constituted large number of male and female traditional healers, was the Hehe (77%). The business of selling medicinal plants is mainly done by other tribes, largely by Masai up to 91% of respondents. The rest of the tribes are distributed as shown in Table 5.

Table 5: Percentage distribution of ethnic groups around surveyed wards in Iringa urban district.

Respondents	Hehe	Bena	Kinga	Others
Traditional healers	77	7	3	13
Medicinal plant sellers	9	Nr	Nr	91
Key informants	Nr	Nr	Nr	100

Note: Nr = No response

Source: Field data (2001).

The reason for the higher number of traditional healers being from Hehe tribe could be associated with the growing market for medicinal plants in the district to cure various diseases as well as the reason advanced for the case of medicinal plant sellers from Luguru in Morogoro urban district.

The general trend in results from both Morogoro and Iringa urban districts showed that Iringa urban district had also large number of medicinal plant sellers from other tribes, with the majority being the Masai. The reason for the large number of medicinal plant sellers being from Masai tribe could be due to the large number or influx of Masai in Iringa urban district. As discussed earlier these people and in most cases women are well known for selling medicinal plants as their source of income. And this is not only for Iringa urban district, but is a feature mushrooming in most urban centres of most districts in this country. Field observation also noted that In Iringa urban district there is a big market for other businesses like handcrafts from the Masai than in Morogoro urban district. This is probably due to the growth of urban centres particularly Iringa urban where different people including tourists visit the place for different activities.

4.1.6 Education level

Most women herbalists interviewed in Morogoro and Iringa urban districts were found to have no formal education compared to men (Table 6). Few men herbalists had formal education up to college level while no women herbalists responded to have attained formal and college education. Vineeta (1997) commented that, women's low level of education in general, together with combination of culture, social life and family commitments are among the factors which tend to put women

away from formal education which could improve their scientific and technological knowledge. In the two study areas, these were among the reasons, which contributed to women failure to take advantage of available training resources and facilities.

Table 6: Percentage distribution of education levels of respondents in Morogoro and Iringa urban districts.

Respondent	Morogoro urban					Iringa urban				
	No Fr	Fr	Pr	Sec.	Coll	No Fr	Fr	Pr	Sec.	Coll
Male	28	11	50	6	6	27	23	18	23	9
Female	47	10	37	5	Nr	65	9	13	13	Nr

Note: No Fr= No formal education, Fr= Formal education, Pr= Primary education, Sec= Secondary education, Coll= College education.

Source: Field data (2001).

Apart from higher number of women herbalists being illiterate, the level of education in the study areas for most herbalists was observed to be low. This could be contributed by most people's financial incapability to foot school fees, uniforms and other related costs. Furthermore, the elder healers tend to restrict young people from attending schools by having a notion that education would change their minds and hence loose the people who could inherit their practices and retain the knowledge in future. Similar reasons for low level of education for most herbalists have been reported by different researchers. Abdallah (2001) observed that the low level of education of herbalists in villages around Urambo district was due to the fact that most primary schools were located far away from villages hence

discouraging people to attend schools. Likewise, a study by Kitula (2001) noted that the lower level of education for most herbalists and other villagers residing around Zaraninge Forest reserve in Bagamoyo was attributed by lack of self-motivation, early marriages and belief in witchcraft.

4.1.7 Origin of knowledge in medicinal plant practices

Most male and female traditional healers interviewed in both Morogoro and Iringa urban districts admitted to obtain their knowledge through inheritance from elders (Table 7). About 64% of male and female medicinal plant sellers interviewed in Iringa urban district admitted to have acquired their knowledge through training, only few (9%) in Morogoro urban admitted to have acquired that way. Likewise, male and female medicinal plant sellers interviewed in Morogoro urban (67%) admitted to have acquired their knowledge from other sources including spiritual arose at elder stages.

Table 7: Percentage distribution of origin of herbalists' knowledge in Morogoro and Iringa urban districts.

Origin of knowledge	Morogoro urban		Iringa urban	
	Traditional healers	Medicinal plant sellers	Traditional healers	Medicinal plant sellers
Inheritance	66	16	68	Nr
Training	9	17	3	64
Inheritance/Training	2	Nr	3	36
Other sources	23	67	26	Nr

Note: Nr = no response

Source: Field data (2001).

Lack of employment opportunities in the study areas as well as mushrooming of various deadly diseases tends to favour the business on practices and selling of medicinal plants. This could be the reason for some of the people opting to locally or traditionally train to practice and sell medicinal plants. The results obtained are closely related to what Urio *et al.* (1996) observed in northern eastern Tanzania where about 84% of traditional healers were reported to obtain their knowledge through inheritance and only few (16%) were reported to have their knowledge through formal training.

4.2 Utilization of Medicinal Plants in Urban Areas

4.2.1 Medicinal Plants

A total of 246 and 177 medicinal plants (including trees, shrubs and herbs) were encountered and recorded in Morogoro and Iringa urban districts respectively and their surrounding forests during the survey (Appendices 1 and 2). Out of these, 106 and 88 plant species from Morogoro and Iringa respectively were botanically identified (Appendices 1a and 2a). The rest (139 and 89 plant species from Morogoro and Iringa respectively) could not be identified due to difficulties in getting parts which could help in identification and have therefore, been presented by their local names as indicated in appendices 1b and 2b. The number of medicinal plants recorded in the study areas is lower than the 295 medicinal plants reported by Medius (1998) for the Bwindi Impenetrable Forest in Uganda. For Morogoro urban district the number is higher than that reported by Ruffo *et al.* (1989) and Maximillian (2001) for East Usambara and Ruvu Forest Reserve in Tanzania where each documented 185 medicinal plant species. The variations in numbers of recorded

medicinal plants from one area to another could be due to the fact that collectors are knowledgeable in few medicinal plants that are used mostly frequently in their areas, but the areas could have more medicinal plants than the number mentioned (Kitula, 2001). Most of the vernacular names of species recorded in Morogoro urban district originate from Luguru, Masai, Sukuma and Zigua. In Iringa urban district, most vernacular names originate from Hehe, Masai, Nyamwezi and Luguru.

4.2.2 Diseases treated by medicinal plants

A total of 72 and 57 diseases were found to be treated using medicinal plants in both Morogoro and Iringa urban districts. The cured diseases ranged from simple diseases such as tooth ache, stomach ache, ears ache and body rashes to chronic diseases such as cancer, tumors, anemia, stroke and blood pressures. In many cases men and women traditional healers and medicinal plant sellers reported to cure such diseases as love, sexual desire, bewitchment, aphrodisiacs, haenia, veneral diseases, epilepsy and convulsion that according to them have many customers. Appendices 1 and 2 apart from giving a descriptive list of all medicinal plants observed and recorded from the two study areas, it also documents the diseases treated. Ruffo *et al.* (1989) and Maximillian *et al.* (2001) also reported a total of 63 and 70 different diseases being treated using medicinal plants in East Usambara and Ruvu Forest Reserve respectively. This indicates the great potential of medicinal plants to the healing of different diseases, which implies high consumption of medicinal plants and thus an urgent need to conserve the rapid loss of the resources.

4.2.3 Practitioners capability to treat various diseases

Most men (50%) than women (37%) traditional healers interviewed in Morogoro urban district were capable of treating less than ten diseases. Most women (50%) traditional healers were found to be capable in treating ten to twenty diseases (Table 8). However, men and women traditional healers were found to have same capability in treating twenty to thirty diseases and no one responded to treat more than fifty diseases. The case was different for Iringa urban district where most men traditional healers were capable of treating ten to twenty diseases compared to women traditional healers who had low capability (Table 8). The results from the two study areas are different from the findings by Maximillian *et al.* (2001) where traditional healers around Ruvu Forest Reserve were capable of treating 41 diseases with an average of 150 patients yearly. Generally in both study areas most men and women traditional healers were found to have low capacity in treating various diseases including chronic diseases like cancer and HIV/ AIDS. However, most male and female healers from Morogoro and Iringa urban districts claimed to be experts in other diseases, which have many customers and ability to generate more income. Such diseases as mentioned in previous section include haenia, epilepsy, women's and infant's complications, blood pressure, love, venereal diseases, sexual desire, body rashes, diarrhea and vomiting. The results are different from those by Medius (1998) in Uganda where the author found variation on the kind of ailments and diseases treated by men and women. While men were capable of handling complicated cases which may have failed in hospitals, women mainly attended

emergency cases such as births and acute child sickness that do not allow time for some one to move a long distance in order to collect medicinal plants or seek medical help. The low capacity in treating various diseases from the two study areas could be contributed by ignorance on management of the diseases. Interview with most male and female herbalists from the two study areas noted that most healers treated diseases basing on experience and disease symptoms but they didn't seem to properly understand the causal-effect of such diseases they treat.

Table 8: Percentage distribution of traditional healers capability to treat diseases in Morogoro and Iringa urban districts basing on gender.

Number of diseases	Morogoro urban		Iringa urban	
	Male	Female	Male	Female
Less than 10	50 (17)	37 (6)	7 (1)	25 (4)
Ten to twenty	38 (13)	50 (8)	73 (11)	56 (9)
Twenty to thirty	12 (4)	12 (2)	13 (2)	6 (1)
Above fifty	Nr	Nr	7 (1)	13 (2)
Total	100 (34)	100 (16)	100 (15)	100 (16)

Note: Numbers in the brackets are frequencies Nr = No response

Source: Field data (2001).

According to Cunningham (1995) many of the traditional medicinal plant and animal material sold in urban markets has symbolic or psychosomatic value for lucky in finding employment; guarding against jealousy when a person has a job whilst their peer group are unemployed or love charms and aphrodisiacs to keep a wife or partner.

4.2.4 Plant parts used for medicine

A list of medicinal plant parts harvested by gender as medicine for treating various diseases in Morogoro and Iringa urban districts is summarized in Table 9. The survey indicated that most men from the two study areas preferred to harvest roots for medicinal purpose (56% and 63% for Morogoro and Iringa urban districts respectively) followed by barks, leaves and other parts (Table 9). Women herbalists were found to utilize more barks (51% and 61% for Morogoro and Iringa urban districts respectively) followed by roots, leaves and other parts such as flowers, fruits, twigs and whole plants. The higher percentage of men than women using roots than other plant parts may be contributed by the fact that harvesting of roots is labour intensive such that women can't afford unless hiring of labour is involved which, again is a costly activity. Furthermore it lies on the belief that roots contain more concentration of the active ingredients than other plant parts.

The results from the two study areas are different to what Medius (1998) reported from Bwindi impenetrable forest in Uganda where, most male herbalists use more roots and barks compared to their female counterparts who use more leaf material. Musila (2000) in Mwingi district in Kenya and Kitula (2001) in villages around Zaraninge Forest Reserve, Bagamoyo in Tanzania reported 45% and 44% of roots respectively being the most commonly harvested plant parts for medicinal purposes. However, the higher percentage of roots being uprooted for medicinal purpose could have impact on forests if the practice is not done sustainably.

Table 9: Percentage distribution of plant parts used by gender for medicine in Morogoro and Iringa urban districts.

