

**Governance and management of urban trees and green spaces in South
Africa: Ensuring benefits to local people and the environment**

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By

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Abstract

In the face of rapid urbanization and global climate change, urban trees and green spaces (UTGS) can contribute to the welfare of people and the urban environment. Urban trees and green spaces can assist to address urbanization challenges related to environmental degradation. While functions of UTGS have been well documented in the developed world, they have not yet received full attention in much of sub-Saharan Africa. Consequently, UTGS are under threat from urban development and fragmentation. Notably, the problems associated with UTGS also fall into the governance realm and indications are that poor governance and management of UTGS can negatively influence the potential benefits of UTGS to local people and the environment. This formed a basis for this research. The main objective of the study was to determine the current governance and management approaches to UTGS in South Africa. Through document search and review, the study determined the governance institutions influencing UTGS at national level and at provincial level (in the Limpopo and Eastern Cape Provinces). Face-to-face and online survey methods were used to determine the extent to which 28 local municipalities had adopted planned, systematic and integrated management of UTGS. The snowball approach was used to determine the key actors involved in UTGS activities and interviews were conducted to establish the roles and capabilities of these actors. A total of 540 household interviews were conducted to determine the institutional factors influencing local peoples' ability to access, plant and use UTGS. The findings of the study showed that UTGS have not been adequately covered in existing governance institutions and practice at national and provincial levels. Local government municipalities were not managing their UTGS in a planned or systematic manner due to constraining factors such as insufficient funds, insufficient personnel, lack of equipment and lack of political support. Only 7.1 % of the surveyed municipalities had an urban tree management plan and an estimate of the urban tree stock; 32.1 % had tree policies; 28.6 % had tree bylaws; 21.4 % had tree planting schedules; 10.7 % had tree maintenance schedules and only 3.6 % had tree inspection schedules. Key actors involved in UTGS activities differed among levels of government. The actors included national and provincial government departments, local government municipalities, Non-Governmental Organizations, private sector companies and local volunteers. Most of the actors, however, either planted trees or provided tree seedlings to municipalities and the local people. Tenure security was a key institutional factor affecting peoples' ability to plant, use or even remove trees from their residential plots. The same applied to trees in the streets and public parks. Whereas most respondents did not require permission to plant (79.8 %) or remove (75 %) trees on their residential plots, a majority of them required permission to plant and remove trees from streets (over 70 %) and public parks (over 80 %). However, with regard to planting and removing urban trees in public open spaces, 54% of the respondents indicated that permission was not required suggesting a lack of

clarity among local residents on the issue. Overall, the findings of this study indicate that there is no political recognition and support for UTGS at almost all levels of government. This has resulted in the lack of incorporation of UTGS in urban planning and development and has caused UTGS to receive limited funding to permit planned and systematic management. Given the current rates of urbanization and urban development, the lowly prioritised UTGS are vulnerable to exploitation. To conserve UTGS and promote their potential contribution to local people and the environment, UTGS must be recognized and placed on political and development agendas. There is a need to develop national guidelines for UTGS management, assess the extent of the urban forest resource in local municipalities, clearly define the roles and capabilities of different actors, integrate UTGS in the urban planning and development system, and most of all seek to involve the local people in overall management and governance of UTGS.

Key words: Governance, management, urban trees, green spaces, urban forestry

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Dedication

I whole heartedly dedicate this piece of work to my dear friends and family for their love, encouragement, prayers, moral and financial support.

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Abbreviations and acronyms

AW	Arbor Week
CBD	Convention on Biological Diversity
CBOs	Community Based Organizations
CDW	Community Development Workers
CIFOR	Center for International Forestry Research
CLG	Community and Local Government
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture Forestry and Fisheries
DEAET	Department of Economic Affairs, Environment and Tourism
DEAT	Department of Environmental Affairs and Tourism
DEDEA	Department of Economic Development and Environmental Affairs
DF	Degrees of Freedom
DFA	Development Facilitation Act
DFED	Department of Finance and Economic Development
DLA	Department of Land Affairs
DLGH	Department of Local Government and Housing
DMA	District Management Area
DoA	Department of Agriculture
DoE	Department of Education
DPLG	Department of Provincial and Local Government
DPW	Department of Public Works

DSD	Department of Social Development
DWAF	Department of Water Affairs and Forestry
ECDH	Eastern Cape Department of Housing
ECECA	Eastern Cape Environmental Conservation Act
ECPGDP	Eastern Cape Provincial Growth and Development Programme
ECPSDP	Eastern Cape Provincial Spatial Development Plan
ECSECC	Eastern Cape Socio Economic Consultative Council
EIA	Environmental Impact Assessment
EPWP	Expanded Public Works Programme
FAO	Food and Agriculture Organization
FTFA	Food and Trees for Africa
GCSI	Government Communication and Information Systems
HH	Household
ICRAF	International Center for Agroforestry
IDP	Integrated Development Plan
IHDP	International Human Dimensions Programme
ISRDP	Integrated Sustainable Rural Development Programme
LEDET	Local Economic Development and Tourism
LEGDP	Limpopo Employment Growth and Development Plan
LEMA	Limpopo Environmental Management Act
LSP	Livelihood Support Programme

MEA	Millennium Ecosystem Assessment
MEC	Member of the Executive Council
MIT	Massachusetts Institute of Technology
MTSF	Medium Term Strategic Framework
MTTP	Millennium Tree Planting Project
NEMA	National Environmental Management Act
NEMBA	National Environmental Biodiversity Act
NEMPA	National Environmental Management Protected Areas Act
NFA	National Forest Act
NFAP	National Forest Action Programme
NFPs	National Forest Programmes
NGO	Non-Governmental Organization
NHRA	National Heritage Resources Act
PSR	Person Specifically Responsible for Urban Trees and Green Spaces
RDP	Reconstruction and Development Programme
RUAF	Resource Centres on Urban Agriculture and Food Security
SABC	South African Broadcasting Corporation
SACN	South African Cities Network
SAHRA	South African Heritage Resources Authority
SANBI	South African National Biodiversity Institute
SANPAD	South Africa Netherlands research Programme on Alternatives in Development

SDP	Spatial Development Plan
SPSS	Statistical Package for Social Sciences
Stats SA	Statistics South Africa
TIPS	Trade and Industry Policy Secretariat
TPGS	Tree Planting or Greening Strategy
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNFCC	United Nations Framework Convention on Climate Change
URP	National Urban Renewal Programme (URP)
USA	United States of America
UTGS	Urban Trees and Green spaces
WBI	World Bank Institute
WESSA	Wildlife Environment Society of South Africa

Chapter One

Introduction

1.1 Introduction

Trees and green spaces in and around cities provide a wide array of economic, social, physical, psychological, and environmental benefits (Kuchelmeister, 1999; Pedlowski *et al.*, 2002; Nowak and Dwyer, 2007; Landry and Chakraborty, 2009). Historically, the benefits derived from urban trees and green spaces (UTGS) in industrialized cities mainly related to health, aesthetic and recreation (Smardon, 1988; Kaplan and Kaplan, 1989). Today, in much of the developing world UTGS provide urban residents, especially the poor, with food, fodder, fuelwood and timber for construction (Horst, 2006; Fuwape and Onyekwelu, 2011). In an era of rapid urbanization, the roles of UTGS are expected to grow as more than 50 % of the world's population will be living in less than 3% of the earth's urbanized terrestrial surface (Singh *et al.*, 2010).

1.2 The global urbanization challenge

Both developed and developing countries across the globe are undergoing an augmented process of urbanization. In 1800, less than 5 % of the global population was living in urban areas (United Nations, 1990; 1991). Today, the population of urbanites exceeds 50 % (Grimm *et al.*, 2008) and come 2030, this population is expected to reach 65 % (United Nations, 2004; Grimm *et al.*, 2008). In developing countries about 44 % of the population currently lives in urban areas, but in the next 20 to 30 years developing countries are expected to have a majority of its people in urban areas (Montgomery, 2008; UN-Habitat, 2009). In many developing countries, rural poverty is the main factor that drives people from the rural areas into the city, in search of employment, food, shelter and education (Lehohla, 2006; World Bank, 2011). Other factors such as environmental degradation, religious strife, political persecution, and lack of basic infrastructure and services, also push people out of rural areas into the city. However, as a result of urbanization, city life can also present a number of challenges. These may include: poverty, unemployment, overcrowded living, environmental degradation, and social problems such as crime and violence (Baker, 2008). With regard to poverty for example, the World Bank projected an increase of urban people living in absolute poverty from 400 million in the 1990s to one billion in the 20th century (Kuchelmeister, 1999). The United Nations Development Programme (UNDP, 1996) estimated a 76 % increase in urban poor during the 1990s and a decrease in rural poor during the same period. More recent estimates indicate that about one third of urban residents are poor, representing one quarter of the world's total population (Ravallion *et al.*, 2007). In developing countries, approximately 750 million people living

in urban areas were estimated to be living below the poverty line of \$2/day in 2002 (Baker, 2008). Baker (2008) further indicated that urban poverty incidence was highest in South Asia and sub-Saharan Africa, with about 46 % and 34 % of the world's poor coming from the two regions respectively. Estimates based on health and environmental conditions suggested that about 600 million people in cities lived in unhealthy conditions in the 1990s (Pastuk, 1999). More recent estimates indicate that nearly one billion of the urban population in developing countries live in slums or unhealthy conditions (UN-Habitat, 2006).

Central to the above, is the negative impact of urbanization on the composition, structural and functional elements of biodiversity (Sandstrom *et al.*, 2006). McConnachie *et al.* (2010) report that the clearing of land for housing and infrastructure during urbanization severely impacts on the extent of natural areas in and around cities. Several other researchers also relate the loss of UTGS to rapid urbanization rates (Cilliers *et al.*, 2004; Lee *et al.*, 2005; Singh *et al.*, 2010). In the face of continuous urbanization, the above mentioned urban challenges are expected to rise in developing countries, including South Africa.

1.3 Urbanization in South Africa

In common with most other developing countries, the South African population is rapidly urbanizing. Circumstances leading to urbanization in South Africa are, however, different from other developing nations (Tattee, 2005). The influx of migrants into South African cities is in part a response to the ending of decades of restrictive apartheid legislation which artificially held down the level of urbanization (Lehohla, 2006). The current government's strong housing programme under the Reconstruction and Development Programme (RDP), which focuses on building large numbers of houses for the black Africans for free (Gilbert, 2004), has also contributed to the influx of poor people into urban areas. In 2001 the level of urbanization in the country was 56 %, giving a 4.3 % increase between 1996 and 2001 (Kok and Collinson, 2006). Within the same years, the rural population decreased from 44.9 % to 42.5 % (Simbi and Aliber, 2000; Stats SA, 2001). Statistics in 2007 showed that more than 60 % of the South African population lived in urban centres (Stats SA, 2007).

Although urbanization is the driving force for modernization, economic growth and development in some parts of the world, it is not always associated with improved household wellbeing in most of sub-Saharan Africa. It is instead associated with poverty, environmental, social and economic problems, especially on urban poor communities (Kuchelmeister, 1999). South Africa for example, is facing many problems related to rapid urbanization, complicated by its apartheid history. These problems relate to poverty and unemployment, land, water, housing (Kuchelmeister, 1999; Lehohla 2006; Setswe, 2010), environmental degradation and severe loss of urban natural resources (Cilliers *et al.*, 2004; Pelser and Redelinghuys, 2009; McConnachie and Shackleton, 2010). With such challenges, innovations on governance of urban

systems are critically required. According to the UN-Habitat (2002), rising to the challenge of urbanization in Africa requires the use of the lever of urban governance that can alleviate urban poverty and improve the environmental living conditions of people. Though little realized, good tree and green space management in and around cities (commonly known as urban forestry), associated with good governance, enabling policies, participatory approaches and capacity building of stakeholders can help mitigate both urban poverty and environmental degradation (Knuth, 2005).

1.4 The urban forestry concept

Not fully studied and recognized in South Africa, and many other sub-Saharan African countries, is the concept of urban forestry and its potential in addressing the urbanization challenges related to poverty and environmental degradation. Urban forestry as defined by Konijnendijk *et al.* (2006, p. 7) is “the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic and aesthetic benefits that trees provide society.” In South Africa, the definition of urban forestry presented in the National Forestry Action Programme (NFAP 1997, p. 54) is that it is “an integrated approach to the planting, care and management of trees in urban and peri-urban areas to secure economic, environmental and social benefits for urban dwellers.” The NFAP (1997) further states that urban forestry includes trees in private gardens and the management of natural forests or woodlands within the urban or peri-urban periphery. In this study, the definition of urban forestry follows closely to that of the NFAP (1997) and is viewed as the establishment, care and management of trees and green spaces (on public or private property) within urban and peri-urban areas. Green spaces in this study include any pieces of land with trees, which may include forests, woodlands, parks, commonages and/or open spaces existing within the urban and peri-urban fringe. Urban forestry is often equated to “green infrastructure” or “urban greening” which involves the planting, care and management of all vegetation in cities and towns (DWAF, 2005). Since they are part of the overall urban forestry concept, UTGS are at certain instances used interchangeably with urban forests in this study.

1.5 Benefits of urban trees and green spaces

The benefits of UTGS, also known as ecosystem services can be divided into two, namely: consumptive (provisioning services) and non-consumptive (regulating and cultural services). Consumptive or tangible benefits of UTGS include fruits, fuelwood, medicines, wood for building, and fodder (Kuchelmeister, 2000; Uddin, 2006; Fuwape and Onyekwelu, 2011), whereas the non-consumptive or intangible benefits of UTGS include carbon sequestration, water and soil protection, habitat protection, noise and air

pollution reduction, shade, beauty, recreation, educational, scientific, spiritual and religious significance (MEA, 2005; Horst, 2006; Shackleton, 2006).