Plant part(s)	Morogoro urban		Iringa urban	
	Men	Female	Male	Female
Roots	56(19)	25(4)	63 (12)	22 (5)
Barks	23 (8)	51 (8)	27 (5)	61(14)
Leaves	18 (6)	12 (2)	5 (1)	4 (1)
Other parts	3 (1)	12 (2)	5 (1)	13 (3)
Total	100 (34)	100 (16)	100 (19)	100 (23)

Note: Numbers in brackets are frequencies

Source: Field data (2001).

Urio *et el.* (1996) and Gathaara and Kahuki (1997) observed that extraction of medicinal plants could be extremely destructive especially where barks and roots are required. It could result into killing of trees and other plants if more roots are dug per plant. Makonda *et al.* (2000) in Geita and Kilosa observed drying patches of tree species following overexploitation of their roots and barks. This emphasizes the need for more extension education to medicinal plant users, on proper ways of sustainably harvesting the roots and other parts of the trees/plants.

4.2.5 Collection of medicinal plants

Most men and women medicinal plant sellers interviewed from Morogoro urban district, obtain their medicinal plant parts outside the district in such areas as Mikese, Kilosa and Ifakara, followed by few men and women traditional healers who collect from within the district i.e. Uluguru Mountains. Only few men and

women traditional healers admitted to collect from both within and outside the district (Table 10). Different results were obtained in Iringa urban district where most men and women herbalists (traditional healers and medicinal plant sellers) interviewed, admitted to collect their medicinal plant parts outside the district i.e. Udzungwa mountain forests, Ifakara, Kilosa and Arusha, followed by men and women traditional healers who admitted to collect within with a few of them collecting from both sources. However, no men or women medicinal plant sellers responded to collect medicinal plant parts within or from both within and outside the district (Table 10). The reason behind collection outside the districts was pointed out to be due to unavailability of plant species required. This could be attributed by uncontrolled cutting of trees for different purposes such as timber, charcoal, firewood as well as expansion of towns and infrastructure development.

Table 10: Percentage distribution of herbalists from Morogoro and Iringa urban districts in relation to the medicinal plant collection sites.

Respondents	Morogoro urban			Iringa urban		
	Collect outside the district	Collect within the district	Both within and outside	Collect outside the district	Collect within the district	Both within and outside
Traditional healers	18	52	30	52	39	9
Medicinal plant sellers	67	33	Nr	100	Nr	Nr

Note: Nr = No response

Source: Field data (2001).

Comparing the trends from the two study areas, results indicated that most men and women medicinal plant sellers collected their medicinal plant parts outside their districts. Generally, most of herbalists complained of travelling long distances in search for the required medicinal plant species. This indicates a higher rate of deforestation in forests around urban areas and thus a need for conserving the potential medicinal plants, which are being overexploited. Kitula (2001) found that the distance from which medicinal plants are collected depend on the type of medicinal plant(s) to be collected from the forest as well as on the type of disease. Sometimes the distance depends on beliefs that the plant collected from the wild and deep in the forest is stronger than the one collected from nearby home or planted (Odera, 1997).

4.2.6 Forms of medicine and preparation methods

Results from Morogoro and Iringa urban districts revealed that 78% and 62% respectively of most interviewed men and women herbalists administered medicines from plants to treat various diseases in form of mixture of concoctions and powder. This was followed by 11 % and 24 % of medicines from plants administered in form of powder only. In Iringa urban district only 4 % of medicines were administered in solid form (either fresh or dried roots, leaves or barks) while in Morogoro urban district there were no responses, 2 % of medicinal plants were reported from both Morogoro and Iringa urban districts, to be administered in form of liquid only (Figure 4).

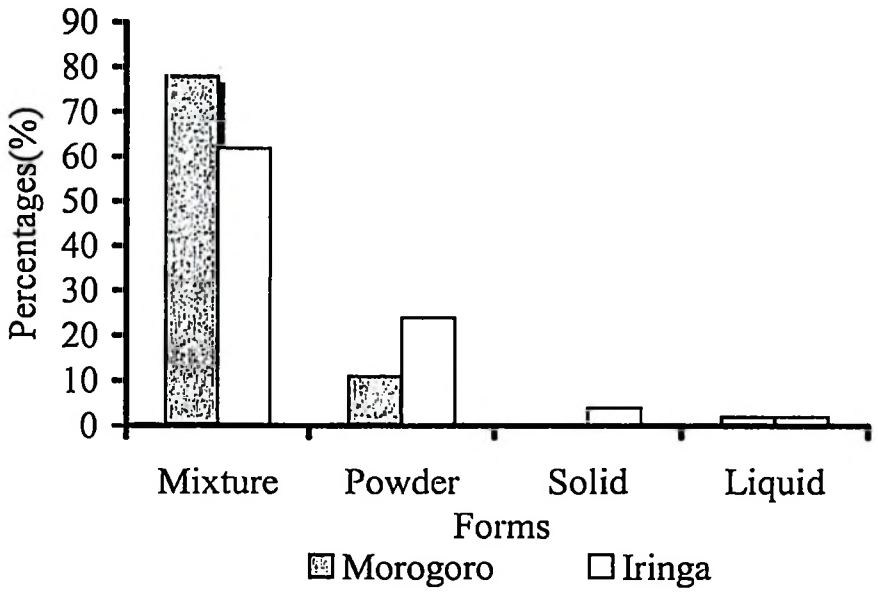

Figure 4: Forms in which medicinal plants are administered for various diseases in Morogoro and Iringa urban districts.

The findings from this study are similar to those reported by Medius (1998) in Uganda, where most of medicinal plants were used in a mixed form. Kitula (2001) also observed that most of the plant medicines are boiled before using due to the belief that boiling is the best method for extracting active ingredients from medicinal plants and the process ensures sterility.

In general most men and women herbalists interviewed from Morogoro and Iringa urban districts preferred to use a mixture of soaking and boiling as well as grinding as their preparation method of medicinal plants for consumption to produce concoction and powder (Table 11). With soaking method, having clean water in the pot, ground barks, roots or pounded leaves are added. The mixture is then allowed to stay for sometime under the sun to concentrate the medicine before use. With boiling method, the mixture is boiled, cooled and sieved ready for use.

Table 11: Percentage distribution of preparation methods of medicinal plants by gender in Morogoro and Iringa urban districts.

Preparation method	Morogoro urban		Iringa urban	
	Male	Female	Male	Female
Boiling	6 (2)	Nr	Nr	9 (2)
Grinding	23 (8)	6 (1)	26 (5)	35 (8)
Mixture of boiling and grinding	71 (24)	94 (15)	74 (14)	56 (13)
Total	100 (34)	100 (16)	100 (19)	100 (23)

Note: Numbers in the brackets are frequencies Nr = No response

Source: Field data (2001).

Comparatively, most women and men herbalists (35% and 26% respectively) interviewed in Iringa urban district preferred to use grinding method for preparation of medicinal plants for consumption, while only few (6% and 23% respectively) of women and men herbalists interviewed in Morogoro urban district were on favour of that method. The reason for the higher percentage of men and women herbalists to prefer using grinding methods during preparation of medicines could be due to easy of storage for ground medicines compared to liquid medicines. Furthermore, liquid medicines take short period to perish. Few men and women herbalists were found to use boiling method only (about 6 % and 9 % for Morogoro and Iringa urban district respectively). There were also no responses on the method of liquid extraction without boiling from the plant medicine.

Field observations noted that most medicines were prepared from more than one medicinal plant tree species and this was argued to be due to concentrating and

strengthening of the medicinal properties for fast curing of some diseases. Furthermore this might be contributed by the fact that most men and women herbalists do not know precisely how much the type of active ingredient is present in that particular medicinal plants being used (Kitula, 2001). In Kibaha district, some diseases like measles were treated using a concoction of twenty (20) plant species while in some cases only a single plant species treated six (6) different diseases (Maximillian *et al.*, 2001). This could indicate variations in the number of plant species used to cure a single disease.

4.2.7 Dosage and side effects

Results obtained from Morogoro and Iringa urban district after cross tabulation analysis showed that most female herbalists had proper dosages (i.e. proper estimate of quantity) to their patients than males (Table 12). This might be due to the fact that women rather than men are the primary care of the families and thus have more knowledge on how to administer the medicines to patients. However, the quantity of medicinal plants used per patient as reported by various male and female herbalists varied depending on the concentration after processing, type and extent of disease and age of the patient. The rest of female herbalists from the two study areas (19% and 9%) respectively were found to have no proper dosages but just estimated quantities basing on their experiences and severity of the diseases.

Table 12: Percentage distribution of dosage administered by male and female herbalists in Morogoro and Iringa urban districts.

Dosage	Morogoro urban		Iringa urban	
	Male	Female	Male	Female
Proper	59 (20)	81 (13)	74 (14)	91 (21)
Improper	41 (14)	19 (3)	26 (5)	9 (2)
Total	100 (34)	100 (16)	100 (15)	100 (23)

Note: Numbers in the brackets are frequencies

Source: Field data (2001).

Apart from female herbalists being knowledgeable on administering plant medicines to patients than men, the results in general revealed that dosages of medicinal plants were not specific and their side effects were not known probably due to ignorance. The most common unit of measure ranged from one teaspoon of the liquid to one-quarter of a cup for children under five years old, while for an adult ranged from one tablespoon to a cup. The results obtained are similar with those reported by Maximillian (1998) and Kitula (2001). The period under dose varied from two to seven days as advised by the herbalist (traditional healer or medicinal plant seller), while for those with no proper dosage the period was determined by how the patient would recover from the disease after taking the remedy. The improper administration of medicinal plants is dangerous as it may result into overdosing or under dosing patients. This emphasizes the need for more training and education to all male and female herbalists so that proper dosages are known. However a thorough research is necessary on the medicinal plants used,

active ingredients present and proper dosages for curing diseases before integrating their use and practices with modern health practices.

4.3 Gender Roles in Medicinal Plant Practices

Results from Morogoro and Iringa urban districts using chi-square indicated that, there is significant difference in the roles played by men and women in medicinal plant practices. The calculated chi-square values (1.581 and 3.830 for Morogoro and Iringa urban district respectively) were found to be less than the tabulated chi-square value (5.991) at 2 degrees of freedom and 0.05 probability levels. The results therefore, supported the null hypothesis that medicinal plant practices are gender dependent (Table 13). However, further analysis by logistic regression showed that medicinal plant practices are independent of gender ($p< 0.05$) but influenced by other factors. These factors include lack of formal education and inheritance of knowledge from elders, which increase the probability, or chance of practicing medicinal plants by herbalists (traditional healers and medicinal plant sellers).

In Morogoro urban district about 68 % of traditional healers interviewed were men while only 32 % were women. Furthermore, 67 % of men were medicinal plant sellers and the rest (33 %) were women. This indicated that men are the most practitioners and sellers of medicinal plants within the district. The reason for the higher number of men and few women being involved in practicing and selling medicinal plants could be due to nature of inheritance, where according to many African societies men are mostly given first priority to acquire the knowledge than women (Urio *et al.*, 1996).

In Iringa urban district the case was different, where about 52 % of traditional healers interviewed were women and only 48 % were men. For the case of medicinal plant sellers about 64 % were women and the rest (36 %) were men. This indicated that most practitioners and sellers of medicinal plants in Iringa urban district are women. The higher number of women being involved in practicing and selling medicinal plants in Iringa urban district apart from the influx of Masai women as discussed earlier could be due, to the migration of most men to other urban centres to search for good jobs. The chance therefore remains only to women to acquire the knowledge, and hence survive through that business. Furthermore, formal discussions with key informants noted that medicinal plant practices in the past and since then were associated with some art of witchcraft where women were so much involved than men.

Generally, comparing the trend from the two study areas, Morogoro urban district had more men involved in medicinal plant practices, while Iringa urban district had more women. The trend could be due to such factors as inheritance systems where women are not so much encouraged to practice unless otherwise, low level of education, migration of men to other towns, traditional cultures and beliefs. Field observation noted that in areas where men are available to inherit the knowledge like Morogoro urban district, women are less involved. The results obtained from Morogoro urban district are similar to Urio *et al* (1996). The authors observed few women taking part in medicinal plant practices, due to inheritance system where women who are involved, acquired the knowledge if the parents had no male child or if there was no other member of the family available to acquire the knowledge.

Furthermore, oldest women traditional healers usually are very secretive in transferring knowledge to young women thus contribute to the low number of women traditional healers in most areas (Maximillian *et al.*, 2001). Otieno (1999) observed that there is a tendency for most traditional healers to dominate medicinal enterprise by posing some myths in relation to medicinal plants.

Table 13: Percentage distribution of gender roles in medicinal plant practices in Morogoro and Iringa urban districts.

Gender roles	Morogoro urban		Iringa urban	
	Men	Women	Men	Female
Traditional healers	68	32	48	52
Medicinal plant sellers	67	33	36	64

Source: Field data (2001).

4.4 Gender and Sustainable Use of Medicinal Plants

Sustainability is as broadly defined by Anderson and Smith (1976) and IUCN (1992) in section 2.4. From the view of this study, sustainable use of medicinal plants refers to the level of harvest at which the medicinal plant species can maintain their population at natural or near-natural levels without changing the species composition of the community.

Results obtained from Morogoro and Iringa urban districts using chi-square revealed existence of a linear association between the roles played by both men and women in sustainable use of medicinal plants. The calculated chi-square values (4.281 and 0.922 for Morogoro and Iringa urban district respectively) were found to be less than the tabulated chi-square value (7.815) at 3 degrees of freedom and 0.05

probability levels. The results therefore, supported the null hypothesis that significant difference exists in the roles played by men and women in sustainable use of medicinal plants.

In Morogoro urban district results showed that most men followed by women suggested several ways to ensure sustainable use of medicinal plants. These included: the need to domesticate the plants, training herbalists on proper and economic ways to administer the medicinal plants to patients (dosages) and propagation of such plants, need for more research in medicinal plants including documentation, toxicity levels, dosages and side effects and need for cooperation amongst herbalists (Table 14). Field observations noted that most men and women traditional healers in the study areas do not succeed due to poor cooperation amongst themselves. This could be due to selfishness where most of them avoid to disclose their information to others, as they fear to loose their market. Moreover, traditional healers do not want to disclose their information to restore their pride, increase influence and market monopoly (Maximillian *et al.*, 2001). Furthermore, most traditional healers, most of them being women suggested the need for the government to impose strong punishment to people like charcoal makers and pit sawyers who contribute much to degradation of environments and hence contributing to rapid loss of forest resources. While most women interviewed (37 %) suggested the need to have training, research and cooperation only few men (19 %) were in favour of such suggestion. The rest of views are distributed in percentages of response as shown in Table 14.

In Iringa urban district results showed that most men and women (50 % and 52 % respectively) were of the idea that to ensure sustainable use of medicinal plants there is a need to conduct training, research and cooperation. Most men supported the need for domestication and/or establishment of community based woodlots than women. The percentage of herbalists intervicwed with their views on sustainable use of medicinal plants is as distributed in Table 14.

Table 14: Percentage distribution of gender against their views on sustainable use of medicinal plants in Morogoro and Iringa urban districts.

Views on sustainable use of medicinal plants	**Morogoro urban**		**Iringa urban**	
	Men	Women	Men	Women
Domestication/establish community based woodlots	28 (10)	21(4)	23 (5)	13 (3)
Training, research & cooperation	19 (7)	37 (7)	50 (11)	52 (12)
Government impose strong punishment to environmental destructors	14 (5)	5 (1)	9 (2)	9 (2)
Both of the above is agreeable	36 (13)	26 (5)	18 (4)	26 (6)
No response	3 (1)	11 (2)	Nr	Nr
Total	100 (34)	100 (19)	100(22)	100(23)

Note: Numbers in the brackets are frequencies Nr = No response

Source: Field data (2001).

Generally most women interviewed from both study areas were of the view of supporting training on how to domesticate the plants and/or establish community based woodlots, involving herbalists in research for medicinal plants and cooperation amongst medicinal plant users than men. This could be as reported by

Cunningham (1995) and Lambert *et al.* (1997) due to the fact that most women herbalists are the primary users and marketers of medicinal plants and herbs, thus are eager to learn more than men. Furthermore as discussed earlier, since women are responsible for collection of NTFPs including the medicinal plant resources, training them on domestication could reduce the time they waste to perform other activities for the welfare of their families.

4.5 Medicinal Plant Harvesting Practices and Associated Problems

Results from the Morogoro and Iringa urban districts revealed that most male and female herbalists interviewed were of the opinion of non existence of poor harvesting practices (i.e. practices that result into over exploitation of the plants e.g. debarking, defoliating and uprooting) of medicinal plants (Table 15). This could probably be due to the fact that most people especially in Iringa urban district are now aware of the importance of the medicinal plants for future generation. However, field observation noted that most men and women herbalists were not open to give views on existence of poor harvesting practices due to fear of being caught or reported as destroyers of environments hence loose their job. Most male herbalists interviewed in Morogoro urban district compared to Iringa urban district agreed on the existence of uprooting and debarking when harvesting the medicinal plants (Table 15).

The results are in agreement with Medius (1998) where in Bwindi Impenetrable Forests in Uganda, male herbalists tend to use more destructive plant collection methods than their female counterparts. The consequences of uprooting and debarking the trees is the long distances they travel to obtain the medicinal plants

since uprooting and debarking dries trees with its parts and eventually killing them. If uprooting and debarking are not done properly and sustainably they are as dangerous as excessive cutting of trees for charcoal and timber. This eventually result to increased rate of deforestation. The poor harvesting techniques reported emphasize the need for more extension education to men and women herbalists on sustainable way of harvesting medicinal plants to avoid loss of valuable tree species.

Table 15: Percentage distributions of views on poor harvesting practices in medicinal plants in Morogoro and Iringa urban districts.

Poor harvesting practices	**Morogoro urban**		**Iringa urban**	
	Male	Female	Male	Female
Uprooting	35 (12)	18 (3)	16 (3)	17 (4)
Debarking	3 (1)	Nr	5 (1)	9 (2)
Uprooting and debarking	30 (10)	13 (2)	5 (1)	13 (3)
None	32 (11)	69 (11)	74 (14)	61 (14)
Total	100 (34)	100 (16)	100 (19)	100 (23)

Note: Numbers in the brackets are frequencies

Source: Field data (2001).

Results obtained through interview with male and female herbalists in Morogoro and Iringa urban districts, after content analysis showed variations in problems as far as medicinal plant practices are concerned (Table 16). While the major problem facing most male and female herbalists (26 %) in Iringa urban district was the existence of poor cooperation amongst traditional healers and medicinal plant sellers, in Morogoro urban district only few herbalists viewed that as a problem. In

general, most male and female herbalists (59% and 38% respectively) in Morogoro urban district were faced with several problems, which hinder the development of medicinal plant practices. These include, lack of cooperation amongst traditional healers/medicinal plant sellers, inadequate knowledge on diseases management, lack of proper storage and processing equipments, dishonest from patients e.g. failure of patients to follow the directives on dosages and failure to pay after being attended and poor working conditions.

Most men and women herbalists do perform their activities in poor and dirty environments thus discouraging people to visit them and also face problems in acquiring licenses for their business. Field observations noted the existence of poor working conditions for most herbalists and lack of processing facilities. For instance most herbalists were observed grinding the barks or roots using hand tools hence wasting more time and energy. The poor working condition was also observed to be due to lack of cleanliness attitude. Furthermore, most practitioners were not having working licenses due to either lack of funds and knowledge on the importance of working licenses, avoidance to pay tax, colluding with tax collectors or beliefs associated with myths. For example some male and female traditional healers declared to work in dirty conditions and declared to have no licenses believing that, their ancestors would get angry and thus loose their jobs. This again could be a trick to avoid paying licenses.

Higher percentage of male and female herbalists in Iringa urban district were observed to have poor cooperation amongst themselves, lack of knowledge on disease management, proper storage and processing facilities and work under poor

conditions than in Morogoro urban district. The problems could be due to selfishness to avoid expressing their skills and knowledge thus protecting their market, inadequate knowledge on managing diseases, poverty as well as strong beliefs from ancestors.

Table 16: Percentage distribution of problems with regards to medicinal plant practices in Morogoro and Iringa urban districts.

Problem	Morogoro urban		Iringa urban	
	Male	Female	Male	Female
Poor cooperation amongst herbalists	5 (2)	13 (2)	26 (5)	26 (6)
Lack of knowledge of disease management/proper storage and processing machines	9 (3)	19 (30)	26 (5)	17 (4)
Dishonest from customers	9 (3)	13 (2)	16 (3)	Nr
Poor working conditions	Nr	6 (1)	11 (2)	17 (4)
Problems in license acquisition	9 (3)	6 (1)	11 (2)	22 (5)
All of above problems are true	59 (20)	38 (6)	11 (2)	17 (4)
No problem at all	9 (3)	5 (1)	Nr	Nr
Total	100 (34)	100 (16)	100 (19)	100 (23)

Note: Numbers in the brackets are frequencies Nr = no response

Source: Field data (2001).

The main sources of problems from the two study areas were observed to be poverty and ignorance due to low level of education and the myths associated with medicinal plant practices. The results suggest the need for training in form of seminars, workshops and short courses programmes. Training will allow herbalists

to meet together and share their views as well as educate each other on the need to exchange knowledge to develop their skills.

4.6 Integration of Medicinal Plant Practices with Modern Health Care in Tanzania.

Results obtained after content analysis indicated that, most male and female herbalists interviewed in Morogoro and Iringa urban districts were in favour of the need for the government to look on practicalities of integrating traditional medicine with modern health care (Table 17). This could involve identifying those herbalists whom their work is more or less scientific. The reason behind most male and female herbalists supporting the idea from the two study areas, was due to the fact that traditional medicine sector has been neglected by the government. According to many men and women herbalists interviewed, the government has not done any serious effort to promote, improve or even value the work done by herbalists in study areas. For instance the majority of male and female herbalists interviewed complained that apart from being partly involved in medicinal plant researches or invited to attend several seminars and workshops they usually face problems of poor cooperation from government institutions like the Muhimbili Traditional Medicine Research Centre (MTMRC) wherever and whenever they want to prove the efficiency of their medicine for curing a certain disease.