There has been a growing global recognition that UTGS improve the quality of urban life (Asomani-Boateng, 2002; Nielsen and Nilsson, 2007; Landry and Chakraborty, 2009; Jim, 2010). For example, UTGS have been documented to contribute to ecological services, including microclimate regulation (Eliasson, 2000; Seth, 2004; Shashua-Bar *et al.*, 2010), air filtration and noise level reduction (Bolund and Hunhammer, 1999; Nowak and Dwyer, 2007). They have been said to provide cultural benefits such as reduced stress levels (Ulrich *et al.*, 1991; Pedlowski *et al.*, 2002), increased attractiveness (Schroeder, 1988; Westphal, 2003), and promotion of social interactions (Kuo *et al.*, 1998; Kweon *et al.*, 1998; Lo and Jim, 2010). Other benefits derived from UTGS include: attracting visitors and promoting a city as a tourism destination (Bowman *et al.*, 2009), increasing property values (Tyrvaainen and Miettinen, 2000; Dombrow *et al.*, 2000) and generating revenue and employment (Chiesura, 2004). In terms of urban food security UTGS provide food (non-timber forest products) such as mushrooms, fruits, nuts, and vegetables to urban communities (Horst, 2006; Fuwape and Onyekwelu, 2011).

1.6 Urban forestry in South Africa

Although its benefits have been well documented, urban forestry is still insufficiently recognized in most developing countries (Kuchelmeister, 1999) and is consequently absent in the urban planning and development processes. In South Africa for example, the full potential of urban forestry is yet to be realized. Shackleton (2006 p. 4) indicated that although tree planting was widely practiced in urban areas of South Africa, it received “neither the profile, government support nor the research focus that it required”. The NFAP (1997) and Shackleton (2006) further reported that tree planting programmes were common in the country but were fragmented and uninformed by a conceptual framework of urban forestry.

In terms of government policy, urban forestry was mentioned as a small component of community forestry in the Forestry White Paper (DWAF, 1996; Shackleton, 2006). There was more significant recognition of urban forestry in the NFAP (1997). However in 2006, Shackleton (2006) reported that there had been little change in the state of urban forestry since the NFAP (1997) almost ten years later, and that none of the goals identified at that time had been fully accomplished. With regard to policy relating to urban development issues in South Africa, McConnachie and Shackleton (2010) reported that most policies were silent or weak on the environmental and natural resource dimensions. McConnachie and Shackleton (2010) further stated that there was a singular focus on infrastructure provision with limited thought or vision to what towns and cities would look like in the coming generations (vis-à-vis the

environment). For example, the much publicised South African Presidential Urban Renewal Programme was said to be more centred on infrastructure, safety and security, with no mention of urban forestry and/or green space planning in its list of deliverables (Shackleton, 2006). This clearly indicated a lack of full recognition of “urban forestry practice and advocacy” in the country (Shackleton, 2006 p. 2). This deficiency does not only allow for more urbanization related challenges to continue, but also makes UTGS vulnerable to loss through rapid urban development which is normally characterised by a lack of environmental planning (DWAF, 2005). The loss of UTGS further results in enhanced environmental, social and economic problems in urban and peri-urban areas.

1.7 Research gap

Urban forestry is perceived as an emerging and young science (Kuchelmeister, 1999; Bensten, 2010) and to date; only little work has been done in this field especially in developing countries (Kuchelmeister, 1999; Shackleton, 2006, Uddin, 2006; Kuruneri-Chitepo and Shackleton, 2011; Raoufou *et al.*, 2011). Compared to the on-going research and wealth of information on the contribution of trees and forests to rural livelihoods, there is a dearth of information on the benefits derived from UTGS, and more so on the governance issues regulating their existence and use in South Africa and other sub-Saharan African countries. Most of the research relating to UTGS or urban forestry in general is based on examples from the developed world, predominantly Europe and the United States. In the sub-Saharan African region, the little work that has been done relating to urban forestry mainly comes from South Africa, with however, limited work relating to management and governance of UTGS. As was observed from the review of the literature herein, the work that has been documented relating to UTGS in the country is on; the extent and distribution of public green spaces (McConnachie *et al.*, 2008; McConnachie and Shackleton, 2010), the contribution, distribution, abundance and composition of street trees (Stoffberg *et al.*, 2010; Kuruneri-Chitepo, 2011), school participation in Arbor Week (Guthrie and Shackleton, 2006; Parkin *et al.*, 2006), and on the perspectives of green planning (Cilliers, 2009). There is currently no information on how UTGS are being governed and managed in the country, and how the current governance and management practices influence the benefits of UTGS to local people and the environment.

1.8 Importance of urban forest governance and management

Despite their potential contribution to urban livelihoods and the environment, UTGS cannot flourish without good governance and management (Choi, 2011). Lawrence *et al.* (2011 p. 1) recently defined governance in the context of urban forestry as the institutions, organizations, knowledge and processes involved in making policy and management decisions. Drawing on this definition, the governance of UTGS is in this study defined as the institutions (formal and informal rules), organizations (key actors),

knowledge and processes that influence the management and use of UTGS. Management is viewed as the day-to-day activities that influence UTGS which include planting, maintenance, and removal of UTGS.

Mayers *et al.*, (2002, p. 3) report that the attainment of sustainable forest management (SFM) depends upon matters far from the forest itself, but rather on the “extent and quality of enabling policy, legal and institutional conditions, put simply, on good forest governance”. “The former conditions together, influence how a society organizes itself to develop and manage forest wealth, to produce forest goods and services, and to consume them” (Mayers *et al.*, 2002, p. 3).

Researchers indicate that urban forest governance is important because it differs from rural forest governance (Knuth, 2005; Lawrence *et al.*, 2011). For example, as reported by Knuth (2005), the policy and legal conditions for promoting forest and tree cover in urban environments and the constraints on the use of and access to these resources are different from those of forestry in rural areas. Lawrence *et al.* (2011) adds that unlike rural forest governance, urban forest governance involves a much wider range of stakeholders, interacting with state and non-state organizations operating at multiple scales. According to Lawrence *et al.* (2011, p. 2) “urban and peri-urban forest governance is important because it differs from but overlaps and contrasts with, other urban environmental governance”. For example, it is at times equated with ‘green infrastructure’ in countries like the United Kingdom (Mell, 2010), but the literature on green infrastructure makes little mention of trees (Johnston, 2009; Stewart *et al.*, 2010). Lawrence *et al.* (2011) adds that urban and peri-urban forestry governance is important because there are specific issues around urban trees, which combine beauty with threat to property.

As much as the above reasons are valid, I propose, in this study, that governance in the urban and peri-urban forestry context is important because it can either hinder or facilitate the potential contribution that UTGS provide to urban livelihoods and the environment. The Lack of recognition of urban forestry at different levels of government, including the lack of enabling governance institutions (i.e. lack of comprehensive policies and legislation, inappropriate land-use policies, poor planning, and poor implementation of government policies) can inhibit the full potential of urban forestry.

1.9 Conceptual research model

The research model (Figure 1.1) depicts the research idea of the study. It illustrates the possible causes leading to loss of UTGS and the effects of such losses. The boxes in pink on the left hand side are some of the identified governance issues that may lead to loss of UTGS, thereby limiting their contributions to local people and the environment, as shown in the white boxes on the right hand side.

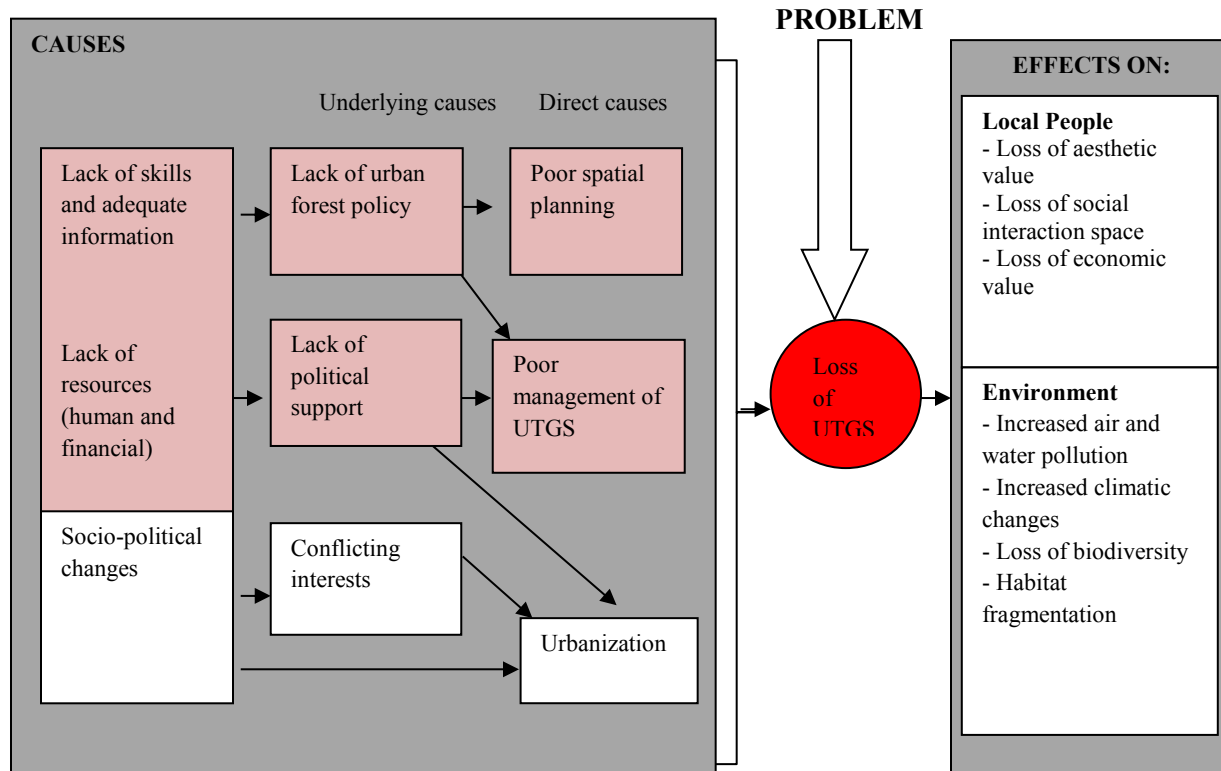


Figure 1.1: Research Model (Source: Adopted from Handavu, 2011)

Explanation of conceptual research model

Previous literature suggests that urbanization is one of the major causes of the loss of UTGS (McKinney, 2002; Chiesura, 2004; Lee *et al.*, 2005 and Singh *et al.*, 2010). Some researchers, for example Cilliers *et al.* (2004) indicate that urban nature decline is due to the lack of clear nature conservation policies from the planning and management process of urban areas; whereas, other researchers indicate that a lack of coordination between spatial planning and environmental management results in conflicting objectives which also contribute to the loss of urban green space (Cilliers, 2009). Factors highlighted in pink were identified for research in this study. The study hypothesized that the lack of recognition of UTGS in the current governance systems in South Africa (including the lack of an urban forestry policy, lack of political support, poor spatial planning and poor management of UTGS at local government level) is leading to the loss of UTGS, hence limiting the potential benefits of UTGS to local people and the environment.

1.10 Motivation for the research

In the face of rapid urbanization and global climate change, UTGS cannot be ignored in South Africa or any other sub-Saharan African country. Urban trees and green spaces are an essential element of the urban environment and are also vital to the well-being of humans and the improvement of human health. Apart from helping to provide livelihoods through food, fodder and fuelwood, trees in urban areas protect scarce water resources, and help moderate pollution, dust and erosion. While the multiple functions of UTGS are reasonably understood worldwide, UTGS are still not receiving full attention in sub-Saharan Africa, and are consequently under threat from urban development and fragmentation. Realizing that poor governance and management can influence the contributions UTGS make to local people and the environment, a study on the current governance and management approaches to UTGS in sub-Saharan Africa, with South Africa as a case study was considered vital for research. The purpose of the research was to:

1. Add to the limited research pertaining to the governance and management of UTGS in sub-Saharan Africa.
2. Critique the way UTGS are being managed and governed at the moment through a review of national and provincial governance institutions relating to urban forestry, and through a situational analysis of selected local government municipalities from the Limpopo and Eastern Cape Provinces of South Africa.
3. From point 2 above, determine and where necessary, propose changes to current governance and management practices to enhance the role of UTGS to local people and the environment.

1.11 Research Questions

The main research question of the study was “What are the current governance and management approaches to UTGS, and how do these influence the contributions of UTGS to local people and the environment?” This question was encapsulated in the following key questions:

1. Are there any governance institutions influencing UTGS at national and provincial level of government, and are these being implemented to promote urban forestry?
2. How are UTGS being managed in selected municipalities of South Africa? Are the concepts of planned, integrated, and systematic management of UTGS being implemented in the management of these in the selected municipalities?
3. Who are the key actors (players) involved in urban forestry in the country? What roles do they play in its deliverance, and how do they perceive its benefits?

4. What governance institutions influence local people's ability to plant trees, to access and make use of UTGS?

1.12 Structure of the thesis

This thesis is made up of eight chapters. Chapter one provides the overall introduction of the subject matter which includes the problem review, research motivation and research questions of the study.

Chapter two provides a review of the literature relevant to this study. It defines urban forest governance and explains why the concept is important for study. Existing literature on the governance institutions that influence urban forestry at international level, in developing countries and in sub-Saharan Africa is then presented. The chapter thereafter explains the importance of planned, systematic, integrated, comprehensive and adaptive management of UTGS with reference to existing literature. In conclusion, the chapter explains how the reviewed literature influenced the current research.

Chapter three gives details of the research methodology and the selected study sites. The chapter is divided in two parts: with part one on the methodology, and part two on the study sites. The part on methodology describes the sampling strategy adopted for the selection of study sites, and a general description of the methods of data collection used to address the key questions of the study. The part on study sites gives both the socio-economic and biophysical descriptions of the selected study sites.

Chapters four, five, six and seven address the first, second, third and fourth key questions respectively. These chapters are written in a paper format with the aim of publishing them all. Each chapter has an introduction, specific methods of data collection and analysis, results and discussion.

Chapter four reviews and critiques the implementation of governance institutions influencing urban forestry at national and provincial levels of government. It starts with an introduction to governance institutions and their importance in urban forestry. It then gives a brief description of the specific methods used to address the key question. The findings to the key question are then presented and discussed. This includes: tree planting and greening initiatives that exist at national and provincial level (in the selected provinces), governance institutions with explicit provisions for urban forestry, and governance institutions that indirectly regulate the planting and use of UTGS. The land use and development policies, plans and legislation with an influence on the environment and natural resources in general, are also presented and discussed in this chapter. The chapter ends with a brief concluding paragraph.