In Morogoro urban district 17% and 16% of male and female herbalists respectively interviewed suggested the need to cooperate amongst themselves first before being involved in modern health practices. In Iringa urban district, while only few women supported the idea, there was no response from males. Cooperation amongst male

and female herbalists to solve their prevailing problems was argued to be important prior to cooperation with the health sector since it could be easier for health sector to work with teams or groups. The other views on integration of medicinal plant practices with modern health care are distributed in percentages as shown in Table 17.

Table 17: Percentage distribution of views on integration of medicinal plant practices with modern health care by gender in study areas.

Views on integration of medicinal plant practices with modern health care in Tanzania	**Morogoro urban**		**Iringa urban**	
	Male	Female	Male	Female
Herbalists should cooperate with health sector	17 (6)	16 (3)	Nr	4 (2)
Herbalists cooperate first before involvement	6 (2)	11 (2)	36 (8)	13 (2)
Government need to identify and involve herbalists in medicinal plants research	56 (20)	32 (6)	64 (14)	61 (14)
Women need to be involved first	Nr	16 (3)	Nr	Nr
All of the above views are true	13 (5)	21 (4)	Nr	5 (1)
No views	8 (3)	4 (1)	Nr	17 (4)
Total	100 (36)	100 (19)	100 (22)	100 (23)

Note: Numbers in the brackets are frequencies

Source: Field data (2001).

Generally, comparison of results from the two study areas indicates that most male and female herbalists were willing to integrate their traditional knowledge with the modern health care technology for the welfare of the people. To be more successful,

cooperation between and among herbalists and the government was of more emphasis. Odhult and Karehed (1997) concluded that both traditional medicines based on herbal remedies and modern medicine are important and must continue to exist side by side to make health care in developing countries available to the majority of the people. Akerele (1987), Anyinam (1987) and Good (1987) have pointed out that there is a need, through training and evaluation of effective remedies to involve herbalists in national health care systems as they are an important and influential group involved in health care.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

From the study, a total of 246 and 177 medicinal plants were recorded in Morogoro and Iringa urban districts respectively, out of these, only 108 and 88 were botanically identified. The recorded medicinal plants were reported to cure about 72 and 57 diseases and other complications in Morogoro and Iringa urban district respectively.

The study found that, significant differences exist in the roles played by gender in sustainable use of medicinal plants. Most women from the two study area rather than men were more supportive to the idea of training in domestication of medicinal plants, establishment of community based woodlots and involving herbalists in researches on medicinal plants.

The medicinal plant practices were observed to be dependent of gender and mostly influenced by social-economic and cultural factors like income generation, low level of education, inheritance systems including traditional cultures and beliefs that discourage women to participate fully as well as geographical location. For instance in Morogoro urban district men were found to dominate the practices of medicinal plants while in Iringa urban women were dominant. Most men and women herbalists from the two districts were found to have low capability in treating diseases. Their capability in treatment is based on long term experience and disease symptoms. However, the causal-effect of the diseases is rarely considered.

Medicinal plants were found to be important source of health care for majority of people in study areas. Herbalists (both men and women) are still very important people in providing primary health care to the urban societies despite most of them having low capability in treating chronic diseases. Most men and women herbalists expressed the potentiality of medicinal plants in healing different diseases ranging from simple to chronic ones.

The study has established the low level of education and inheritance system to be among the factors hindering the medicinal plant practices by gender. However, income generation, difficulties in accessing modern health services, traditional cultures and beliefs contribute to the use and practice of medicinal plants in study areas.

It was also observed that most male and female herbalists cover long distances to harvest medicinal plants mainly from forests outside the municipality and sometimes even outside the regions. Most male herbalists preferred to harvested roots for medicinal purpose while women preferred to harvest barks. Almost all men and women herbalists interviewed from Morogoro and Iringa urban districts used a mixture of boiling and grinding to prepare medicinal plants for consumption. Above all, this study has found that most men and women herbalists do not have specific dosages and they are ignorant on the side effects of the medicinal plant medicines.

Although medicinal plants create employment and generate income, illiteracy and lack of cooperation for most men and women herbalists contributes to inefficient and unsustainable use of medicinal plants. Furthermore rapid urbanization,

population increase, economic hardship and greater demand for plant medicines favour the increase in harvesting of medicinal plants from forests located in rural areas. This accelerates depletion of the rural forest resource base where certain species continued to be vulnerable to overexploitation, and consequently amplify problems associated with primary health care.

The study noted also that most men and women herbalists were willing to integrate their traditional knowledge with the modern health care practices. To be more successful there is a need for cooperation between and amongst herbalists (both male and female) and the government through the Ministry of health.

5.2 Recommendations

From the conclusions, the following recommendations are made:

1. There is a need for sensitizing and training all herbalists (men and women) on how to domesticate valuable species of medicinal plants in their home gardens, assist them in establishment of community based woodlots as well as involving them in researches on medicinal plants. However women should be much sensitized since they are the primary users and marketers of medicinal plant materials.
2. Since illiteracy is an obstacle towards sustainable resource use of medicinal plants, it is therefore recommended to conduct organized public awareness programmes to all herbalists. This could include training, seminars, short courses on diseases management and administration, processing, storage, proper ways of harvesting medicinal plants and conservation needs. This will not only improve their understanding about all the necessary activities

connected with medicinal plants practices but also will ensure sustainable use of the medicinal plants.

3. There is a need for most men and women herbalists to be sensitized to acknowledge the need to change their attitude and start cooperating amongst themselves and passing their knowledge to young generations to avoid loss of information. Knowledge transfer should be given priority to young women who contribute much to the health care of families since they are less considered in the process of inheritance. Furthermore, the traditional cultures and beliefs that hinder participation of women in medicinal plant practices should be discouraged so as to advance the practice.
4. Further studies should be carried out in the two study areas on how to domesticate the potential medicinal plant species in home gardens, determine efficacy of medicinal plants so as to justify their continued use and to provide a basis for establishing effective and safe ways of administering the medicinal plant remedies.
5. There is a need of integrating traditional medicinal plant practices with the modern health care system in Tanzania, bearing in mind the great contribution of medicinal plants to majority of people in both urban and rural areas. The government should establish proper regulations and registrations on all aspects concerning plant medicines and their practices, as well as provision of financial support to promote the potential role of medicinal plant industry in socio-economic development.

As discussed previously, hundreds of medicinal plant species in the wild are threatened with extinction due to over harvesting, destructive collection techniques

and conversion of habitats for agricultural use. Conservation and production of medicinal plants in community gardens should be given priority along with other conservation practices so as to preserve the potential medicinal plants and herbs. The conservation practices including the use of protected areas, community awareness and training, medicinal plant research, and documenting the knowledge of traditional uses are critical to the long term use of these important plants.

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LIST OF APPENDICES

Appendix 1a: List of botanically identified medicinal plants recorded from Morogoro urban district including parts used and diseases cured.

Local name	Botanical name	Disease(s) treated	Part(s) used
Busaluzena (h)	*Abrus precatorias*	Viral & bacterial infections/Aphrodisc	Leaves
Enseka	*Ximenia caffra*	Mental case	Roots
Ilula lyape	*Acacia seyal*	Convulsion	Roots
Isamiko	*Bridelia micrantha*	Malaria	Barks
Itembosho (h)	*Aloe vera*	Chronic diseases	Leaves
Msagwasagwa	*Kadaba farinosa*	Ulcers/Dysentery/ Tuberculosis	Leaves
Kalialia	*Maerua triphylla*	Asthma	Leaves
Kalialia	*Maerua triphylla*	Rheumatism	Fruits
Kalialia	*Maerua triphylla*	Breast swelling/Aphrodisc	Roots
Mtitu	*Rutidea orientaris*	Stroke/Ulcers	Roots
Lonzwe(h)	*Euphobia hilter*	Blood Pressure/Fungus	Leaves
Lufyambo(H)	*Abrus precatorius*	Stomach /eyes ache/ Hemorrhoids	Leaves
Lufyambo(h)	*Abrus precatorius*	Hemorrhoids	Roots
Lugaka(h)	*Aloe vera*	Various diseases	Wholeplant
Malula	*Acacia sp.*	Aphrodisc	Roots
Mavumbula	*Terminali brownii*	Bewitchment	Whole plant

Mbaazi	*Cajanus cajan*	Dysentery	Leaves
Mbigiri nene(h)	*Tribulus terrestris*	Gonorrhea	Leaves
Mbuyu	*Adansonia digitata*	Women's stomach ache	Flowers
Mbuyu	*Adansonia digitata*	Tuberculosis	Barks
Mbuyu	*Adansonia digitata*	Bewitchment	Whole plant
Mdaa	*Euclea divinorum*	Yellow fever	Roots
Mdaladala	*Euclea fructucosa*	Chronic malaria	Leaves/ Root
Mdamba	*Ficus ingens*	Various diseases	Roots
Mdaula	*Zanha africana*	Early abortion/sexual desire/ Stomach ache/ Love/ Haenia	Roots
Mdaula	*Zanha africana*	Love	Leaves
Mdimudimu	*Suregada zanzibariensis*	Mental case	Roots
Mdimudimu	*Suregada zanzibariensis*	Snake bite	Leaves
Mfirigisi	*Albizia harveyi*	Anemia	Roots
Mfirigisi	*Albizia harveyi*	Stomach ache/Snake bite	Leaves
Mfuleta	*Albizia anthihelmintica*	Various diseases/Worms /Asthma/ Schistomiasis/	Barks
Mfuleta	*Albizia anthihelmintica*	Sexual desire/ Various diseases/ Infertility/ Chest pains	Roots
Mfumbi	*Bauhinia petersiana*	Diabetes	Roots

Mfumbiri	*Lonchocarpus capassa*	Sexual desire/Haenia	Roots
Mfuru	*Vitex doniana*	Women's stomach ache	Roots
Mfutambula	*Entada abyssinica*	Mental case	Roots
Mgude	*Sterculia appendiculata*	Various diseases	Barks
Mgude	*Sterculia appendiculata*	Cerebral malaria	Leaves
Mgude	*Sterculia appendiculata*	Bewitchment	Whole plant
Mgunga	*Acacia albida*	Bewitchment	Roots
Mhagata	*Pterocarpus angolensis*	Abdominal pains after delivery	Roots
Mhalalanhuba	*Erythrina abyssinica*	Low Blood Pressure	Roots
Mhunungu	*Zanthoxylum chalybeum*	Toothache/Haenia/stomach ache Women's complications/ Abortion	Roots
Mhunungu	*Zanthoxylum chalybeum*	Gonorrhea/Infants complications/ Ulcers/ Women's complications	Barks
Mjafari	*Zanthoxylum chalybeum*	Tumors/stomach ache/ Backache/ Haenia	Roots
Mjohoro	*Cassia siamea*	Typhoid fever	Barks
Mjohoro	*Cassia siamea*	Haenia/ Typhoid fever/Stomach ache	Roots
Mkalakala	*Ozoroa insignis*	Convulsion	Barks
Mkalya	*Zanha africana*	Tuberculosis	Leaves
Mkalya	*Zanha africana*	Chronic malaria	Roots
Mkangazi	*Khaya anthoceca*	Bewitchment	Whole

			plant
Mkilika	*Ehretia amoeana*	Chronic malaria/Love/ Haenia/Infants complications/ Epilepsy	Roots
Mkilika	*Ehretia amoeana*	Various diseases	Whole plant
Mkilika	*Ehretia amoeana*	Infants high fever/ Love/ Chest pains/ Convulsion	Leaves
Mkongo	*Afzelia quanzensis*	Convulsion	Roots
Mkongo	*Afzelia quanzensis*	Syphilis	Barks
Mkongokowe	*Acacia tortilis*	Late labour pains	Roots
Mkongokowe	*Acacia tortilis*	Syphilis	Barks
Mkongolo	*Acacia albida*	Pregnancy poison	Leaves/ Barks
Mkongowe	*Acacia tortilis*	Toothache/ High fever	Barks
Mkongowe	*Acacia tortilis*	Stroke/Convulsion/ Infertility/ Women's stomachache/ Gonorrhea	Roots
Mkwangwasale	*Smilax anceps*	Tuberculosis	Leaves
Mkorosho	*Anacardium occidentale*	Diarrhea	Barks
Mkorosho	*Anacardium occidentale*	Hemorrhoids/ High Blood Pressure	Roots
Mkumbi	*Hymenea verrucosa*	Sexual desire	Roots
Mkundekunde	*Indigofera rhynchocarpa*	Schistomiasis	Barks

Mkundekunde	*Indigofera rhynchocarpa*	Coughing	Leaves
Mkundekunde	*Indigofera rhynchocarpa*	Haenia/Gonorrhea/ Malaria	Roots
Mkuyu	*Ficus sycomorus*	Various diseases	Whole plant
Mkuyu	*Ficus sycomorus*	Stroke/ Dysentery	Roots
Mkwaju	*Tamarindus indica*	Hookworms/ Dysentery	Leaves
Mkwaju	*Tamarindus indica*	Abdominal pains	Barks
Mkwambe	*Flueggea virosa*	Dysentery/ Infants complications/	Roots
Mkwambe	*Flueggea virosa*	Stomach ache/ Diarrhea	Leaves
Mlama	*Combretum molle*	Women's stomach ache/Haenia/ Infertility	Roots
Mlama	*Combretum molle*	Various diseases	Whole plant
Mlama	*Combretum molle*	Family planning	Twig
Mlama mwekundu	*Combretum schumanii*	Various diseases	Roots/ Leaves
Mlama mweupe	*Combretum collinum*	Various diseases	Barks
Mlama mweupe	*Combretum collinum*	Women's stomach ache/ Various diseases/ Dysentery	Roots
Mlama mweusi	*Combretum apiculatum*	Schistomiasis	Roots
Mlama ng'ombe	*Combretum adenogonium*	Schistomiasis	Roots
Mlama ng'ombe	*Combretum*	High and low Blood	Leaves

	adenogonium	Pressure	
Mlimao	*Citrus limon*	Chronic malaria	Fruits
Mlimao	*Citrus limon*	Snake bite	Leaves
Mlongelonge	*Moringa oleifera*	Diabetes/ High Blood Pressure	Leaves
Mlongelonge	*Moringa oleifera*	Milk production	Barks
Mlonje	*Moringa oleifera*	Epilepsy/Liver problems	Roots
Mlonje	*Moringa oleifera*	Asthma	Barks
Mlonje	*Moringa oleifera*	High Blood Pressure	Brown leaves
Mlonje	*Moringa oleifera*	Sexual desire/ Asthma	Leaves
Mlungulungu	*Zanthoxyum capensis*	Infants complications/ Joint pains	Barks
Mlungulungu	*Zanthoxyum capensis*	Yellow fever/ Haenia/ Gonorrhea//Stomachache/Hemorrhoids/ Syphilis	Roots
Mlungulungu	*Zanthoxyum capensis*	Syphilis	Leaves
Mluziluzi	*Hagenia abyssinica*	Infertility	Roots
Mmoyomoyo	*Deinbollia borbonica*	Mental case/ Heart diseases	Roots
Mmulimuli	*Cassia abbreviata*	Haenia	Roots
Mng'ongo	*Ekeberiga capensis*	Dysentery	Leaves
Mninga	*Pterocarpus angolensis*	Anemia/ Abdominal tumor	Barks
Mninga	*Pterocarpus angolensis*	Stroke	Roots

Mnung'anung'a	*Clausea anisata*	Hemorrhoids	Roots/ Leaves
Mpapai	*Carica papaya*	Stroke	Leaves
Mpapai dume	*Carica papaya*	Haenia/women's stomach ache	Roots/Fruits
Mpela	*Adansonia digitata*	Stomach ache	Leaves
Mpera	*Psidium guajava*	Dysentery/ Waist pains	Roots
Mpera	*Psidium guajava*	Diarrhea/Malaria	Leaves
Mpera pori	*Combretum schumannii*	Stomach ache	Roots
Mpilipili	*Schinus molle*	Ulcers/ Serious headache	Roots
Mpingi	*Ximenia caffra*	Schistomiasis/Hemorrhoids/ Infertility/Haenia/ Malaria/ General body weakness	Roots
Mpingi	*Ximenia caffra*	Syphilis/ Gonorrhea	Leaves
Mpingi	*Ximenia caffra*	Swelling of limbs/ Infertility	Barks
Mpingo	*Dalbergia melanoxylon*	Dysentery/ Various diseases/ Stomach ache	Roots
Mpingo	*Dalbergia melanoxylon*	Dysentery/ Convulsion	Barks
Mpingo	*Dalbergia melanoxylon*	Stomach ache/ Infants high fever	Leaves
Mpululu	*Terminalia sambeziaca*	Infertility	Roots
Msada	*Vangueria infausta*	Diabetes/ High fever	Leaves
Msada	*Vangueria infausta*	Hookworms/ Diabetes	Roots

Msada	*Vangueria infausta*	Low Blood Pressure	Whole plant
Msada	*Vangueria infausta*	Syphilis	Barks
Msalasi	*Friesodielsia obovata*	Malaria	Barks
Msalasi	*Friesodielsia obovata*	Infertility	Roots
Msasa	*Acacia mellifera*	General body weakness	Whole plant
Msaula	*Parinari curatefolia*	Love	Roots
Msegese	*Piliostigma thoningii*	High fever/Stomach ache/ Haenia	Roots
Msegese	*Piliostigma thoningii*	High fever/Stomach ache	Barks
Msekela	*Euclea divinorum*	Love/ Stroke	Leaves
Msekela	*Euclea divinorum*	Love	Roots
Mseri	*Ocotea usambarensis*	Women's' stomach ache/ Love/ Infants Complications/ Infertility/Anemia	Barks
Mseri	*Ocotea usambarensis*	Anemia/ Pregnancy complications/ Women's stomachache/ Anemia/ Convulsion	Roots
Mseri	*Ocotea usambarensis*	Infertility/ Various diseases	Barks
Msofu-simba	*Uvaria acuminata*	High and low Blood Pressure	Roots
Msokonoi	*Warburgia salutaris*	Coughing/Haenia	Roots

Msokonoi	*Warburgia salutaris*	Pneumonia/cough/ /Haenia/Typhoid fever/ stomach ache	Barks
Msosoawana	*Dombeya rotundifolia*	Schistomiasis	Roots
Mtarawanda	*Markhamia obtusifolia*	Failure to deliver/Epilepsy	Roots
Mtandula	*Acacia polyacantha*	Late labour pains	Roots
Mtiki	*Tectona grandis*	Swelling of limbs	Barks
Mtogo	*Dichrostarchys cinerea*	Women's abdominal pains	Roots
Mtogo	*Dichrostarchys cinerea*	Love	Leaves
Mtogo	*Dichrostarchys cinerea*	Gonorrhea/ Love/ Schistomiasis	Barks
Mtonga	*Strychnos spinosa*	Abdominal tumors/ Various diseases	Roots
Mtonga	*Strychnos spinosa*	Various diseases	Barks
Mtugutu	*Vernonia subuligera.*	Women's stomach ache/Haenia	Roots
Mtulatula(h)	*Solanum incanum*	Energy additive	Fruits
Mtundulu	*Dichrostachys cinerea*	Haenia	Roots
Mtundwi	*Ximenia caffra*	Schistomiasis	Roots
Mtutuma	*Catunaregan spinosa*	Haenia/Infants complications	Roots
Muhingi	*Ximenia caffra*	Diabetes	Roots
Muhungajini	*Senna occidentalis*	Convulsion	Leaves
Muwindi	*Acacia polyacantha*	Infertility	Roots

Mvule	*Milicia excelsa*	Infants Fever/ Uterus cancer/Pneumonia	Barks
Mvule	*Milicia excelsa*	General body weakness	Whole plant
Mvumbasi	*Ocinum americanum*	Epilepsy	Roots
Mwarobaini	*Azadirachta indica*	Malaria/ Fever/	Leaves
Mwarobaini	*Azadirachta indica*	Haenia/ Chronic malaria	Roots
Mwarobaini	*Azadirachta indica*	Various disease	Whole plant
Mwembe	*Mangifera indica*	Tuberculosis/Dysentery / Waist pains/ Infertility	Barks
Mwembe	*Mangifera indica*	Anemia	Roots
Mwembe pori	*Ozoroa insignis*	Stomach ache	Roots
Mwiluti	*Prunus africana*	Cancer	Seeds
Mwiza	*Bridelia cathartica*	Hemorrhoids	Barks
Myegea	*Kigelia africana*	Infertility	Barks
Myegea	*Kigelia africana*	Anemia	Fruits
Myombo	*Brachystegia boehmii*	Anemia	Barks
Mzambarau	*Syzygium cuminnii*	Diabetes mellitus	Leaves/ Fruits
Nengonengo	*Securidaca longipendiculata*	Infertility	Roots
Njolwambogo	*Piliostigma thonningii*	Women's stomach ache	Leaves
Nkalalanhuba	*Erythrina abyssinica*	Yellow fever	Barks

Nkalya	*Zanha africana*	Epilepsy	Roots
Nkonola	*Annona senegalensis*	Body Fracture	Barks
Nkuluwanti(h)	*Physaris peruviana*	Strong Antibiotic/anti parasitic	Roots
Nkuluwanti(h)	*Physaris peruviana*	Strong antimalarial/ Typhoid fever	Leaves
Ntindwanzagamba	*Piliostigma thonningii*	Epilepsy	Roots
Nyuguyu	*Balanites aegyptiaca*	Asthma	Leaves
Ol kiloriti	*Acacia nilotica*	Waist pains/Malaria	Roots
Ol kiloriti	*Acacia nilotica*	Haenia	Barks
Ol maroroi	*Combretum molle*	Abdominal pains	Roots
Ol oleile	*Euphobia tirucalii*	Chronic diseases	Roots
Os sagararam	*Piliostigma thoningii*	Haenia	Barks
Sungwi	*Vitex mombasae*	Infertility	Roots
Unkown	*Tabena montana*	Restore Central Nervous System	Roots
Stars of Jerusalem(h)	*Catharanthus roseus(L)*	Diabetes mellitus	Leaves/ Roots
Stars of Jerusalem(h)	*Catharanthus roseus(L)*	Pregnancy High Blood Pressure	Flowers

Appendix 1b: List of botanically unidentified medicinal plants recorded from Morogoro urban district including parts used and diseases cured.