In chapter five, the management of UTGS in the surveyed local government municipalities is discussed. Similar to chapter four, this chapter starts with an introduction to the importance of UTGS management,

and then gives a brief description of the specific methods adopted to address the second key question. Findings to the question are then presented and discussed. The extent to which the surveyed local municipalities were implementing planned, systematic and integrated management of UTGS is discussed with reference to existing literature on UTGS management. A concluding paragraph on the chapter is then given.

Chapter six describes the key actors involved in UTGS and the roles they play. This chapter also discusses key actors' levels of knowledge and appreciation of UTGS associated benefits. Following a brief introduction to the key question, the specific methods adopted to address the question are presented. The findings, including the actors involved in urban tree related activities, the roles they play, and their perceptions of urban forestry benefits are then presented and discussed. The chapter ends with a brief conclusion on the findings to the key question.

Chapter seven discusses the governance institutions that influence local people's ability to plant trees, access and use UTGS. An introduction to the key question is given. In the introduction, an explanation is given on how governance institutions such as tenure security may potentially influence the planting and use of UTGS. The specific methods of data collection used to address the key question are presented. After which, the findings to the study including the institutional factors that influence local people's ability to plant, access and use UTGS on public and private land are presented and discussed. Findings on local people's level of knowledge and involvement in tree planting and greening activities are also presented and discussed in this chapter. A conclusion on the findings to the key question is then given.

The last chapter (Chapter eight) synthesizes the major findings of the four research questions. In this chapter, final conclusions are drawn and recommendations are made for improved governance and management of UTGS. Following Chapter eight is an outline of the references and a list of appendices.

Chapter Two

Literature review

2.1 Introduction

This chapter constitutes a review of the body of knowledge relevant to the study. As indicated in chapter one, there is limited published information on the governance and management of UTGS. In guiding the search for information, the research began by asking the following questions:

- What is known from existing literature on and about urban forest governance?
- What can be learnt from previous studies on the management of UTGS?

2.2 What is known from existing literature on urban forest governance?

The term governance has been widely and variously interpreted by people, depending on which context it is being used (Kooiman and Bavink, 2005; Lebel *et al.*, 2006; Biermann *et al.*, 2009). Urban forest governance as outlined in Chapter one refers to the institutions, organizations, knowledge and processes that shape decisions about the management of UTGS (Lawrence *et al.*, 2011).

Institutions are in this study defined as the rules (regulations, legislation and procedures) relevant to urban forestry (Konijnendijk, 2012). Scholars report that the legal and political rules and regulations that affect urban forests and their management hail from a diverse range of sectors including planning, forestry, environmental and nature conservation (Knuth, 2005; Konijnendijk and Gauthier, 2006; Lawrence and Dandy, 2012). According to Lawrence *et al.* (2011, p. 2) “all levels of government can affect the urban forest, from national (administrations and policies relating to forestry, environmental protection, natural resources, transport or road works), to various scales of local government (land use planning and zoning)”. For this reason, an integrated approach to urban forest governance is increasingly called for (Konijnendijk, 2003; Lawrence *et al.*, 2011) which includes integration across components of the urban forest and green spaces; between sectors; and across scales (e.g. cities and countries) (Lawrence and Dandy, 2012). For example, urban forests have an obvious role in meeting multiple policy goals such as sustainable development (Nilsson *et al.*, 2009), climate change mitigation (Jim, 2008), and other environmental objectives (Lawrence *et al.*, 2011). Researchers stress that such roles need to be recognized and integrated into the afore-mentioned policies and plans in order to ensure successful urban forestry (Lawrence *et al.*, 2011; Konijnendijk, 2012).

Since tenure (ownership and rights of access and use) has both practical implications for access and control, and equity issues (Whitehead, 2009), several researchers identify it as an institution with potential influence on UTGS (FAO, 1995; Knuth 2005; Lawrence *et al.*, 2011). According to Knuth (2005, p. 24), “urban forests might be owned by a number of private property owners, municipalities, regions or states.” Knuth (2005) indicates that such a diversity of ownership and responsibility is important to consider in urban forest governance because it both facilitates and complicates the management of urban forests. Other researchers indicate that trees on private property (e.g. gardens, private woodlots) may form a greater part of the urban forest, hence need government attention (in terms of policies and laws) just like trees on public property (McPherson, 1998; Conway and Urbani 2007; Lawrence *et al.*, 2011). More recently, Lawrence and Dandy (2012) reported that the public’s use of urban trees and forests on both private and public land could be influenced by various aspects of governance, including property rights and informal social norms that influence individual behavior.

Organizations in the definition above include key actors involved in urban forest governance, while the broader term of stakeholders refers to “organizations and individuals that have a vested interest in urban forests, but are not actively involved in governance” (Konijnendijk, 2012). Lawrence and Dandy (2012) report that successful urban forest governance relies on involving the right stakeholders, which may include the private sector, community based organizations, and Non-Governmental Organizations (NGOs). Since UTGS are used for a wide range of purposes (including provision of food, fuelwood, shade, and cultural benefits), researchers stress the need for socially inclusive urban forest governance (Konijnendijk, 2003; Lawrence *et al.*, 2011; Konijnendijk, 2012). According to Konijnendijk (2012), the socially inclusive nature of urban forestry relates to equity issues and the wider involvement of interest groups and urban residents. Lawrence *et al.* (2011) adds that interest groups and user demands have an important role to play in urban forest governance.

Knowledge is considered a vital component of urban forest governance; for example knowledge of the urban tree stock is important to plan and implement strategies on how to manage the trees (Gerhardt, 2010; Lawrence *et al.*, 2011). Technical knowledge is also needed to ensure appropriate trees are planted in a place and manner that will ensure their survival (Lawrence and Dandy, 2012). “Knowing urban society’s manifold perceptions, preferences and demands for urban forest goods and services is also important for improved decision making about UTGS” (Lawrence *et al.*, 2011 p. 13).

Finally, the processes that may potentially shape decisions about UTGS include the procedures and ways of involving organizations and the general public in UTGS activities. These processes can range from

consultation to grassroots forms of participation, and can draw on tools ranging from questionnaires to participatory mapping and planning (Lawrence and Dandy, 2012).

According to Lawrence *et al.*, (2011) the complexity, diversity and competing land use demands of the urban context as well as the contradictory qualities of UTGS, frame the importance of urban forest governance. However, a review of the literature shows that urban forestry governance has received less and limited attention at almost all levels of government, and that there is relatively limited comparative knowledge of this field.

2.2.1 Urban forestry governance at international level

In the 1990s, Lanly (1997) indicated that trees in and around the places where people lived hardly received international attention. According to Kuchelmeister (1998), most major international donor agencies at the time restricted their forestry mandate to rural areas. Global policy processes such as the Intergovernmental Forum on Forests (IFF) and the World Bank Forest Policy Review, as cited in Kuchelmeister (1999) had not identified urban forestry as a subject. The agendas and foci of international forestry research agencies, like the Center for International Forestry Research (CIFOR) and International Center for Agroforestry (ICRAF) were almost exclusively rural (Kuchelmeister, 1998). The discussions on criteria and indicators for urban quality and sustainable human settlements (e.g. UN Habitat, 1997) and the development debates on sustainable forest management paid hardly any attention to urban forests (Prabhu *et al.*, 1998).

To date, urban forestry has received little attention from international development agencies. Konijnendijk (2004) and Knuth (2005) report that the expanded efforts of the United Nations Food and Agriculture Organization (FAO), unlike other organizations, were more likely to promote urban forestry. Knuth (2005) indicated that FAO had been among the first organizations taking up the challenge of promoting the concept of urban and peri-urban forestry in developing countries and countries with economies in transition. According to Knuth (2005), FAO conducted a review of existing activities within urban forestry, as well as an identification of needs for further development. Knuth (2005) also reported that FAO had recognized urban forestry's contributions to food security and poverty alleviation and had encouraged partnerships and information sharing between localities and countries. However, even with FAO's extensive participation in urban forestry activities, Kelley (2008) argued that international bodies had otherwise failed to focus on urban forests in their agenda.

2.2.2 Urban forestry governance in developing nations

In 1999, Kuchelmeister (1999) reported that urban forestry generally received little attention on political agendas of developing countries. He indicated that most National Forest Programmes (NFPs) in developing countries had insufficiently, or not at all, considered urban forestry. Kuchelmeister (1999) concluded that there was an urgent need to include in NFPs a focus of the needs and values of urban societies. He added that there was a need to develop guidelines on how to identify and involve urban stakeholders and disseminate lessons learned from urban forestry programmes under the umbrella of NFPs.

Five years later, Konijnendijk *et al.* (2004) indicated that urban and peri-urban forestry had seldom been subjected to integrative policies, whether at local or national level in developing nations. In addition, a case study conducted by Knuth (2005) in five countries (Canada, China, Germany, Philippines, and South Africa) showed that there was no specific legislation on urban and peri urban forestry and greening existing at national level in these countries. According to Knuth (2005, p. 8) there were only “a few specific laws dealing with urban trees, such as those requiring permits for tree removals or providing for protection of trees in and around cities”. For example, some cities may have laws in place for protecting trees in public and private areas, with the felling of such trees subject to official authorization from local government authorities (e.g. Schmied and Pillmann, 2003). Knuth (2005) concluded that there was a need to develop and improve existing legal frameworks for urban forestry in developing nations. She stated that in most countries, urban tree and vegetation laws were only extensions of existing laws protecting soils and environmentally sensitive lands and that in the rare cases that urban forests were mentioned in national legislation, it was mostly through certain explicit provisions as part of Forestry Acts. For example, “the Forest Act of Zimbabwe (1996) states that single trees can be protected from cutting according to section 39 of the Act, if such trees have been declared by the minister to be protected through statutory instruments” (Knuth, 2005). According to Knuth (2005), even though the definition of forests by the Act does not refer to urban and peri-urban forestry, municipal trees might be partly protected by the Forest Act of Zimbabwe (1996).

In 2006, Konijnendijk and Gauthier (2006) reported that some links to urban forests were found in national environmental legislation and in land use planning Acts, but that these regulated urban forests only partly. The authors stated that “land use legislation and protection of urban forest resources was especially problematic in developing countries, where uncontrolled migration towards cities, poverty and lack of control lead to drastic and illegal changes in land use and overexploitation of green resources” (Konijnendijk and Gauthier, 2006, p. 422).

More recently, Choi (2011, p. 39) reported that “the sustainability goals of the Rio Declaration on Environment and Development (i.e. Rio Declaration, 1992) and subsequent forest principles were inadequate to foster urban forests in developing countries, because they fail to empower decision makers and citizens to implement such policies”.

2.2.3 Urban forestry governance in sub-Saharan Africa

Literature on urban forestry governance in sub-Saharan Africa is scarce. In 1999, Kuchelmeister (1999) indicated that urban forestry was yet to be included in National Forest Programmes (NFPs) of most developing countries, including most sub-Saharan African countries. Zimbabwe for example had not identified urban forestry as a key subject of the NFP at the time (Gwaze, 1999 as cited in Kuchelmeister, 1999, p. 7), and the same was probably the case for most other countries in the region. In South Africa, urban forestry was identified as a key element of the NFAP (1997) which clearly stated the objectives and the importance of urban forestry. The roles of the different stakeholders in urban forestry deliverance were also outlined. However, as stated by Shackleton (2006) most of the indicators of achievement outlined in the NFAP had not been achieved at all, or only partially. The possible reasons why urban forestry has still not received full attention in the country, for example why it had not been mentioned in the Presidential Urban Renewal Programme, have not been documented. This deficiency formed part of the basis for the current study.

2.3 What can be learnt from previous studies on how UTGS should be managed?

A review of the literature conducted herein called for planned, systematic and integrated management approaches to UTGS management (Kuchelmeister, 1997; Miller, 1997; Konijnendijk *et al.*, 2004; Britt and Johnson, 2008). For example, as early as the 1980s urban forestry was defined as the “planned, integrated and systematic approach to the management of trees in urban and peri-urban areas for their contribution to the physiological, sociological, and economic well-being of urban society” (Grey and Deneke, 1986). In the 1990s, researchers such as Kuchelmeister (1997; 1998), Miller (1997), and Johnston (1997; 1998) also highlighted the importance of a planned, systematic and integrated approach to urban forestry management. Today, this approach to urban forestry is still called for by researchers such as Konijnendijk (2006), Gerhardt (2010), and Lawrence *et al.* (2011).

2.3.1 Planned management of UTGS

According to Britt and Johnston (2008), any resource has to be managed in a planned or strategic way. Planning is important in order to define overall long-term management objectives and specific plans and

targets to achieve them. In the case of urban trees for example, questions such as; what functions are the trees to perform, where are the trees to be planted, what future management will be required, and what species can be made available, have to be carefully analysed during the planning phase of tree establishment. According to Choi (2011 p. 39) urban forestry programmes must include “effective planning in order to avoid inadvertent problems, such as displacement of important native species in the future”. Johnston and Rushton (1998) report that “planning that allows for the majority of UTGS management to be carried out in a pro-active manner, rather than a re-active one, should be attempted.” In the past, however, planning and management of urban forests have not been as effective as they could have been, because the benefits trees provide have often been underestimated by planners or managers of urban forests (Knuth, 2005; Gerhardt, 2010).

2.3.2 Integrated Management of UTGS

Also essential for the effectiveness of the urban forest concept is the principle of integrated management (Lawrence *et al.*, 2011). Urban forestry is regarded as a “multi-disciplinary approach to the planning and management of urban forests and trees” (Lawrence, 2011, p. 6); therefore, the practical management of the urban forest requires the input of a wide range of relevant professionals. These may include arboriculturists, landscape architects, planners, ecologists, foresters, and community workers. According to Gerhardt (2010) anyone with some form of responsibility for a part of the urban forest needs to be involved in UTGS management; for example, involving the private and voluntary sector or even the general public in an urban tree programme can result in a positive contribution to the urban forest as well as to the community (Johnston, 1989). Stakeholder involvement and their active participation can also play a pivotal role in dealing with challenges and conflicting interests of urban land-use practices, planning and management of urban green spaces. According to Lawrence *et al.* (2011 p. 11) “social conflicts occur frequently in urban and peri-urban forestry, as relatively small tree and woodland resources need to cater for a high and diverse demand for ecosystem services”. Lawrence *et al.* (2011) reported that stakeholder and public involvement is an important tool for managing conflicts in urban and peri-urban forestry.