Local name	Botanical name	Disease treated	Part(s) used
Amabosya(h)	*Unkown*	Aphrodisc/energy additive	Roots
Amasomabaigi(h)	*Unkown*	Asthma	Leaves
Chasa	*Unkown*	Coughing	Roots
Ebisulwe(h)	*Unkown*	Aphrodisc	Roots
Hambahamba	*Unkown*	Late labour pains	Roots
Huhunga	*Unkown*	Malaria	Roots
Hulukundu	*Unkown*	Hemorrhoids	Roots /Leaves
Jabukheri	*Unkown*	Hemorrhoids	Roots
Kifulo	*Unkown*	Convulsion	Leaves
Kilindilangunda	*Unkown*	Epilepsy	Roots
Kisungumili	*Unkown*	Haenia/sexual desire/ Infants complications	Roots
Lusagalala	*Unkown*	Tuberculosis	Leaves
Lusegwa	*Unkown*	Tuberculosis	Roots
Lusila	*Unkown*	Haenia	Roots
Luziwana	*Unkown*	Infertility	Roots
Lwengele	*Unkown*	Stroke	Roots
Makumbogawima(h)	*Unkown*	Family planning	Roots
Makwega	*Unkown*	Infertility	Roots
Malamula	*Unkown*	Infertility/Kidney problems	Roots
Matamagabagikulu(h)	*Unkown*	Tropical fungus	Leaves

Mbakwe	*Unkown*	Late labour pains	Leaves
Mbalugwa(h)	*Unkown*	High and low blood pressure	Roots
Mbosho	*Unkown*	Measles	Roots
Mbudika	*Unkown*	Epilepsy	Roots
Mchemle	*Unkown*	Haenia/Various diseases/Gonorrhea/ Asthma/ Schistomiasis/ Women's stomach ache/ Hemorrhoids/ Failure to deliver	Roots
Mchemle	*Unkown*	Flu/headache/ Various diseases/Infants high fever	Barks
Kusembela	*Unkown*	Infertility	Roots
Mdungwa	*Unkown*	Anemia/Dysentery	Fruits/ Barks
Mfumbasi	*Unkown*	Various diseases	Roots
Mfunganyumbu	*Unkown*	Infertility/ Uterus cancer	Roots
Mfunguo(h)	*Unkown*	Late labour pains/ Infertility/ Failure to deliver/ Blood Pressure	Leaves
Mgama	*Unkown*	Stomach ache	Roots
Mgama	*Unkown*	Pregnancy poison	Leaves/ Barks
Mgama	*Unkown*	Infertility/Kidney problems	Roots
Mhalaka	*Unkown*	Tumors/ Hemorrhoids/ Abdominal swelling/ Various diseases	Barks
Mhalaka	*Unkown*	Variousdiseases/Haenia /Women's stomach	Roots

		/ Women's stomach ache/ Infertility	
Mhofuhofu	*Unkown*	Impotency	Roots
Mhoza	*Unkown*	Bewitchment	Leaves
Mhungajini	*Unkown*	Pregnancy poison	Leaves/Barks
Mhutanzila	*Unkown*	Infertility	Roots
Milulu	*Unkown*	Late labour pains	Roots
Mjata	*Unkown*	Infertility/Kidney problems	Roots
Mjati	*Unkown*	Various diseases	Whole plant
Mjati	*Unkown*	Abdominal pains	Leaves
Mjomjo	*Unkown*	Infertility	Roots
Mkaja	*Unkown*	Gonorrhea	Roots
Mkaju	*Unkown*	Diarrhea/Malaria	Leaves
Mkangekibichi	*Unkown*	Worms/constipation	Roots
Mkaukau	*Unkown*	Hemorrhoids	Roots
Mkoma	*Unkown*	Body rashes	Barks
Mkomamwenzie	*Unkown*	Bewitchment	Roots
Mkoya	*Unkown*	Fever/BP/Diabetes	Barks
Mkumbikumbi	*Unkown*	Haenia/Infants complications	Barks
Mkundi	*Unkown*	General body weakness	Root /Barks
Mkunju	*Unkown*	Various diseases	Whole plant
Mkunju	*Unkown*	Schistomiasis/Venereal diseases/ Infants complications/ Women's stomach ache/ Anemia	Roots

Mkunju	*Unkown*	Dysentery	Leaves
Mkunungu	*Unkown*	High and low BP/Chronic flu	Roots
Mkunungu	*Unkown*	Various diseases	Barks
Mkupachcswa	*Unkown*	Measles	Roots
Mkuyati	*Unkown*	Infants complications	Roots
Mkwamba	*Unkown*	Epilepsy/ Infertility	Roots
Mkwambamaji	*Unkown*	Mental case	Roots
Mkwamba	*Unkown*	Epilepsy/ Infertility	Roots
Mkwiati	*Unkown*	Haenia/sexual desire	Roots
Mkwizingwi	*Unkown*	Haenia/ Schistomiasis/ General body weakness/ Infertility	Roots
Mkwizingwi	*Unkown*	Haenia	Barks
Mlaulau	*Unkown*	Blood Pressure/Diabetes	Barks
Mlawilila	*Unkown*	Stomach ache/worship/ Love	Barks
Mlawilila	*Unkown*	Love	Roots
Mlelawana	*Unkown*	Infertility	Roots
Mlembelembe	*Unkown*	Measles	Roots
Mlembelembe	*Unkown*	Cancer/High Blood Pressure	Seeds
Mlaulau	*Unkown*	Blood Pressure/Diabetes	Barks
Mlawilila	*Unkown*	Stomach ache/worship/ Love	Barks
Mlungumagoma	*Unkown*	Infertility	Roots
Mmemele	*Unkown*	Skeletal tuberculosis	Barks

Mmungi	*Unkown*	Skeletal tuberculosis/ Pregnancy poison	Barks
Mmungi	*Unkown*	Pregnancy poison	Leaves
Mnafu(h)	*Unkown*	Typhoid fever	Leaves
Mnyamimba	*Unkown*	Overbleeding	Roots
Mnyanza	*Unkown*	Haenia	Roots
Mnyenye	*Unkown*	Ulcers	Roots
Molwe	*Unkown*	Yellow fever	Roots
Mpaja	*Unkown*	Chest pains/Asthma	Roots
Mpaja	*Unkown*	Syphilis	Barks
Mpandepande	*Unkown*	Measles	Roots
Mpendo	*Unkown*	Haenia	Roots
Mpondelo	*Unkown*	Haenia	Roots
Mpoza(h)	*Unkown*	General body weakness	Leaves
Mpululo	*Unkown*	Convulsion	Leaves
Mpundu	*Unkown*	Hookworms	Leaves
Msaka	*Unkown*	Various diseases	Roots/Barks
Msambao	*Unkown*	Haenia	Roots
Msansambeke	*Unkown*	Abdominal pains	Roots/Leaves
Msanzo	*Unkown*	Infants complications	Leaves
Mseyi	*Unkown*	Various diseases/ Stomach ache/Feetache	Roots
Msombasomba	*Unkown*	Pneumonia/ Asthma	Leaves
Msotoana	*Unkown*	Schistomiasis	Roots
Msumbwi	*Unkown*	Stroke	Roots
Mswagamene	*Unkown*	Hemorrhoids	Roots

Mswena	*Unkown*	Allergy/Waist pains	Roots
Mtanange	*Unkown*	Skeletal tuberculosis	Barks
Mtogola	*Unkown*	Stroke	Roots
Mtomoko	*Unkown*	Women's stomach	Roots
Mtukutu	*Unkown*	Snake bite	Leaves
Mtunu	*Unkown*	Skeletal tuberculosis	Barks
Mtunu	*Unkown*	Convulsion	Roots/ Leaves
Mtwini(h)	*Unkown*	Diarrhea/Vomiting	Leaves
Muhindila	*Unkown*	Various diseases	Roots/ Barks
Muhungilo	*Unkown*	Bewitchment	Whole plant
Mukutani	*Unkown*	Headachc/women stomach ache	Roots
Mukutani	*Unkown*	Haenia	Barks
Mungwi	*Unkown*	Strong antibiotic	Leaves
Mwagu/Malela	*Unkown*	Stomach ache	Roots
Mwambala	*Unkown*	Skeletal tuberculosis/ Overbleeding	Barks/ Leaves
Mwanamimba	*Unkown*	Women's stomach ache/ Infertility	Roots
Mwanamimba	*Unkown*	Women's stomach ache	Barks
Mwangwi	*Unkown*	Infertility	Barks/ Leaves
Mwegoha	*Unkown*	Diarrhea	Roots
Mweleka	*Unkown*	Convulsion	Roots

Mwembeluala	*Unkown*	Hemorrhoids	Barks
Mwengere	*Unkown*	Various diseases	Wholeplant
Mwepula	*Unkown*	Bronchistis	Leaves
Mwepula	*Unkown*	Body swelling	Barks
Mwinamo	*Unkown*	Epilepsy/High blood pressure	Roots
Mwinula	*Unkown*	Stroke	Leaves
Mzingile	*Unkown*	Anemia	Fruits
Mzizima	*Unkown*	High Blood Pressure	Roots
Mzuwana	*Unkown*	Infants complications	Roots
Nasingwai	*Unkown*	Malaria/Dysentery/ Diarrhea	Barks
Nasingwai	*Unkown*	Blood pressure/Diabetes mellitus/Malaria/ Dysentery	Roots
Ngeye	*Unkown*	Epilepsy	Roots
Ngulukundu	*Unkown*	Infants complications	Roots
Nkangayonzwa	*Unkown*	Women's stomach ache	Leaves
Ntunyuntunyu(h)	*Unkown*	Antimalarial	Roots
Ntuzya	*Unkown*	Mental case	Roots
Nyakatao(h)	*Unkown*	Uterus cancer	Leaves
Nyamiki	*Unkown*	Infertility	Roots
Nzekozeko	*Unkown*	Earache	Leaves
Obwanda (h)	*Unkown*	Fructure	Leaves
Ol lweisuki	*Unkown*	Asthma/chest pains	Roots
Ol rondwai	*Unkown*	Infertility	Seeds/

			Root
Omuhunda	*Unkown*	Malaria	Barks
Omwitankole	*Unkown*	Body rashes	Barks
Ol milulai	*Unkown*	Infertility/ sexual desire	Roots
Siniguse	*Unkown*	Infertility	Roots
Swagamene	*Unkown*	Hemorrhoids	Leaves
Tenya (h)	*Unkown*	Chronic abdominal pains	Roots
Tizamkweo (h)	*Unkown*	Asthma	Leaves
Vuga (h)	*Unkown*	Hemorrhoids	Roots/ Leaves

Appendix 2a: List of botanically identified medicinal plants recorded from Iringa urban district including parts used and diseases cured.

Local name	Botanical name	Disease treated	Part(s) used
Kamjukule	*Marsdenia abyssinica*	Stomachache	Roots
Mlemandembwe	*Gardenia jovistonantis*	Headache	Leaves
Likamanda	*Rhamnus prionoides*	Milk production	Leaves
Lilimbili	*Ensete verricosum*	Milk drought	Wholeplant
Lipembapemba	*Rumex abyssinicus*	Vomiting	Roots
Lukalakenga	*Asparagus asiliacus*	Syphilis	Roots
Lupebeta	*Rutidea fuscescens*	Coughing	Roots
Mbuyu	*Adansonia digitata*	High Blood Pressure/ Chronic disease	Roots
Mbuyu	*Adansonia digitata*	Body rashes/Back ache/ Infertility	Barks
Mchongoma	*Cassia siamea*	Convulsion	Barks
Mdahisa	*Myrica salicifolia*	Epilepsy	Roots
Mdamba	*Ficus ingens*	Rheumatism	Barks
Mdunula	*Chassalia violacea*	Syphilis	Roots
Mdunula	*Chassalia violacea*	Infants complications/ Mental case/ Syphilis/Women's stomach ache/ /Infertility/ Pneumonia	Roots
Mdunula	*Chassalia violacea*	Pneumonia	Barks
Mfuleta	*Albizia*	Chronic malaria/	Roots

	anthihelmintica	Infertility	
Mfumbi	*Bauhinia petersiana*	Venereal diseases	Roots
Mfumbili	*Lonchocarpus capassa*	Rheumatism	Barks
Mfutsa	*Myrianthus holstii*	Stomach ache	Barks
Mgegele	*Dicostachys cinerarea*	Chronic disease/ Women's stomach ache/ Venereal diseases/ Tuberculosis	Roots
Mgelele	*Dicostachys cinerarea*	Abdominal ulcer	Leaves
Mgola	*Flacourtia indica*	Stomach ache	Roots
Mgudegude	*Kigelia africana*	Bewitchment	Roots
Mgulukanziva	*Kigelia africana*	Stomach ache	Roots
Mgunga	*Acacia tortilis*	Eyes ache	Leaves
Mgungu	*Dalbergia lactea*	Body rashes	Leaves
Mguti	*Maesa lanceolata*	Urine track infection/ Infertility/ Dysentery	Roots
Mguti	*Maesa lanceolata*	Breast swelling	Barks
Mguti	*Maesa lanceolata*	Women's stomach ache/ Body rashes	Leaves
Mguvani	*Markhamia obtusifolia*	Convulsion	Leaves
Mheti	*Ocotea usambarensis*	Haenia/ Fever/ Amoebic dysentery	Roots
Mhomang'ambaku	*Canthium oligocarpum spp.captum*	Syphilis	Roots
Mhongola	*Schrebera elata*	Fructure	Leaves

Mhongola	*Schrebera elata*	Fructure	Barks
Mhongola	*Schrebera elata*	Chronic wounds	Roots
Mhotaponzi	*Crossopterix febrifuga*	Diarrhea	Leaves
Mhotaponzi	*Crossopterix febrifuga*	Infertility/ Venereal diseases/Hookworm	Roots
Mhotaponzi	*Crossopterix febrifuga*	Diarrhea	Leaves
Mhungulu	*Pappea capensis*	Mouth ulcers	Leaves
Mjafari	*Combretum molle*	Bewitchment	Roots
Mkalakala	*Ozoroa insignis*	Love	Roots
Mkangalanyabu	*Caloncoba welwitschii*	Pneumonia	Barks
Mkulungu	*Pterocarpus tinctorius*	Women's stomach ache/ Uterus cancer	Barks
Mkuyu	*Ficus sycomorus*	Body rashes/Back ache	Barks
Mkuyu	*Ficus sycomorus*	Body rashes	Whole plant
Mkwaju	*Tamarindus indica*	Bewitchment/ Stomach ache	Barks
Mkwambe	*Flueggea virosa*	Chronic disease/ Stomach ache	Roots
Mkwangasale	*Smilax anceps*	Body rashes	Leaves
Mlemandembwe	*Gardenia jovistonantis*	Chronic diseases	Roots
Mlungulungu	*Zanthoxylum capensis*	Haenia/ Stomach ache/Typhoid/ Rheumatism/ Haenia/ Dysentery	Roots
Mlungulungu	*Zanthoxylum capensis*	Chest pains	Leaves

Mmbembekwele	*Dracaena laxissima*	Tonsillitis	Roots
Mmulimuli	*Cassia abbreviata*	Tambazi/ Haenia/ Malaria/Rheumatism	Roots
Mmulimuli	*Cassia abbreviata*	Infants complications	Leaves
Mnung'anung'a	*Clausea anisata*	Gonorrhea/ Mental case	Roots
Mnunu	*Tecomaria capensis*	Amoebic dysentery	Roots
Mnyanyinyanyi	*Embelia schimperi*	Women's stomach ache	Leaves
Mpangipangi	*Indogofera bartata*	Infants complications	Leaves
Mpapai	*Carica papaya*	Abdominal ulcer	Leaves
Mpera	*Psidium guajava*	Abdominal ulcer	Leaves
Mpingo	*Darbergia melanoxylon*	Infertility	Roots
Mpingo	*Darbergia melanoxylon*	Infants fever	Leaves
Mpogolo	*Acacia albida*	Infertility	Roots
Mputika	*Shrebera trichoclada*	Love	Roots
Msada	*Vangueria infausta*	Women's stomach ache/ Infants complications/ Bewitchment	Roots
Msalasi	*Friesodielsia obovata*	Syphilis	Roots
Msasati	*Vitex mombassae*	High Blood Pressure/ Heart problems	Leaves
Msaula	*Parinari curatellifolia*	Love/ Chest pains	Roots

Msaula	*Parinari curatellifolia*	Love	Leaves
Msegese	*Piliostigma thonningii*	High fever	Barks
Msekela	*Euclea divinorum*	Love	Leaves
Msisi	*Tamarindus indica*	Dysentery	Barks
Msokonoi	*Walburgia salutaris*	Head/Limbs/Back ache/Chest/Cough/ Haenia/Tambazi/ Heartburn/ Stomach ache/Diarrhea	Barks
Msombe	*Ficus sur*	Infertility	Roots
Msombe	*Ficus sur*	Milk production	Barks
Mtanula	*Ziziphus mauritania*	Uterus tumor/ Stomach ache /Dysentery	Roots
Mtogo	*Dichrostarchys cinerea*	Infertility	Roots
Mtugutu	*Vernonia spp.*	Stomach ache	Roots
Mtundulu	*Dichrostachys cinerea*	Haenia	Roots
Mtundwa	*Ximenia caffra*	Women's stomach ache	Leaves
Mtundwa	*Ximenia caffra*	Infertility/ Women's stomach ache	Roots
Muhomang'ambaku	*Canthium oligocarpum spp. Captum*	Convulsion	Fruits
Mulambalafidunda	*Osyris lanceolata*	Venereal diseases	Roots
Mumbala	*Anthocleista grandiflora*	Chest pains/ Heartburn	Barks
Mveriveri	*Rauvolfia caffra*	Mental case/ Epilepsy	Roots

Mveriveri	*Rauvolfia caffra*	Rheumatism/ Chest pains	Barks
Mwarobaini	*Azadirachta indica*	Family planning	Seeds
Mwefi	*Myrica salicifolia*	Tooth decay	Barks
Mwembe	*Mangifera indica*	Infertility	Roots
Mwembe	*Mangifera indica*	Stomach ache	Leaves
Mwembe	*Mangifera indica*	Stomach ache	Barks
Mwesa	*Bridelia micrantha*	Uterus tumor	Roots
Mwiputsa	*Teclea nobilis*	Chest pains	Roots
Mwitsa	*Bridelia micrantha*	Women's stomach ache/Infertility/ Tuberculosis	Roots
Mwitsa	*Bridelia micrantha*	Stroke	Barks
Mwitsa	*Bridelia micrantha*	Convulsion/ Women's stomach ache	Leaves
Mwitsa	*Bridelia micrantha*	Cough	Barks
Myowe	*Creterispermum longipendiculatum*	Rheumatism/ Limbs ache	Barks
Mzambarau	*Vangueria infausta*	Infertility	Roots
Mzambarau	*Vangueria infausta*	Infertility	Barks
Ngulukila (P)	*Parasitic higher plant*	Mental case	Leaves
Ng'witya	*Kigelia africana*	Love	Roots
Ol dokoh	*Cordia sinensis*	Dysentery	Roots
Ol engurusai	*Acacia polyacantha*	Haenia	Roots
Ol esiteti	*Grewia bicolor*	Infertility	Roots
Ol esiteti	*Grewia bicolor*	Missing Menstrual	Barks

		periods	
Ol kiloriti	*Acacia niltotica*	High Blood Pressure	Roots
Ol kiloriti	*Acacia niltotica*	High Blood Pressure	Leaves
Ol kiloriti	*Acacia niltotica*	Diarrhea/ High Blood Pressure/Toothache/ Anemia	Barks
Ol olerai	*Acacia xanthophloea*	Tonsillitis	Roots
Ol ordaiboi	*Kigelia africana*	Diabetes mellitus	Roots
Ol oremiti	*Salvadora persica*	Gonorrhea/Syphilis	Roots
Ol orng'abori	*Erythrina abyssinica*	Epilepsy/High BP	Barks
Ol remiti	*Salvadora persica*	High Blood Pressure	Leaves
Ol remiti	*Salvadora persica*	Chest pains	Roots
Ol remiti	*Salvadora persica*	Chest pains	Roots
Ordaipoi	*Kigelia africana*	Typhoid fever	Barks

Appendix 2b: List of botanically unidentified medicinal plants recorded from Iringa urban district including parts used and diseases cured.

Local name	Botanical name	Disease treated	Part(s) used
Derikesi (h)	*Unkown*	Infants headache	Rope
Endafutai	*Unkown*	Early pregnancy bleeding	Roots
Engomai	*Unkown*	Infertility	Roots
Enjabalero	*Unkown*	Infertility/Venereal diseases	Roots
Enjabalero	*Unkown*	Haenia	Barks
Enjekuo	*Unkown*	Infertility	Roots
Kilingaduma	*Unkown*	Epilepsy	Roots
Lekakaya	*Unkown*	Gonorrhea/Syphilis/Haenia	Roots
Likowo	*Unkown*	Venereal diseases	Roots
Lengurusia	*Unkown*	Epilepsy/Earache	Fruits
Livingambunda	*Unkown*	Convulsion/Infertility	Roots
Lubunda	*Unkown*	Bewitchment	Leaves
Ludilimbwi	*Unkown*	Diarrhea	Roots
Lukenekene	*Unkown*	Love	Roots
Matanga/Mhalaka	*Unkown*	Pneumonia/ Infertility/ Limb swelling	Stem
Mbata	*Unkown*	Venereal diseases	Roots
Mbewe	*Unkown*	Women's stomach ache	Roots
Mbuko	*Unkown*	Earache	Barks
Mbungu	*Unkown*	Epilepsy	Roots
Mduma	*Unkown*	Stomach ache /Tambazi/ Infertility	Roots