2.3.3 Systematic management of UTGS

According to Johnston and Rushton (1998) the more systematic tree management is, the more cost effective it becomes. For an urban tree programme to be effective, all its operations need to be conducted in a scheduled and systematic manner, which includes “regular inspections to minimize hazards to the public through dangerous trees” (Gerhardt, 2010, p. 3).

Though similar to the concepts of planned, systematic and integrated management of UTGS presented above, the key elements for sustainable urban forest management identified by Dwyer *et al.*, (2003) provide a more comprehensive approach to UTGS management. Dwyer *et al.*, (2003) reported on the need to manage urban forests for sustainability and indicated that urban forests are diverse, interconnected and dynamic, and thus require the involvement of a wide range of disciplines, users and managers to sustain forest health. The authors identified seven key elements essential for sustainable urban forest management. These included the need:

- a) To recognize and embrace the diversity and complexity of urban forests, by adopting urban forest programmes that draw from multiple disciplines. Disciplines that may, for example, be involved in urban forestry management include; wildlife management, hydrology and soils, atmospheric science, psychology and sociology, landscape architecture, and recreation management.
- b) For managers involved in urban forestry activities to develop locally specific management strategies that address or meet the local needs of people within a specific environment, given the unique character of the urban forest resource found in a particular setting.
- c) To focus on human dimensions, knowing that urban environments are rapidly changing and that while human activities can change the urban forest structure, they can also minimize detrimental changes due to natural forces such as insects and diseases.
- d) To encourage coordination across land, users, and ownerships. Here the authors reported on the importance of multi-stakeholder involvement in the management of the urban forest. According to Dwyer *et al.* (2003), “partnerships among a wide range of decision makers who affect the urban forest resources provide opportunities for those involved to identify common interests and resolve potential problems”.
- e) To capitalize on connections with other activities that may have an influence on the condition of the urban forest resource. For example, coordinating urban forests with residential development, infrastructure development and maintenance, community empowerment, and environmental education.
- f) To implement a comprehensive ecosystem-based approach to planning and management of the urban forest resource, given its complex and diverse nature. Neville (2000) indicated that the “complex relationship of urban forest components to air water quality, wildlife habitat, and aesthetic character suggest that focusing management activities on only one component of the urban forest is likely to yield an unbalanced flow of other important benefits”.
- g) To implement adaptive management, given the dynamic nature of the urban forest resource. Management of urban forests must be able to respond to the changing environment and also to the

health and use of resources over time. For example, urban trees can play a role to urban climate change mitigation (Bowler *et al.*, 2010). According to Dwyer *et al.* (2003), without adapting to the potential changes in the urban environment, the urban forest management system is likely to be unsustainable.

Central to the above management approaches is the need for both financial and human capital in UTGS management. Lawrence *et al.* (2011) report that local authorities often face increasing pressure on their budgets, and green space management is usually affected. Researchers indicate that the lack of sufficient resources for urban forestry or UTGS to a large extent affect local governments adoption and implementation of urban tree related programmes (Kenney and Idziak, 2000; Conway and Urbani, 2007).

2.4 Conclusion

From the review of the literature, the following implications were drawn for the current study:

- Though essential for successful urban forestry, urban forestry governance has received little attention, in terms of international and national programmes, policies, plans and legislation. The implication for this research therefore is that this deficiency also exists in South Africa and is likely to have inhibited the full potential of urban forestry in the country. I therefore reviewed governance institutions influencing urban forestry in the country, and analysed the extent to which these were being implemented to promote urban forestry.
- To be effective, UTGS management has to be planned, systematic and integrated. According to Dwyer *et al.* (2003) comprehensive and adaptive approaches to urban forestry management are additionally important for more sustainable urban forest management. Through a set of formulated questions, I studied the extent to which planned, systematic and integrated approaches were being implemented in the management of UTGS at local government level in selected municipalities of South Africa.

Chapter Three

Methodology and study sites

3.1 Introduction

This chapter is divided into two parts. Part one describes the sampling strategy and the methods of data collection used in the study whereas Part two describes the study sites.

Part one

3.2 Methodology

The methodology section presents the sampling strategy, sample frame and the methods of data collection used in the study.

3.2.1 Sampling strategy

The sampling strategy adopted in the study was based on the system of government in South Africa. According to the South African Constitution (1996), there are three spheres of government in the country, namely: national, provincial and local government. The local government sphere is made up of metropolitan, district and local municipalities¹. Each sphere of government is divided into three parts, namely: legislature, executive and administration. Legislature (elected members) at each sphere of government represents the public. The legislature's functions include approving policies and laws, and monitoring the work of the executive and government departments. The executive (cabinet or executive committee) co-ordinates the making of policies and laws and oversees implementation of the laws and policies by the government departments. The Administration, which is made up of departments and public servants is responsible for doing the work of government, including implementation of laws and policies approved by the legislatures.

Through the Executive, each sphere of government has authority to formulate laws and policies relating to UTGS. However, these laws have to be approved by the legislature after which they have to be implemented by the departments and public servants at the administration level. To get a reasonable representation of all the government spheres above, this study was conducted at national, provincial, district, local and household level.

¹Metropolitan municipalities exist in the biggest cities of South Africa. Areas that fall outside metropolitan municipalities are divided into local municipalities. District municipalities are made up of a number of local municipalities. Some district municipalities also include nature reserves and district management areas.

a) National level

At national level the study involved a review of national programmes, plans, laws and policies relating to tree planting as well as removal of UTGS in the country. It also included 14 face-to-face interviews with officials from national government departments, i.e. six from the Department of Agriculture Forestry and Fisheries (DAFF), four from the Department of Environmental Affairs and Tourism (DEAT), two from the Department of Public Works (DPW) and two from the Department of Local Government and Housing (DLGH)

b) Provincial level

Two provinces of similar socio-economic status, but different biophysical conditions were randomly selected for the study. Since South Africa has nine provinces, conducting a study in two gave a sampling intensity of 22.2 %. For comparison sake, the Limpopo Province was selected because it is dominated by a treed biome (i.e. savanna), whereas the Eastern Cape Province was selected because it is dominated by a non-treed biome (i.e. thicket). The line of thought in the selection of these two provinces was that the current situation on the ground in terms of tree composition, was likely to influence adoption of tree planting programmes and tree use regulations. Therefore, a hypothesis was developed that municipalities in the Eastern Cape Province, which is in a non-treed biome, had better UTGS management (e.g. more efforts in promoting tree planting and regulating tree use) than municipalities in the Limpopo Province, which is in a treed biome. The study involved a review of provincial programmes, plans, laws and policies relating to the planting and use of UTGS in the two selected provinces. It also involved nine face-to-face interviews with officials from provincial government departments that were identified as key actors involved in UTGS activities.

c) District Level

Three district municipalities from each selected province (i.e. Limpopo Province and Eastern Cape) were randomly selected for the study. These district municipalities were selected for the purpose of aiding the selection of the local municipalities in which the study was going to be conducted. A total of six district municipalities were surveyed giving sampling intensities of 60 % and 50 % of the district municipalities in the Limpopo and Eastern Cape Provinces, respectively.

d) Local municipal level

Three local municipalities were selected in each of the three selected district municipalities in each province (Figure 1.1). A hypothesis was developed that the local municipality housing the district municipality had better management of UTGS than those further away from the district municipality. Since local municipalities housing the district are in close proximity to the district municipality, the

researcher assumed that these municipalities could easily access resources for UTGS from the district municipality, unlike local municipalities located further away from the district municipality. The local municipality housing the district municipality was therefore selected in every district. The initial plan was to select two other local municipalities, one closest to the municipality housing the district, and the other furthest. However, two challenges were faced:

1. Some selected district municipalities were not being housed in a local municipality. For example the Cacadu and Amathole District Municipalities in the Eastern Cape are housed by metropolitan municipalities.
2. Municipal officials from some selected municipalities could not be interviewed because they were not willing to participate in the survey.

To overcome the first challenge, the metropolitan municipalities found to be housing the district municipality were included in the survey. To address the second challenge the next nearest municipality was randomly selected for the study. A total of nine local municipalities out of 25 were surveyed in the Limpopo Province giving a sampling intensity of 36 % of all the local municipalities in that province. Out of 39 local municipalities in the Eastern Cape, 10 were surveyed giving a sampling intensity of 25.6 %. The two metropolitan municipalities in the Eastern Cape Province were also surveyed at a sampling intensity of 100 %.

e) Household Level

One local municipality out of the three in each district was randomly selected for the household survey. The survey was conducted in the main town of the selected municipality. In each town, three residential areas, namely: old township, Reconstruction Development Programme (RDP) areas, and informal residential areas were surveyed. The study singled out these three residential areas because of their differences in structural, social and ecological make-up. Old township and RDP areas are formal urban residential areas which are structured, organized, and have permanent houses. Informal residential areas (slums or squatter camps) are unstructured, and are normally established on land that has not been surveyed (Stats SA, 2001). Unlike formal residential areas, informal areas are mostly located on the periphery of towns and are mainly made up of new urban migrants (Landman and Napier, 2010). RDP residential areas are smaller in plot sizes than old township areas, and also have smaller public green spaces (McConnachie and Shackleton, 2010). On the other hand, plot sizes in the informal residential areas vary, ranging from 100 m² to 400 m² (Van Averbek, 2007). One of the aims of this study, therefore, was to determine whether the above differences among residential areas, as well as local rules and regulations affected the residents' ability to plant trees, access and use UTGS differently.

The selection of households within each town was carried out using aerial photographs at a scale of 1: 5 000. On the photographs, the surface area of each town was divided into three, i.e. old township areas, RDP, and informal. Settlement boundaries were then defined, and grid lines were drawn on the photographs so as to obtain coordinates falling on a household plot. These coordinates were then entered into Microsoft Excel to aid the random selection of the households to be interviewed. Thirty households were selected in each residential area (i.e., 30 in the informal areas, 30 in RDP areas, and 30 in the old township areas) giving a total of 90 in each town/municipality (Figure 3.1). This added up to 270 households in each selected Province (Limpopo and Eastern Cape) and 540 for the whole survey.

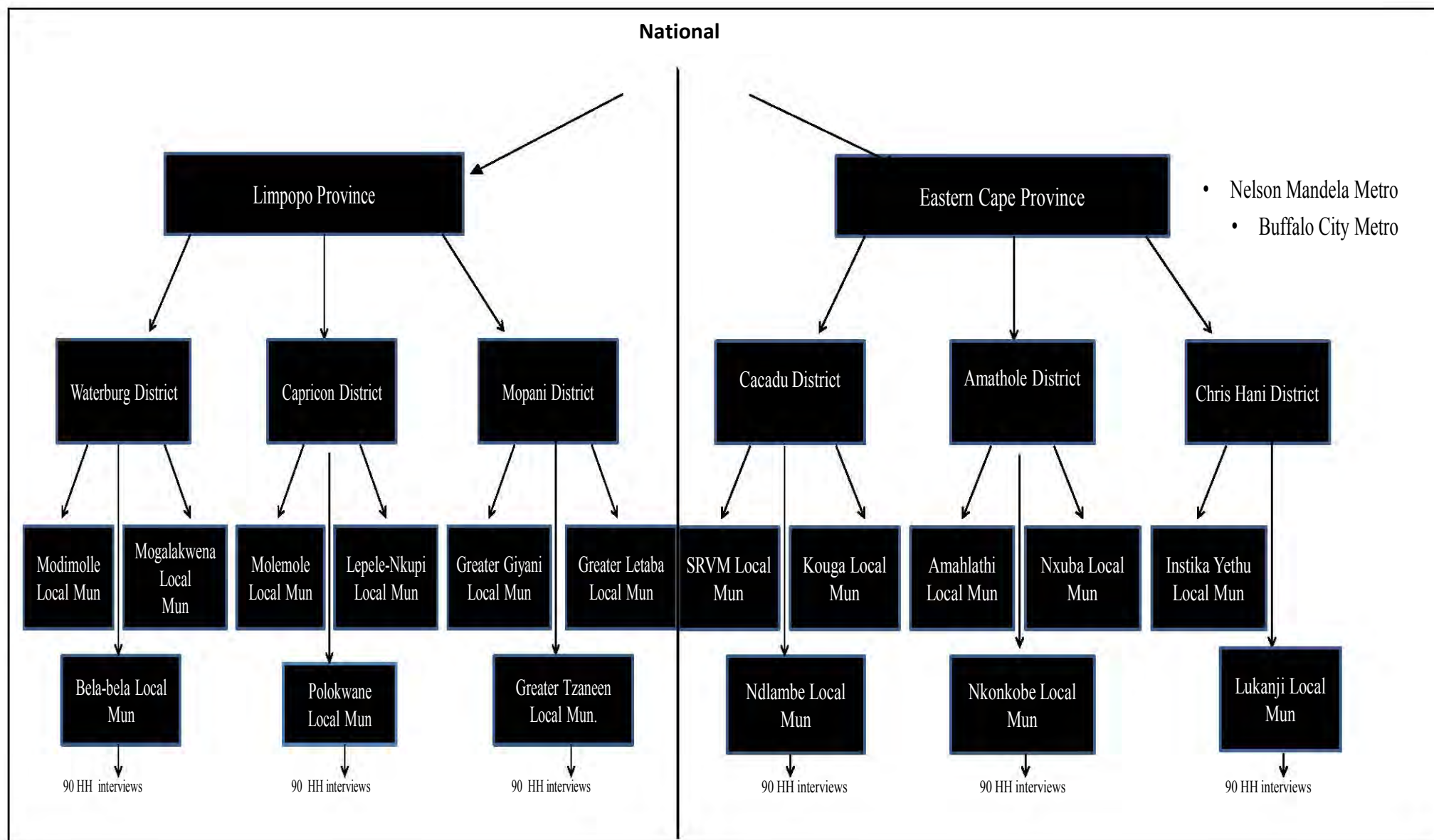


Figure 3.1: Sampling framework (Mun represents municipality whereas Metro represents a metropolitan municipality)

3.2.2 Methods of data collection

Different methods of data collection were used to address the study research questions. The question on urban forestry governance was mainly investigated through a review of existing national and provincial level legislation, plans and policy documents. The question on management of UTGS at local government level was addressed through a case study analysis of 19 municipalities (nine from the Limpopo Province and 10 from the Eastern Cape Province) and an online survey sent to all other local government municipalities in the country. To identify the key actors involved in urban forestry a snowball approach was adopted, and key informant interviews were conducted to determine key actor's roles, knowledge, and perceptions of urban forestry benefits. A household questionnaire was developed to determine the institutions that influence local people's ability to plant trees, access and use UTGS. The precise methods used for each research question are presented in the chapters addressing the research questions. This section however, provides a collective and general explanation of the methods of data collection used in the whole study.

a) Pilot study

Prior to data collection, a pilot study was conducted with the aim of testing the data collection tools. According to Burton (2000), conducting a pilot test helps determine the effectiveness of sampling methods, and levels of responses of interviewees. It offers guidance on what questions should be included in the interview schedule, helps increase data quality, and also reduces costs that may be unnecessary (Burton, 2000). Pilot testing also provides valuable information about how long it takes to complete a given questionnaire, whether the instructions and the questions are clear, and whether questions are well suited (e.g., appropriate terminology and reading level) to the group being surveyed (Van Teijlingen and Hundley, 2001). In this study, a pilot study was conducted in the Makana Municipality, Grahamstown, Eastern Cape Province. The study included testing of two data collection tools, one intended for the municipalities, and the other for households. One municipal official from the Makana Municipality was interviewed during pilot testing, and five household interviews, three from the informal settlement, and two from the old township settlement area were conducted. The time that was taken to conduct an interview was recorded, unclear questions were noted, and changes were made before printing the interview sheets for the main research study.

b) Document review

The study involved a review of documents, including policies, programmes, legislation and plans relating to tree planting and use of UTGS. Document review is a method of data collection that involves making use of data that are already available by reviewing existing documents (IUCN, 2009). With the document review method, one can obtain objective data at relatively low costs (World Bank, 2007). The extraction of documents can be however, time consuming and difficult if files are

incomplete and inaccurate (World Bank, 2007). Data to be collected are therefore limited to what is available and accessible. At both national and provincial (Limpopo Province and Eastern Cape) levels of government, the document review method was used to determine governance institutions that influence tree planting and use of UTGS. The method was also used to counter check information given during key informant interviews. At local level, the method was also used to complement and counter check information given by the selected municipalities. For example, tree bylaws and policies produced by municipal officials and those published on municipal websites were examined to determine how they influenced planting and use of urban trees.

c) Interview surveys

An interview is an important tool to use when the aim is to get in-depth information about a topic or subject at hand (FAO, 1998). In this study three different interview schedules were developed for the three types of respondents (households, municipal officials and other key actors involved in UTGS activities) (see Appendix 2, 3 and 4). The interviews were conducted face-to-face with respondents within the selected study sites, whereas telephone interviews were conducted with key actors outside the study areas. Key informants were targeted for all the interviews conducted. A key informant refers to anyone who can provide detailed information and opinions based on his or her knowledge of a particular issue (FAO, 1998). In the case of this study, key informants included: forest officers, environmental officers, law monitoring and compliance officers, and regional forest managers; from national and provincial government departments: town planners, park managers, horticulturists, environmental officers at local government level, and household heads at household level.

d) Online survey

An online questionnaire was sent to all local government level municipalities in the country (263). The aim was to get a broader perspective of the management of UTGS at local government level. Email contacts for the municipalities were obtained from the Government Communication and Information Systems (GCIS) department website (GCIS, 2011). Though potentially useful to cover a wide study area, the online survey has the disadvantage of low response rates, especially if some potential respondents have no internet access, or if available email addresses are wrong or have been changed (Opdenakker, 2006).

e) Snowball approach

Collecting data from an unknown population is difficult because of the absence of a sampling frame. Snowball sampling has attracted considerable interest as a method of collecting data on populations without a central list of members to sample from (Coleman 1958; Frank and Snijders 1992; Shively, 2011). Using the snowball approach, the study yields a study sample through referrals made among people who share, or know of others who possess the same characteristics that are of research interest.

According to Coleman (1958), the method is uniquely designed for sociological research because it allows for the sampling of natural interactional units. In this study, the snowball approach was used to identify key actors involved in UTGS activities in the selected study sites.

f) Observations

Observations are an important tool for data collection as they provide a researcher the opportunity to counter check and corroborate data collected from other research methods (Foster, 1996). Denscombe (2007) adds that observations allow one to scrutinize what is happening in real life situations. In this study, observations were particularly important to counter check responses from municipal officials and other key actors as to what was happening on the ground (household level).

3.3 Data analysis

The methods of data analysis adopted for each research question are presented in the chapter addressing the particular question. Analysis of the reviewed documents was mainly dependant on interview responses obtained from municipal officials, other key actors, and household respondents. Except for research question one, the data obtained for the other three research questions were coded (i.e. transformed into numbers and letters) prior to analysis. Coding is important in research surveys because it facilitates data entry (Neuman, 2003). The coded data were captured in Microsoft Excel (2007), and thereafter exported to the Statistical Package for Social Sciences (SPSS, Inc., 2007) and Statistica (Inc., 2010) for analysis. Chi square tests were used to analyse all categorical data. The chi square test of independence was used to test for significant relationships between different variables, whereas 2 x 2 contingency tables were used to compare the percentages of two different variables. Descriptive statistics such as bar graphs, frequency tables and percentages were also created and used for the presentation of results.

Part two

3.3 Location and description of study areas

This section gives an overview of the location, socioeconomic and biophysical statuses of the selected study sites. Figure 3.2 shows the location of the Limpopo and Eastern Cape Provinces on a South African vegetation map. The map shows how the two provinces differ in terms of biome and vegetation composition.

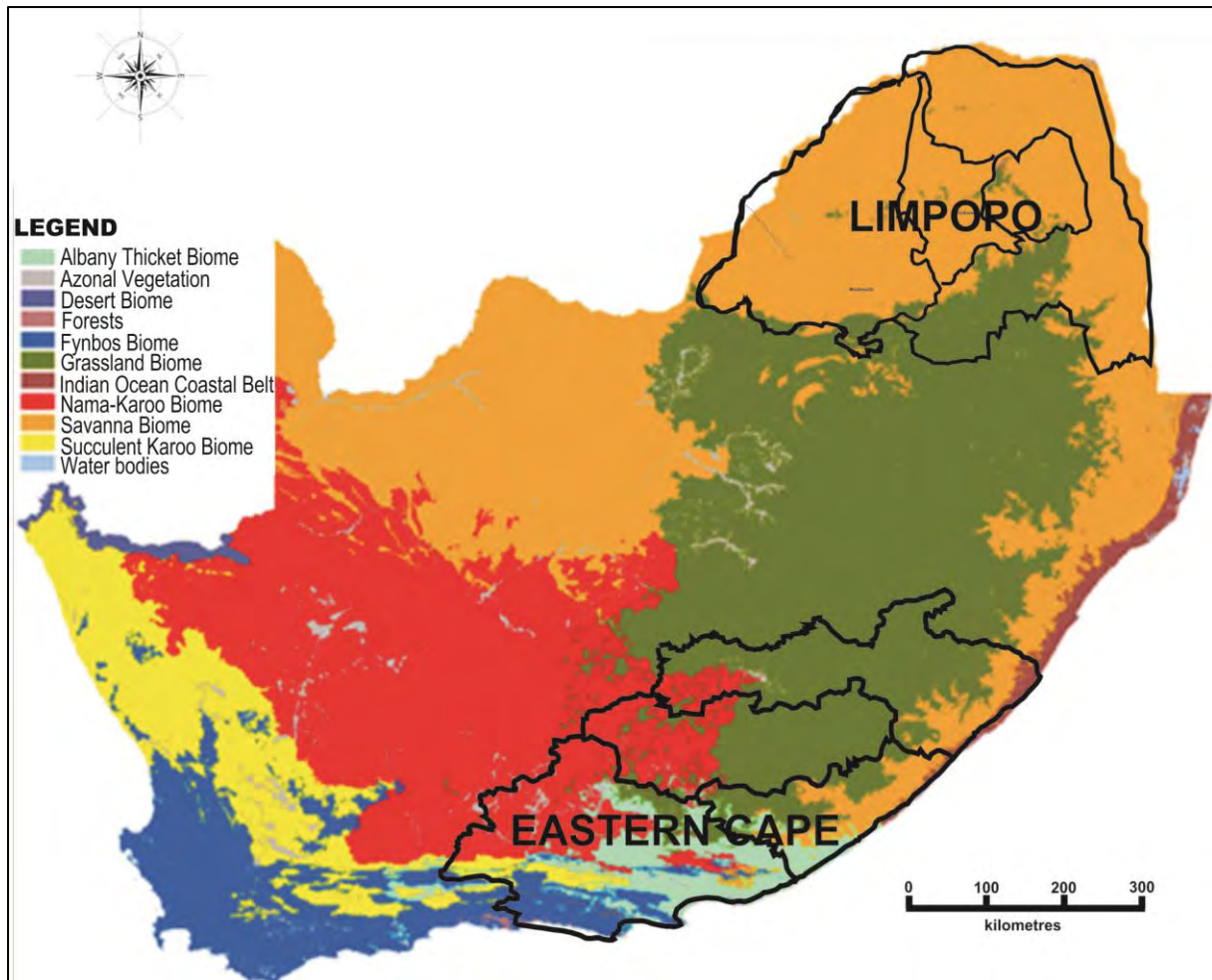


Figure 3.2: Location and Biome types of the Limpopo and Eastern Cape Provinces.

3.3.1 Limpopo Province

Limpopo Province is the fifth largest province of South Africa, with an area of 123 900 km². The city of Polokwane is the capital of the province, and the centre of government and commerce (Polokwane Local Municipality IDP, 2011). The province is divided into one District Management Area (DMA), five district municipalities (Waterberg, Capricorn, Mopani, Sekhukhune and Vhembe District), and 25 local municipalities. Figure 3.3 shows the location of the surveyed local municipalities in the Limpopo province.

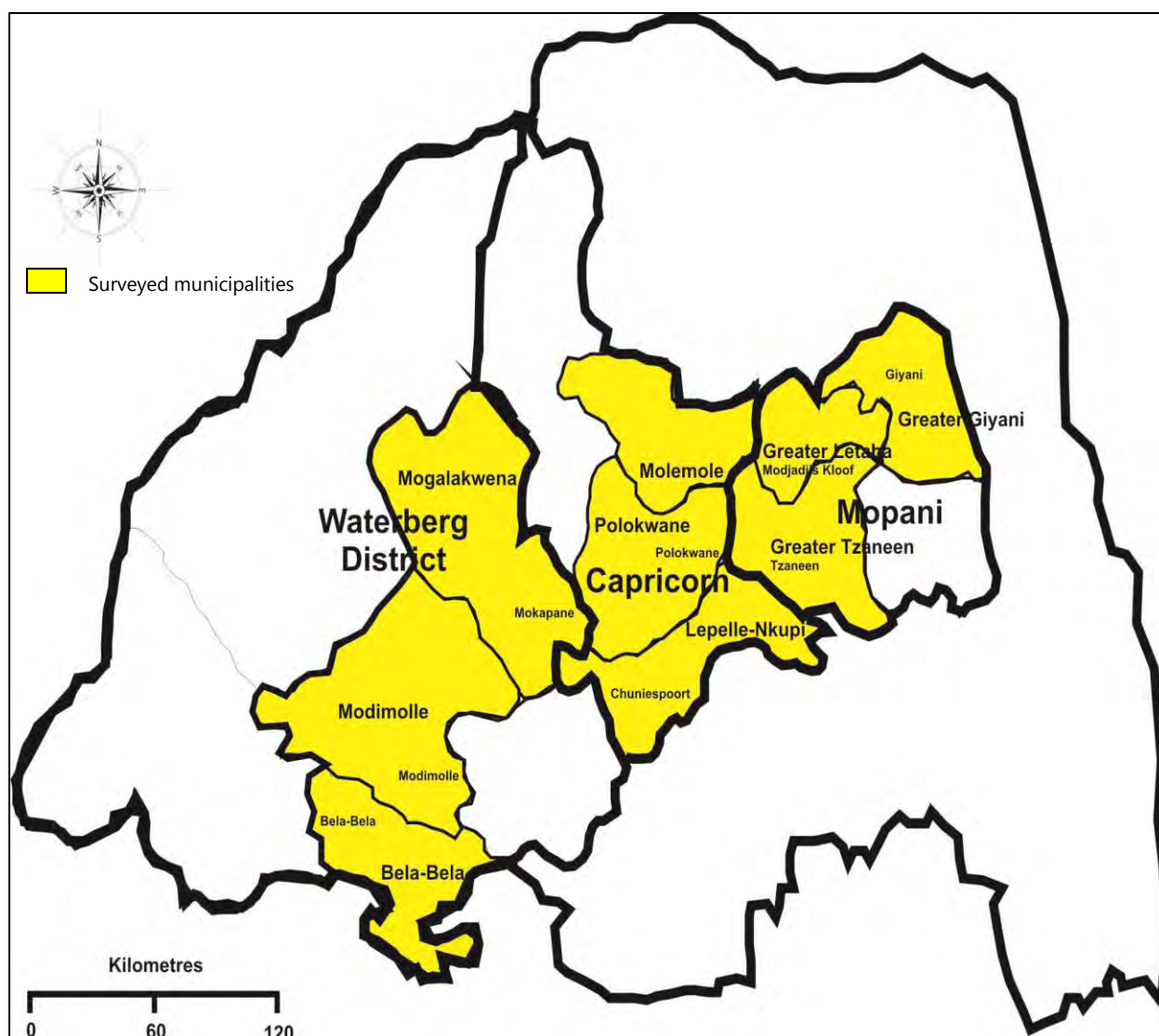


Figure 3.3: Location of selected municipalities in the Limpopo Province

a) Socio-economic status of the Limpopo Province

The Limpopo Province is predominantly rural in nature, and is made up of three former homeland areas namely: Gazankulu, Venda and Lebowa (Limpopo DFED, 2003). The majority of the population is Sepedi speaking (52.1 %), followed by Xitsonga (22.4 %), and Tshivenda (15.9 %). Most households survive mainly on grants, and contributions from breadwinners who migrate to urban centres (Limpopo DFED, 2003).