Mduna	*Unkown*	Infertility	Roots
Mfukilang'ambaku	*Unkown*	Infertility	Roots
Mgumila	*Unkown*	Epilepsy	Roots
Mgwalangwa	*Unkown*	Goodlucky	Roots
Mhalaka	*Unkown*	Headache	Roots
Mhanza	*Unkown*	Cancer/ Chest pains	Roots
Mhanza	*Unkown*	Epilepsy	Leaves
Mhulanzuna	*Unkown*	Abscess	Seeds
Mhulatavangu	*Unkown*	Infertility	Roots
Mhulungu	*Unkown*	Gouts/ Rheumatism/ Overbleeding	Roots
Mikisari	*Unkown*	Women's stomach ache	Roots
Mkakatika	*Unkown*	Nausea	Barks
Mkalanganga	*Unkown*	Vomiting	Leaves
Mkufya	*Unkown*	Epilepsy	Roots
Mkunganilwa	*Unkown*	Snake bite	Leaves
Mlengwe	*Unkown*	Epilepsy	Roots
Mlezi	*Unkown*	Failure to deliver	Roots
Mlimbo	*Unkown*	Infertility	Roots
Mlungurungwane	*Unkown*	Abdominal pains	Roots
Mlyasenga	*Unkown*	Hookworms/ Amoebic dysentery	Roots
Mnyanandala	*Unkown*	Infertility/ Uterus tumor	Roots
Mpoloto	*Unkown*	Bewitchment	Roots
Mpolowoni	*Unkown*	Aphrodiscs	Roots
Msanzo	*Unkown*	Body rashes	Roots

Msechela	*Unkown*	Goodluck/ Charms	Roots
Mselesele	*Unkown*	Infertility	Leaves
Msoywi	*Unkown*	Stomach ache	Leaves
Mtanga	*Unkown*	General body weakness	Roots
Mtawa	*Unkown*	Dysentery/Gonorrhea	Roots
Mtifyo	*Unkown*	Hemorrhoids	Roots
Mtulo	*Unkown*	Love	Leaves
Mtumbatumba	*Unkown*	Haenia	Roots
Mtundila	*Unkown*	Infants complications	Leaves
Mtundila	*Unkown*	Infants complications	Roots
Muhemi	*Unkown*	Venereal diseases/ Gonorrhea	Roots
Muhemi	*Unkown*	Rheumatism	Barks
Muhisa	*Unkown*	Mental case	Roots
Muhwisa	*Unkown*	Eyes ache	Leaves
Mukutani	*Unkown*	Malaria/Worms/Venereal diseases/ Haenia/ Infants complication	Roots
Mukutani	*Unkown*	Stomach ache /Worm	Barks
Muwenge	*Unkown*	Stomach ache	Barks
Muwenge	*Unkown*	Stomach ache	Roots
Mvangaduma	*Unkown*	Epilepsy/Chest ache/ Serious headache/ Bewitchment	Roots
Mvangaduma	*Unkown*	Infertility	Leaves
Mvangaduma	*Unkown*	Various diseases	Wholepla nt
Mwendi	*Unkown*	Business lucky	Roots

Mwini	*Unkown*	Mental case	Leaves
Mwisasamulo	*Unkown*	Infertility	Roots/ Barks
Myangi	*Unkown*	Epilepsy	Roots
Nasingwai	*Unkown*	Stomach ache/Typhoid/ Haenia/ Nausea	Barks
Nasingwai	*Unkown*	Typhoid fever/Anemia	Roots
Ndalagwai	*Unkown*	Stomach ache	Roots
Nekmojiki	*Unkown*	Worms	Roots
Ngesilema	*Unkown*	Infants complications	Roots
Ngitaruo	*Unkown*	Hemorrhoids	Leaves
Njanierbori	*Unkown*	Diarrhea	Barks
Ol biririoebori	*Unkown*	Stomach ache	Barks
Ol engilai	*Unkown*	Syphilis	Roots
Ol karaha	*Unkown*	Stomach ache	Barks
Ol kilepori	*Unkown*	Tuberculosis/Asthma	Roots
Ol lweisuki	*Unkown*	Coughing	Roots
Ol milulai	*Unkown*	Stomach ache/ Aphrodiscs	Barks
Ol ngieweru	*Unkown*	Milk production	Roots
Ol njanilongera	*Unkown*	Stomach ache /Love/ Diarrhea	Barks
Ol olasorai	*Unkown*	Abscess	Roots
Ol olebaki	*Unkown*	Infertility	Roots
Ol olobito	*Unkown*	Stomach /Back ache	Roots
Ol onjasalge	*Unkown*	Overbleeding	Roots
Ol orbukoi	*Unkown*	Yellow fever	Roots

Ol orbukoi	*Unkown*	Diabetes mellitus	Barks
Ol ordaida	*Unkown*	Chronic malaria	Roots
Ol orkalei	*Unkown*	Epilepsy	Roots
Ol orng'oswai	*Unkown*	Haenia/Gonorrhea	Roots
Ol orobito	*Unkown*	Abdominal pains	Roots
Ol orodwa	*Unkown*	Epilepsy/Chest ache	Fruits
Ol oroesa	*Unkown*	Dysentery	Roots
Ol oruoswai	*Unkown*	Haenia	Roots
Ol saradaki	*Unkown*	Cough/Abscess	Roots
Ol simangiro	*Unkown*	Haenia	Roots
Simanjiroi	*Unkown*	Yellow fever	Roots
Usongoyo	*Unkown*	Tetanus	Roots

Appendix 3a: Questionnaire survey of utilized medicinal plants in urban areas by medicinal plant sellers.

Market/Place..... Ward..... Division.....

District..... Region..... Seller's name.....

Age..... Gender: Male (...)/Female (...) put a tick (✔) on appropriate answer.

Ethnic group..... Respondent code no.....

Marital status (Put a tick (✔) on appropriate answer)

- Single (....)
- Married (....)
-Widowed (....)
- Divorced (....)

Education status (Put a tick (✔) on appropriate answer)

i. No formal education (...)

ii. Adult education (...)

iii. Primary (...), Secondary (...), Higher (Specify)

Interviewer's name..... Date of interview.....

1. Mention the different plant species you are selling for medical purposes.

Local name	Botanical name
i).....	.....
ii).....	.....
iii).....	.....

(Please use separate sheet for more list)

2. To your knowledge are there any other medicinal plants/trees available in this area not in your selling list? Mention them.

Local name	Botanical name
i).....	.....
ii).....	.....
iii).....	.....

3. Where do you obtain the sold medicinal plants? (Put a tick (✓) to the right answer)

   i) Collect from other districts/regions? (Yes/No). If yes name the place.....

   ii) Collect myself from the natural forests within the region (....)

   iii) Buy from other sellers (....)

   iv) From both sources (....)

4. How do you prepare the remedies from different plant/trees for different usage?

   .....

   .....

   .....

5. Mention the diseases, which are commonly, treated, parts used and the species used from the sold medicinal plants.

Disease	Part(s) used	Species used
.....	.....	.....
.....	.....	.....
.....	.....	.....

6. How do you administer your remedies to the patients (Dosage and frequency)
   a) Proper dosage depending on age and disease extent e.g. one cup, teaspoonful once, for three or seven days etc. (...)
   b) No proper dosage just estimated quantity by the patient as directed (...)
7. What problems do you face on selling the medicinal plants?

   .....

   .....

   .....
8. Do you have problems on obtaining the medicinal plants from the forest? (Yes/No). If yes mention the problems.

   .....

   .....

   .....
9. What are the poor harvesting practices, which you think you, or other collectors' practice and thus contribute or affect sustainability of medicinal plants?

   .....

   .....

   .....
10. What are your own views on promoting the sustainable use of medicinal plants for health care system in Tanzania?

    .....

    .....

    .....

Appendix 3b: Questionnaire survey of utilized medicinal plants in urban areas by traditional healers.

Place..... Ward..... Division.....

District..... Region..... Age.....

Practitioner's name ..... Gender: Male (...)/Female (...) (Please put a tick (✓) on appropriate answer).

Ethnic group..... Respondent code no.....

Marital status (Put a tick (✓) on appropriate answer)

- Single (....)
- Married (....)
- Widowed (....)
- Divorced (....)

Education status (Put a tick (✓) on appropriate answer)

i. No formal education (...)

ii. Adult education (...)

iii. Primary (...), Secondary (...), Higher (Specify)

Interviewer's name..... Date of interview.....

11. Mention the different plant species you are using for medical purposes

Local name	Botanical name
i).....	.....
ii).....	.....
iii).....	.....

(Use separate sheet for more lists)

12. To your knowledge are there any other medicinal plants/trees available in your practicing list which at present you are not using? Mention them.

Local name	Botanical name
i).....	.....
ii).....	.....
iii).....	.....

13. Where do you obtain the sold medicinal plants? (Put a tick (✓) to the right answer)

    i) Collect from other districts/regions? (Yes/No) If yes name the place.....

    ii) Collect yourself from the natural forests within the region (...)

    iii) Buy from sellers or other practitioners (...)

    iv) From both sources (...)

14. Mention the diseases, which are commonly, treated, parts used and the species used from the medicinal plants.

Disease	Part(s) used	Species used
.....	.....	.....
.....	.....	.....
.....	.....	.....

15. How do you prepare the remedies from different plant/trees for different usage?

    .....

    .....

    .....

16. How do you administer your remedies to the patients (Dosage and frequency)

    a) Proper dosage depending on age and disease extent for a certain period e.g. one cup, teaspoonful for three or seven days etc. (....)

    b) No proper dosage just estimated quantity by the patient as directed (....)

17. In what form do you give the medicine to the patients? (Tick (✔) the appropriate answer)

    i) Liquid form (....)

    ii) Solid form (....)

    iii) Powder form (....)

    iv) Mixture form (....)

    v) Any other form? Specify .....

18. What is your capability in treating different disease? (Number of diseases) (Please suggest a number for each case i.e. 10, 20, 40, etc.)

    .....

    .....

    .....

19. Where did you obtain the knowledge you are practicing?

    a) Inheritance from elders (....)

    b) Training (....)

    c) Both inheritance and training (....)

    d) Any other (Please specify).....

20. What problems do you face on treating people using the medicinal plants?

.....

.....

.....

21. Do you have problems on obtaining the medicinal plants from the forest? (Yes/No). If yes mention the problems.

.....

.....

.....

22. What are the poor harvesting practices, which you think you, or other collectors' practices and thus contribute or affect sustainability of medicinal plants?

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.....

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23. What are your own views on promoting the sustainable use of medicinal plants for health care system in Tanzania?

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Appendix 3c: Questionnaire survey of utilized medicinal plants in urban areas by key informants /extensionist/botanists.

Place..... Ward..... Division.....

District.....Region..... Name of person.....

Age..... Gender: Male (...)/Female (...) put a tick (✓) on appropriate answer.

Ethnic group..... Respondent code no.....

Profession.....

Marital status (Put a tick (✓) on appropriate answer)

- Single (....)
- Married (....)
- Widowed (....)
- Divorced (....)

Interviewer's name..... Date of interview.....

24. Based on your knowledge, could you please give information on the use of identified medicinal plants?

.....

.....

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25. Based on your knowledge, could you please give information on medicinal plant practices basing on gender?

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.....

.....

26. What are your own views on promoting sustainable use of medicinal plants in relation to conservation particularly in your area of work?

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27. What are your own views on promoting or incorporating sustainable use of medicinal plants for improving the health care systems in Tanzania?

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