According to Statistic South Africa (Stats SA, 2007), the Limpopo Province had a population of over 5.2 million in 2007, giving a population increase of 4.9 % from 2001. The province had an annual economic growth rate of 6.8 % between 2000 and 2001. The major contributors to the economy include mining and quarrying (24 %), general government services (20 %), finance, real estate, and business services (17 %), and the wholesale and retail trade (13 %)(LEDET, 2009). The biggest

employment sectors are the government and the agriculture sectors. Although there has been an improvement in the economic growth rate of the province, Limpopo Province is faced with developmental challenges of high dependency ratios, poverty, equity and illiteracy levels, and skewed distribution of resources (LEDET, 2009). In 2009, the province had 27.8 % unemployment rate, 60 % poverty, and 48.6 % illiteracy levels (LEDET, 2009). Table 3.1 shows the socioeconomic status of the surveyed municipalities in the Limpopo Province.

b) Biophysical status of the Limpopo Province

In terms of the biophysical status, the Limpopo Province is characterized by a diverse topography, ranging from 120 m above sea level in the eastern lowlands to over 2000 m in the central highlands of the Waterberg complex and the Drakensberg Escarpment (Limpopo DFED, 2003). The province falls in the summer rainfall region with the western part semi-arid and the eastern part largely sub-tropical. It is characterized by an annual average rainfall ranging from 300 mm to 900 mm (Limpopo DFED, 2003) and almost all year round sunshine, with temperatures rising to 27°C and sometimes reaching the mid-thirties in summer (October-March). Winter on the other hand is characterized by cold and dry early mornings, warm mid-days, warm and dry afternoons, and cool to cold nights (Limpopo DFED, 2003).

The Limpopo Province falls within the greater savanna biome, commonly referred to as “bushveld” with a small representation of grassland and forest biome (Limpopo DFED, 2003; Mucina and Rutherford, 2006). It has a total of 15 vegetation types, most of which fall under the savanna biome (Mucina and Rutherford, 2006). The Limpopo Department of Finance and Economic Development (Limpopo DFED, 2003) reports that the province has three centres of endemism (i.e. Drakensburg Escarpment, Sekhukhuneland and Soutpansberg) and is home to several rare and unique vegetation types, as well as red data species. The province has 52 provincially protected areas covering an area of 335 601 hectares. As of 2011, the Limpopo Province had three established biosphere reserves, namely: the Kruger to Canyons Biosphere Reserve, the Waterberg Biosphere Reserve and the Vhembe Biosphere Reserve (which was only officially opened in 2011). According to Limpopo DFED (2003), the pressures threatening biodiversity in the province include unsustainable use of biodiversity, poverty, lack of strategic thinking and planning, and conflicts between conservation and development needs. A summary on the biophysical status of the selected municipalities in the Limpopo Province is shown in Table 3.2.

Table 3.1: Socioeconomic status of selected municipalities in Limpopo Province

Municipality name	Area size (km ²)	Urban/Rural	Population (Cs 2007)	Poverty rate % (income 0-R1600/month)	Unemployment rate (%)	Functional literacy rate (%)	Main economic sectors
DC33: Mopani District	2 5 344***	Predominantly rural***	1 068 568	77.0 %***	41.6 % ***	60.0 %***	Mining, community service, trade, finance, transport and agriculture***
LIM331: Greater Giyani Local Municipality	2 967. 27 **	Predominantly rural**	247 657	95.92%**	60.4%**	57.9%**	Public sector, agriculture, retail and service sector**
LIM332: Greater Letaba Local Municipality	1891**	Predominantly rural**	247 739	90.1% **	28.0%***	71.5%**	Community, social and personal services, agriculture, whole sale, and manufacturing**
LIM333: Greater Tzaneen Local Municipality	3 240 ***	Predominantly***	349 087	70.0 % **	20.0 %**	63.3 %**	Community services, finance, and trade**
DC35: Capricorn District	21 706***	Predominantly rural ***	1 243 167	88.0 % ***	26.1 %***	88.0 %***	Community services, finance, and trade sector**
LIM353: Molemole Local Municipality	3 347***	Predominantly rural **	100 408	88.3% **	69.0 %**	76.1%**	Community and personal service, household, finance, insurance, real estate, business and wholesale trade
LIM354: Polokwane Local Municipality	3 766***	Predominantly rural	561 772		15.8% **	57.6%**	Finance and business services, community services, and transport**
Sources:	**	Local Municipality Integrated Development Plan (IDP)			***	District Municipality Integrated Development Plan (IDP)	

Municipality name	Area size (km ²)	Urban/Rural	Population (Cs 2007)	Poverty rate % (income 0-R1600/month)	Unemployment rate (%)	Functional literacy rate (%)	Main economic sectors
LIM355: Lepele-Nkumpi Local Municipality	3 454**	Predominantly rural***	241 414	71.4%**	43.0 %**	30.0 %**	Community, social and personal, wholesale and retail trade, manufacturing, and construction**
DC36: Waterberg District	49 523 ****	Predominantly rural ***	596 092	85.6% **		74.0 %***	Mining, finance, transport, wholesale, government services***
LIM365: Modimolle Local Municipality	5 543**	3 towns and surrounding rural areas	52 602	73.0%**	13.7**	58.0 %**	Agriculture and forestry, community and services sector, finance, manufacturing**
LIM366: Bela-Bela Local Municipality	4000 **	1 town and surrounding rural areas	55 844	11.0 %	31.0 %**	76.6%**	Tourism, construction, agriculture
LIM367: Mogalakwena Local Municipality	6 166**	Predominantly rural (168 Villages)***	330 649	84.4% **	45.0 %**	76.4%**	Mining, finance, wholesale, government services***
Sources:	**	Local Municipality Integrated Development Plan (IDP)			***	District Municipality Integrated Development Plan (IDP)	

Table 3.2: Biophysical status of selected municipalities in the Limpopo Province

Municipality name	Biome types	Dominant biome types	No. of vegetation types	Dominant vegetation type (s)	Conservation status	Mean annual precipitation (mm)	Mean annual temperature (°C)
DC33: Mopani	Forest Grassland Savanna	Savanna	19*	Granite Lowveld**	Vulnerable**	633**	20.9**
LIM331: Greater Giyani Local Municipality	Savanna*	Savanna (100.0 %)*	5*	Lowveld Rugged* Mopaneveld (54.0 %)	Least threatened**	501**	21.6**
LIM332: Greater Letaba Local Municipality	Forests Grassland Savanna*	Savanna 87.5 %)*	9*	Tzaneen Sour Bushveld (64.1 %)*	Endangered**	781**	19.7**
LIM333: Greater Tzaneen Local Municipality	Forests Grassland Savanna*	Savanna (86.5 %)*	11*	Granite Lowveld (41.1 %)*	Vulnerable**	633**	20.9**
DC35: Capricorn	Grassland Savanna*	Savanna*	23*	Makhado Sweet*	Vulnerable**	454**	18.5**
LIM353: Molemole Local Municipality	Savanna*	Savanna (100.0 %)*	4	Makhado Sweet Bushveld (86.58 %)*	Vulnerable**	454**	18.5**
LIM354: Polokwane Local Municipality	Grassland Savanna	Savanna (98.1 %)*	10*	Polokwane Plateau Bushveld (84.6 %)*	Least threatened but degraded**	500**	16.9**
LIM355: Lepele-Nkumpi Local Municipality	Grassland Savanna*	Savanna (82.6 %)*	17*	Sekhukhune Plains Bushveld (18.6 %)* Springbokvlakte Thornveld (17.5 %)*	Vulnerable** Endangered**	518** 567**	19.0** 18.6**
Sources: *	SANBI Municipal Summaries						
**	Mucina and Rutherford (2006)						

Municipality name	Area size (km ²)	Urban/Rural	Population (Cs 2007)	Poverty rate % (income 0-R1600/month)	Unemployment rate (%)	Functional literacy rate (%)	Main economic sectors
DC36: Waterberg	Grassland Savanna*	Savanna*	22*	Springbokvlakte Thornveld**/ Waterberg Mountain Bushveld**	Endangered** Least threatened	567** 616**	18.6** 17.6**
LIM365: Modimolle Local Municipality	Grassland Savanna*	Savanna (94.9 %)*	7*	Waterberg Mountain Bushveld (49.9 %)*	Least threatened **	616**	17.6**
LIM366: Bela-Bela Local Municipality	Savanna*	Savanna (100.0 %)*	7*	Springbokvlakte Thornveld (63.4 %)*	Endangered**	567**	18.5**
LIM367: Mogalakwena Local Municipality	Grassland Savanna*	Savanna (98.2 %)*	12*	Makhado Sweet Bushveld (33.5 %)*	Vulnerable**	454**	18.5**
Sources: *	SANBI Municipal Summaries						
**	Mucina and Rutherford (2006)						

3.3.2 Eastern Cape Province

The Eastern Cape is the second largest province in South Africa with an area of 169 580 km², representing 13.9 % of South Africa's total land mass (CSIR, 2004). It is situated on the eastern seaboard of South Africa with its capital Bhisho located 60 kilometres from East London (one of the two ports of the province). The Eastern Cape Province is divided into two metropolitan municipalities (Nelson Mandela Bay, and Buffalo City Metropolitan Municipality) and six district municipalities (Cacadu, Amathole, Chris Hani, Ukhahlamba, O.R. Tambo and Alfred Nzo). The district municipalities are in turn divided into 37 local municipalities. In Figure 3.4, the location of the surveyed local and metropolitan municipalities in the Eastern Cape Province is shown.

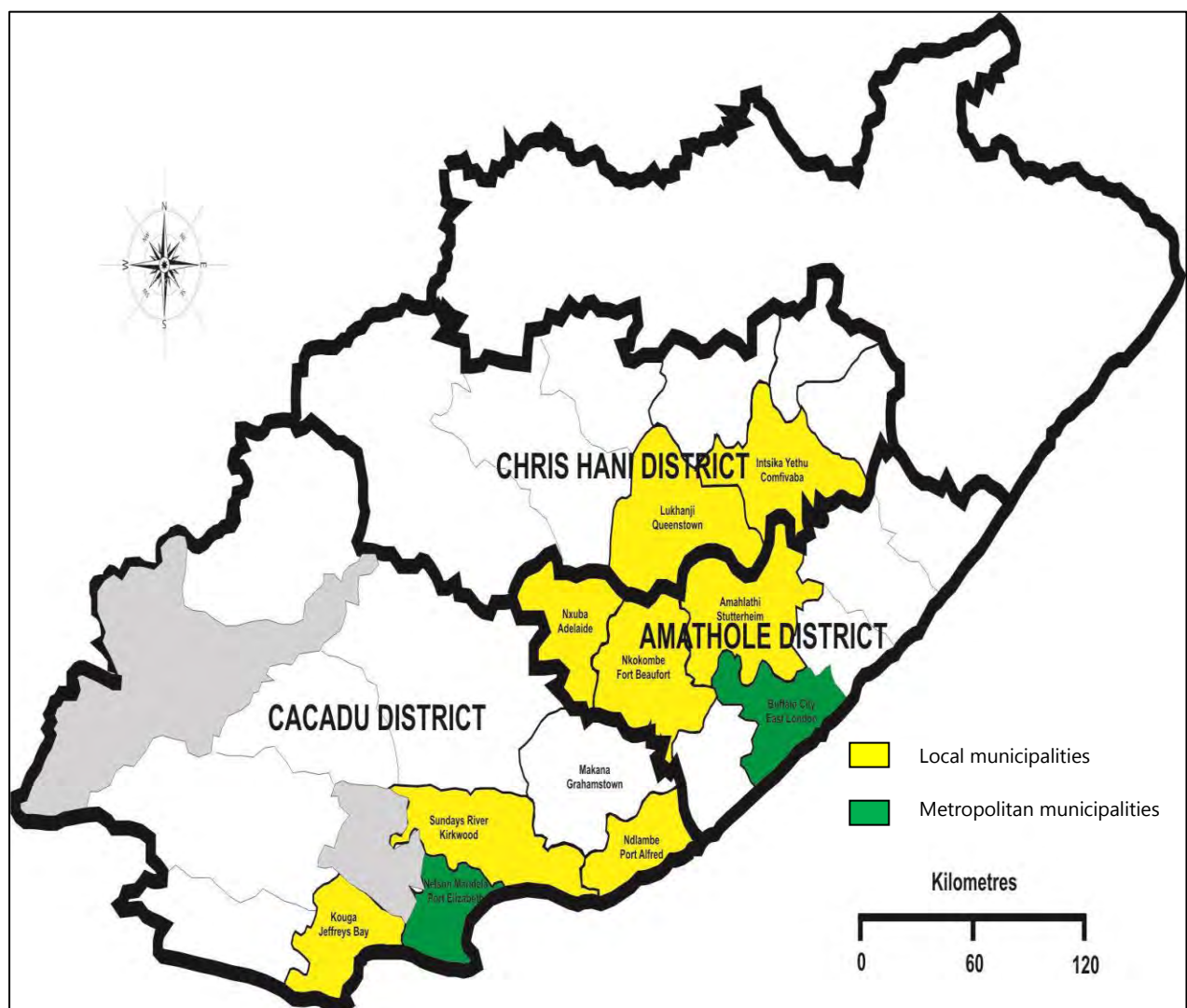


Figure 3.4: Location of selected municipalities in the Eastern Cape Province

a) Socioeconomic status of the Eastern Cape Province

The Eastern Cape Province is mainly rural, and is made up of two former homelands, namely: the former Transkei and Ciskei. It has a Xhosa-speaking majority, who are largely dependent on government grants (Lahiff, 2003), and natural resources to meet their household needs.

Stats SA (2007) reported that the Eastern Cape was home to over 6.5 million people in 2007. The province is said to have the highest incidence of poverty in the country (Lahiff, 2003; Nauta, 2004), although the Limpopo Province and KwaZulu-Natal are said to compete strongly (CSIR, 2004). In 2007, the Eastern Cape poverty rate was approximately 54.0 % (ECSECC, 2011). In the same year unemployed persons in the province, including the non-economically active, added up to 3882 134 (59.5 % of the population) (ECSECC, 2011). According to CSIR (2004), the high incidences of poverty and unemployment maybe linked to the relatively high rural population, poorly paid employees, low literacy levels, and the economic neglect of the former homelands Transkei and Ciskei that are located within the Eastern Cape's boundaries. The low employment and income rates mean that many households are vulnerable to problems associated with poverty, such as poor health care and poor living conditions. Nauta (2004) reported that the Eastern Cape was experiencing mass migrations of rural people to towns and cities in search of employment and better standards of living. As a result of urbanization, urban areas of the Eastern Cape are subject to social, economic, political and ecological problems (Nauta, 2004). Table 3.3 gives a summary of the socioeconomic status of the municipalities that were selected for study in the province.

b) Biophysical status of the Eastern Cape Province

In terms of the biophysical status, the Eastern Cape Province is characterised by varying rainfall and temperature conditions depending on the distance from the ocean (CSIR, 2004). Coastal areas of the province enjoy mild temperate conditions ranging between 14 and 23°C, while the inland areas experience slightly more extreme conditions with temperatures of 5 to 35°C. According to DEDEA (2009), mean annual precipitation varies considerably across the Eastern Cape from 300 mm per annum in the west to 1000 mm per annum in the east.

The Eastern Cape has the highest number of biomes (seven) and vegetation types (29) compared to the other provinces of South Africa (CSIR, 2004; Mucina and Rutherford, 2006; DEDEA, 2009). Of the seven different biomes, Grassland, Nama Karoo, Thicket and Savanna biomes are the most extensive (see Figure 3a above). The Department of Economic Development and Environmental Affairs (DEDEA, 2009) reports that the province incorporates five centers of endemism, with the largest (the Albany Centre of Endemism) extending almost nine million hectares across the province (Van Wyk and Smith, 2001). A total of 316 threatened plant species are found in the province, with more than one fifth occurring in the Thicket biome (CSIR, 2004). CSIR (2004) reports that there are

many sensitive and conservation-worthy areas in the Eastern Cape which are under threat from alien vegetation, erosion, pollution and poor land-use practices. Low and Rebelo (1996) and CSIR (2004) further report that the province is one of the three most degraded provinces in South Africa. The high levels of land degradation in the province, coupled with rainfall variability have a negative impact on delivery of ecosystem services and reduce natural productivity over time (CSIR 2004). Table 3.4 shows the biophysical status of the surveyed municipalities in the Eastern Cape Province.

Table 3.3: Socioeconomic status of selected municipalities in Eastern Cape Province

Municipality name	Area size (km ²)	Urban/Rural	Population (CS 2007)	Poverty rate (income 0 - R1600/month)	Unemployment rate (%)	Functional literacy rate (%)	Main economic sectors
Nelson Mandela Metropolitan	1950 *	Predominantly urban***	1 176 082	32.0 %*	30.0 %*	90.0 %*	Manufacturing, finance, community services and transport*
DC10: Cacadu District	58 243*	Predominantly rural***	363 496	37.0 %*	20.0 %*	68.0 %*	Government, finance and, trade, and agriculture*
EC105: Ndlambe Local Municipality	2 000**	Predominantly rural**	46 359	30.0 %**	18%.3 % ***	66.7%*	Tourism and recreation, agriculture, and small enterprises**
EC106: Sundays River Valley Local Municipality	3508 **		34 935	60.3%**	48.9%**	57.5%*	Agriculture, community services, private households, and manufacturing**
EC108: Kouga Local Municipality	2 419 **		73 274	31.4 %**	4.7%**	80.3% *	Agriculture, commercial and retail trade, and community services**
DC12: Amathole District	23 577***	Predominantly rural***	1 664 753	53.0 %*	44.0 %*	57.0 %*	Community services, finance, trade and manufacturing
EC124: Amahlathi Local Municipality	4269**	Predominantly rural**	112 735	67.5%*	83%**	65.3%*	Community, social and personal services, agriculture & forestry and manufacturing**
EC127: Nkonkobe Local Municipality	3725 **	Predominantly rural **	130 100	71.0 %**	68.0 %**	74.1%*	Education, health, retail, and public service**
Sources:	* **	ECSECC (2011) Local Municipality Integrated Development Plan (IDP)		***	District Municipality Integrated Development Plan (IDP)		

Municipality name	Area size (km ²)	Urban/Rural	Population (CS 2007)	Poverty rate (income 0 - R1600/month)	Unemployment rate (%)	Functional literacy rate (%)	Main economic sectors
EC128: Nxuba Local Municipality	2 749**	Predominantly rural**	21 467	75.9%**	60.8%**	72.1%*	Agriculture, community & public sector service
EC125: Buffalo City Metropolitan Municipality	169 580 **	Predominantly urban**	724 312	35.0 %*	25.0 %*	85.0 % *	Finance, community services, manufacturing, trade and transport*
DC13: Chris Hani	36 561 *	Predominantly rural **	798 597	53.0 %*	35.0 %*	55.0 %*	Community services, finance, trade, and transport*
EC134: Lukanji Local Municipality	4231 **	Predominantly urban	208 081	45.0 %**	50.0 %**	74.9%*	Community services, trade, household, agriculture, finance and manufacturing
EC135: Intsika Yethu Local Municipality	3 616**	Predominantly rural	185 342	76.0 %**	87.1%**	50.1%*	Community services, trade and agriculture**
Sources:	* **	ECSECC (2011) Local Municipality Integrated Development Plan (IDP)		***	District Municipality Integrated Development Plan (IDP)		

Table 3.4: Biophysical status of selected municipalities in the Eastern Cape Province

Municipality name	Biome types	Dominant biome types	No. of vegetation types	Dominant vegetation type	Conservation status	Mean annual precipitation (mm)	Mean annual temperatures (°C)
Nelson Mandela Metropolitan	Albany Thicket	Albany Thicket*	21*	SundaysThicket	Least threatened**	334**	17.5**
	Fynbos*			(41.1 %)*			
Cacadu	Albany Thicket , Forests,	Nama-Karoo (62.2 %)*	32*	Eastern Lower Karoo (35.0 %)*	Least threatened**	247**	16.5**
	Fynbos, Grassland						
	Nama-Karoo						
	Succulent Karoo*						
EC105: Ndlambe Local Municipality	Albany Thicket, Forests	Albany Thicket (95.9 %)*	12*	Albany Coastal Belt (47.4 %)*	Least threatened**	677**	17.8**
	Fynbos, Savanna*						
EC106: Sundays River Valley Local Municipality (SRVM)	Albany Thicket, Forests	Albany Thicket (87.2 %)*	17*	Sundays Thicket	Least threatened**	334**	17.5**
	Fynbos, Savanna*			(29.9 %)*			
EC108: Kouga Local Municipality	Albany Thicket	Fynbos (68.8%)*	20*	Kouga Grassy Sandstone Fynbos (25.6 %)*	Least threatened**	537**	15.7**
	Fynbos*						
DC12: Amathole District	Albany Thicket, Forests	Savanna*	12**	Bhisho Thornveld*	Least threatened**	717**	17.0**
	Grassland, Savanna, Indian Ocean Coastal Belt,*						
EC124: Amahlathi Local Municipality	Albany Thicket, Forests	Grassland (56.9 %)*	10*	Amathole Montane Grassland (42.2 %)*	Least threatened**	672**	14.7**
	Grassland, Savanna*						
EC125: Buffalo City Metropolitan Municipality	Albany Thicket, Forests	Albany Thicket	12*	Albany Coastal Belt (38.8 %)*	Least threatened**	677**	17.8**
	Grassland, Savanna*	(66.8 %)*					

Sources: * SANBI Municipal Summaries

** Mucina and Rutherford (200

Municipality name	Biome types	Dominant biome types	No. of vegetation types	Dominant vegetation type	Conservation status	Mean annual precipitation (mm)	Mean annual temperatures (°C)
EC127: Nkonkobe Local Municipality	AlbanyThicket, Forests Grassland, Savanna*	Albany Thicket 47.6 %)*	9*	Great Fish Thicket (32.8 %)*	Least threatened**	449**	17.1**
EC128: Nxuba Local Municipality	Albany Thicket Grassland*	Albany Thicket (68.7 %)*	8*	Amathole Montane Grassland (37.8 %)*	Least threatened**	672**	14.7**
DC13: Chris Hani District	Albany Thicket Grassland, Nama-Karoo*	Grassland (99.1 %)*	5*	Karoo Escarpment Grassland (77.8 %)*	Least threatened**	421**	13.5**
EC134: Lukanji Local Municipality	Grassland, Savanna*	Grassland (84.6 %)*	10*	Queenstown Thornveld (28.0 %)*	Least threatened**	481**	14.7**
EC135: Intsika Yethu Local Municipality	Grassland Savanna*	Grassland (93.2 %)*	6*	Tsomo Grassland (58.3 %)*	Vulnerable	609**	15.2**

Sources: * SANBI Municipal Summaries

** Mucina and Rutherford (2006)

3.4 Conclusions

The chapter has described the sampling strategy and sampling intensities that were used in this study. Although time and resources were a major constraint in determining the sample size of the study, this study covered more than 20 % of the provinces in South Africa, and 20-60 % of the district and local municipalities in each province. This sample size was adequate for describing the current status of governance and management of UTGS in the country.

The Limpopo and Eastern Cape Provinces were selected to compare if differences in biophysical status influence governance and management of UTGS. The two provinces differ in terms of their biophysical/ecological conditions as shown in Tables 3.2 and 3.4. Most municipalities in the Limpopo Province fall under the Savannah Biome, whereas the Thicket and Grassland Biome are the most dominant in the Eastern Cape.

Tables 3.1 and 3.3 have shown that the two provinces are similar in terms of their socio-economic status. They are both predominantly rural, fit into an urbanization transition, and have a large poverty stricken population which leads to high dependency on social grants and natural resources for survival. Both provinces are also faced with high unemployment and illiteracy levels.

Chapter Four

Governance institutions influencing urban forestry at national level and at provincial level in the Limpopo and Eastern Cape Provinces

4.1 Introduction

Institutions are commonly referred to as “rules of the game” in society that define social practices, and guide interactions among individuals (North, 1990; Young, 2002; Vatn, 2005) by stipulating what actions are required, permitted, or forbidden in particular situations (Poteete and Ostrom, 2002). Institutions can be formal or informal. Formal institutions include written or codified rules, constitutions, contracts, decision making procedures and processes that are enforced by formal legal structures (e.g. government). Informal institutions on the other hand include socially shared rules, usually unwritten (e.g. norms, customs and ethics) that are “created, communicated and enforced outside of formal or official structures” (Helmke and Levitsky, 2003). In this study, institutions are defined in the context of urban forestry as the rules, decision making processes, procedures and programmes that influence the management and use of trees and green spaces in urban and peri-urban areas.

Dietz *et al.* (2003 p. 1907) state that “in the absence of effective governance institutions at an appropriate scale, natural resources and the environment are in peril from an increasing human population”. Governance institutions are important because they mediate the allocation, access and use of ecosystems and services by people (Ostrom, 1990; Adger, 1999; Young 2003). Specifically, formal and informal institutions determine the ways in which the external context and trends influence local livelihoods and therefore patterns of resource use (Leach *et al.*, 1997; Dietz *et al.*, 2003; Pacheco *et al.*, 2008).

According to Akerlund *et al.* (2006), a lack of awareness combined with inadequate legislative and institutional frameworks has inhibited development of the full potential of urban forestry, especially in developing countries. Institutional aspects of urban forestry, including policy and legal conditions promoting urban tree cover, and the constraints on the use of and access to these resources, are not commonly (or widely) discussed in existing literature about urban forestry in developing countries (FAO, 1995; Kuchelmeister, 1997; Knuth, 2005; Lawrence *et al.*, 2011). This deficiency called for research on the governance institutions influencing urban forestry in South Africa. Knuth (2005) conducted a study of the legal and institutional aspects of urban and peri-urban forestry and greening in six countries, one of which was South Africa. However, the study did not give details on the governance institutions that influence urban forestry at national and provincial levels of government in South Africa, and whether these are active or are being implemented to promote urban forestry in the country.

Although local municipalities are responsible for the overall governance and management of urban trees and green spaces (UTGS) in the country (DWAF, 2005), a review of national and provincial level programmes, policies and laws influencing urban forestry was considered central to this study. According to the Constitution of South Africa (1996), municipalities are only obliged to manage local affairs subject to national and provincial legislation without impeding the performance of their own functions. Therefore, the government at the national and provincial levels indirectly impacts on local governments through decisions made by the legislator or the courts. For example, local governments must pursue air quality and safe drinking water standards established by the national government. National and provincial level policy and legislation are also important because they can have an impact on the conceptualization and formulation of urban forestry strategies and programmes at the local level of government. Thus, this chapter addressed the key question, “Are there any governance institutions influencing urban forestry at national and provincial level of government, and are these being implemented to promote urban forestry in the country?” This was addressed through the following specific questions:

1. Are there any tree planting or greening programmes or initiatives existing at national level and at provincial level in the Limpopo and Eastern Cape Provinces of South Africa?
2. Are there any policies or legislations with provisions for urban trees and green spaces (UTGS) at national and provincial level of government in the selected provinces? Are these being implemented to achieve urban forestry?
3. Are UTGS or is urban forestry in general recognized in national and provincial land use and development plans, policies and legislation?

4.2 Methods

The main method of data collection used was document search and review. Broad details on the method have been presented in Chapter three; section 3.1.3.2. The search was guided by Knuth's (2005) statement that “when looking at legislation that pertains to urban forests, it is necessary to examine forestry, environmental and planning legislation in addition to several other laws and regulations.” Some documents for review were provided by key actors involved in urban forestry activities identified through a snowball approach (Chapter three; section 3.1.3.2). Other documents were obtained from the internet and in particular from national and provincial government department websites, using the Google search engine. After logging onto Google, key words such as urban trees, urban greening, urban forestry, environment, planning and development policies, laws, and programmes in South Africa were used to guide the search for relevant documents. Once found, the documents relating to UTGS, urban forestry or environment in general were reviewed. The review was complemented by 28 interviews conducted with municipal officials, 79 key informant interviews with key actors involved in UTGS activities and 540 random household surveys.

4.3 Document analysis

Interview responses obtained from municipal officials, other key actors, including urban residents were used to critique implementation of the reviewed national and provincial level policies, laws, plans and programmes at ground (local) level. For example, through household surveys, local people's knowledge of the reviewed governance institutions (e.g. laws regulating use of urban trees and green spaces) was used to examine how effective these institutions were at ground level (Table 4.1). Through interviews with municipal officials and other key actors involved in urban forestry activities, information on tree inventories and tree monitoring was also used to critique the effectiveness of national and provincial tree planting and greening programmes. Interesting and relevant comments made by the aforementioned respondents were also captured and used in the analysis of documents.

Table 4.1: Analysis of institutions influencing urban forestry

Institutions	Analysis questions
Tree planting and greening programmes	- How many local people (urban residents) know and are involved in these programmes in the selected study sites? - Is monitoring of the trees that are planted done? Are the tree inventories kept to tell how many of the trees planted are actually surviving?
Policies and laws influencing use or removal of UTGS	- Are UTGS explicitly mentioned and regulated in these policies and laws? - Are the laws known by other key actors? - Have the policies and laws been adopted at municipal or local government level?
Land use and development plans policies and laws	- Do these plans have provisions for UTGS? - Is this being reflected on the ground?

4.4 Findings

4.4.1 Tree planting and greening

The study established that tree planting and urban greening initiatives do occur at national and provincial levels of government in the Limpopo and Eastern Cape Provinces.

Tree planting and greening programmes at national level

Three main tree planting and greening programmes and strategies led by national government were found. These included the National Greening Strategy, the Million Trees Programme, and the National Arbor Week campaigns. The other tree planting and greening initiatives were being coordinated by a national non-governmental organization (NGO) Food and Trees for Africa (FTFA), with support from national departments, civil society groups and private companies. These programmes included the Trees for All Programme, Trees for Homes Project, EduPlant Schools

Competition, and the Food Gardens for Africa Programme. A description of each of the tree planting and greening programmes I evaluated is given below.

a) The National Greening Strategy

This strategy was developed in 1998 by the then Department of Water Affairs and Forestry (DWAF), now called the Department of Agriculture, Forestry and Fisheries (DAFF). It was developed as an attempt to contribute to the improvement of the quality of life in urban communities with an emphasis and focus on the environment. The then DWAF recognized that trees could contribute positively to the environment by mitigating adverse effects like excess carbon, desertification, climate change and global warming. According to DWAF (2005), townships and informal settlements were to be included specifically because in the past these areas were disadvantaged in terms of planning for parks as well as tree planting in streets and open spaces. The Department of Water Affairs and Forestry was to spearhead the greening programme and provide support relating to the urban forestry and urban agroforestry components of urban greening. However, DWAF recognized the need to involve other partners and service providers with different roles to play in urban greening. These partners included local government (municipalities), national and provincial government departments, private companies, NGOs and community based organizations (CBOs). According to DWAF (2005), the core role player through which the urban greening programme was to be implemented, was local government (municipalities) because they are responsible for integrated development planning in both urban and rural areas. The process of preparing integrated development plans (IDPs) and land development objectives was thus identified as a means to include urban greening in local government plans (DWAF, 2005).

b) The Million Trees Programme

This programme was initiated in 2007 and was born out of a need to address poverty alleviation by directly tackling issues of food security and malnutrition. According to DAFF (2011a), the set target of the programme was to plant a million trees across the country annually into the future. The main focus of the programme was said to be the neediest areas. Through the Million Trees Programme, low-income communities were to be provided with indigenous trees and fruit trees, which they would grow at their homes (DAFF, 2011a). The Million Trees Programme was going to contribute nationally towards the improvement of the quality of life and the development of sustainable human settlements. The programme was said to be implemented in line with Section two of the National Forest Act, 1998 (Act 84 of 1998) which provides for assistance for community forestry programmes. The Department of Agriculture, Forestry and Fisheries indicated that the Million Trees Programme had succeeded in planting over four million trees since its inception, with 40% of these being fruit trees. The planting campaigns were facilitated by DAFF regional offices and were carried out in partnership with other

actors, including private companies, municipalities and civil organizations. According to DAFF (2011a), trees planted in peoples homesteads received more care than trees that were planted in public places and on the streets.

c) National Arbor Week Programme

Arbor Day was first celebrated in South Africa in 1975. The one day celebration was extended to one week in 1996 when the Minister of the then Department of Water Affairs and Forestry emphasized its importance in South Africa. DAFF is the official custodian of the National Arbor Week Programme (DAFF, 2011a). Arbor Week concentrates on heralding the general value of trees in the country, whereas Arbor City Award is used as an incentive to encourage municipalities to keep their landscapes tidy and green. Facilitated by DAFF, the Arbor Week Programme is conducted in September every year. Other stakeholders, including public institutions, government, private sector and civil society also hold their own events. The Minister and other political office bearers are invited to such events. This, according to DAFF (2011a) gives recognition to the greening programme and serves as a good awareness raising platform to encourage communities to green their areas. DAFF provides promotional material and themes for annual celebrations, and also provides information on the selected trees of the year. Through the supply of trees for greening and other tree planting events associated with Arbor Week, commercial and community based nurseries have economically benefited from the Arbor Week programme (DAFF, 2011a).

d) Trees for All Programme

The Trees for All Programme formerly called the National Tree Distribution Programme, was initiated by Food and Trees for Africa (FTFA) in 1990. According to FTFA (2011), thousands of applications for trees are sent to the organization from poor communities living in barren, dusty townships across South Africa. Indigenous trees or fruit trees are provided to these communities with assistance from sponsors (FTFA, 2011). Trees are ordered from the nearest tree grower (emerging nurseries where possible) and are delivered with instructions on how they should be planted and maintained. Tree planting events are held with the communities in order to highlight the benefits of trees and greening, and spread awareness and education. According to FTFA (2011), almost four million trees have been distributed through this programme nationwide.

e) Trees for Homes Project

The Trees for Homes Project is run by FTFA with support from the national departments of Housing, Agriculture and Forestry and Environment (FTFA, 2011). The programme started in 2000 to address climate change, improve quality of life and create sustainable settlements by giving low-income communities fruit trees or indigenous trees to plant in their homes, as well as provide training, short

term paid employment and environmental awareness. FTFA (2011) indicated that about 705 000 trees for homes had been planted since 2000, sequestering about 264 045 tons of CO₂ over 15 years. In addition, FTFA (2011) reported that these trees had created 17 625 hectares of urban forest in poor areas. The programme had, as of 2011 trained and given stipends to 7 820 unemployed community educators, nationwide.

f) EduPlant Schools Competition

EduPlant is a schools competition that was developed and coordinated by FTFA, with support from national departments and private companies. According to FTFA (2011), the competition is an opportunity to reward schools that promote food security and improve nutrition and self-reliance in communities. Schools across the country that raise their own permaculture gardens can enter their food gardens into the EduPlant Schools Competition and stand a chance of winning the competition. FTFA (2011) reported that permaculture encourages the incorporation of trees into food gardens. By teaching learners, educators and the surrounding communities to sustainably grow their own produce, the EduPlant programme contributes towards the alleviation of food shortages in indigent communities (FTFA, 2011). About 500 schools take part in the competition each year, with 60 schools representing all nine provinces chosen to participate in the finals. Finalists and winning schools receive cash prizes which could be used towards the procurement of additional educational and gardening resources. Schools also stand a chance to win a two week permaculture design course for their project leaders. According to FTFA (2011), the benefits of participating in the annual EduPlant programme are significant in that schools become hubs of environmental awareness, sustainable learning and nutritional knowledge. Some schools gain income from the production and sale of fruit and vegetables and involve unemployed parents and neighbours in the gardening effort (FTFA, 2011).

g) Food Gardens for Africa

The Food Gardens for Africa Programme, formerly called the Urban Greening and Community Food Gardening Programme, is another FTFA coordinated programme that was established to promote and facilitate food security, food sovereignty and food safety (FTFA, 2011). FTFA receives requests from communities and schools across South Africa for assistance in developing food gardens and small scale farming projects. According to FTFA (2011), there is widespread growing interest in the programme from various government departments, aid agencies, private companies, HIV/AIDS organizations and others in the development sector in the programme. FTFA (2011) reports that there is increased recognition of permaculture as a remarkable tool to achieve food security, better natural resource use and management, wealth creation and improved health and nutrition by many organizations. The Food Gardens for Africa programme recognizes that through natural processes,

green spaces remove carbon dioxide from the atmosphere and replenish the air with life-sustaining oxygen, thus mitigating global warming (FTFA, 2011).

Programmes promoting tree planting and greening at provincial level (Limpopo and Eastern Cape Provinces)

The study found four provincial government programmes promoting tree planting and greening in the Limpopo and Eastern Cape Provinces (Table 4.2). Two of these programmes were specific to an individual province, i.e. Greening Limpopo Programme specific to the Limpopo Province, and Gardening and Greening Human Settlements specific to the Eastern Cape Province. The other two programmes (Greenest Municipality Competitions and the Schools State of the Environment Report Competition) were common in both provinces.

Table 4.2: Tree planting programmes in the Limpopo and Eastern Cape Provinces

LIMPOPO PROVINCE	EASTERN CAPE PROVINCE
<i>Greening Limpopo Programme</i> This programme was initiated by the then Premier of the Limpopo Provincial Administration in 2008. The primary objective of the programme was to reduce the province's carbon footprint and at the same time mitigate the effects of land degradation. The main objective of the greening Limpopo programme was to assist and encourage Limpopo Province residents to improve their environment and contribute to the reduction of global warming by growing suitable trees in and around their places of residence, and through this process also create necessary employment which would contribute to the Expanded Public Works Programme. The Member of the Executive Council (MEC) of the Limpopo Department of Public Works was mandated to lead this initiative as its Chief Ambassador. The programme had intrinsic synergies with the Expanded Public Works Programme (EPWP), and was to contribute to creating jobs and alleviating poverty. The MEC took the initiative to expand the programme by mobilizing the private sector to fund the programme and thus complement governments' efforts in poverty alleviation. Civil society and other organs of state were co-opted into the programme so as to ensure that a holistic and integrated approach was taken to mitigate the effects of environmental degradation, deforestation, desertification and global warming. The target beneficiaries of the project were said to include all households living in degraded areas. These were to be paid a stipulated daily wage based on prevailing wage rates in each region of the province. Priority was to be given to households headed by single mothers, orphans, poor households, and those with terminally ill members. Informal settlements were not covered by the programme, but eligible people residing in informal areas were to be employed by the programme. Through this programme, established business organizations in the province were to be mobilized and persuaded to include the greening project into their Corporate Responsibility Programmes.	<i>Gardening and greening Human Settlements Project</i> The Eastern Cape Department of Housing (ECDH) – Directorate Stakeholder Engagement initiated, and launched a Gardening and Greening Human Settlement Project on the 3rd of November, 2011. The project was launched in conjunction with the Department of International Relations and Cooperation, DAFF, NGOs, and private sector companies. The purpose of the programme is to green human settlements in the Eastern Cape Province, thereby complying with the principles of sustainable development which are directed towards poverty eradication and the improved quality of household life for the communities. The greening initiative is to be conducted through planting vegetable gardens, indigenous trees and fruit trees, landscaping and flower gardens. According to ECDH (2011), each recipient of a housing unit in the province is supposed to receive a tree as well as vegetable seeds as a starter pack. The project is in its development phase, and is to be piloted in Zanemvula (Nelson Mandela Bay Metropolitan Municipality), Ngangelizwe at King Sabata Dalindyebo (OR Tambo District Municipality), and Reeston (Buffalo City Metropolitan Municipality), before being implemented in other areas receiving housing units in the province.

Limpopo Province and Eastern Cape Greenest Municipality Competitions

According to LEDET (2011), the Greenest Municipality Competition (GMC) is an environmental programme with a broad focus on sustainable development. In the Limpopo Province the programme is run by the provincial department of the Limpopo Economic Development, Environment and Tourism (LEDET), whereas in the Eastern Cape Province, the programme is run by the provincial department of Economic Development and Environmental Affairs (DEDEA). LEDET (2011) reported that the GMC is linked to international and national initiatives of greening South Africa, combating climate change, and promoting cleaner technologies amongst others. The GMC is designed for South African municipalities. The purpose of GMC is to promote environmental sustainability, to sustain economic growth (through job creation, sustainable service delivery, local economic development and waste management), and to increase public participation in environmental planning and management. The GMC has six core elements, one of which includes landscaping, tree planting and beautification. This core element requires municipalities to give details of how they manage parks and open spaces, and also the tree planting and maintenance activities that they are involved in. The other five core elements include waste management, energy efficiency, water management and conservation, public participation and community empowerment, and leadership and institutional arrangements. The latter looks at the formation of municipal policies, visions and missions which translate into strategies and plans to achieve green objectives. It also looks at the appointment of relevant greening experts, budget allocation for GMC activities and overall education and awareness campaigns relating to green activities. The municipalities that enter in the competition are assessed based on the above mentioned core elements. Municipalities that meet competition requirements receive cash prizes.

Limpopo Province and Eastern Cape Schools State of the Environment Report Competition

This is a provincial environmental education programme and competition that was established in 2003 (LEDET, 2011). The programme was established as a response to the Constitution of South Africa Chapter two, section 24, which provides for the right to a healthy environment, and the National Education Policy Act 18 of 1996, which acknowledges the environment as an integral part of the curriculum. It is an annual competition with schools competing under a theme guided by the United Nations Environment Programme's (UNEP) international declaration (LEDET, 2011). According to LEDET (2011), there are different environmental themes every year, and the schools that enter the competition are required to do poster drawings at grade three level and verbal presentations at grade six and nine. The theme for the year 2011 was "Indigenous Trees and the Environment". The objectives of this school competition programme are to;

- describe the environmental status quo, challenges and solutions of the school and surrounding communities
- strengthen the school curriculum through environmental projects and activities
- raise environmental awareness (importance and conservation of natural resources)
- develop research and life skills (learner's ability to identify, interpret, recognize and find possible solutions to issues and risks in their immediate environment)
- promote self-reliance, networking and social awareness (learners, school governing structures and community engagement in actions that contribute to a better state of the environment).

According to LEDET and DEDEA officials, the schools competition programme encourages tree planting and greening in both primary and secondary schools.

4.4.2 Policies and legislation with provisions for UTGS

Policies and legislation with explicit provisions for UTGS

This study established that urban forestry was only explicitly mentioned in three national policies and legislation. These included the White Paper on Sustainable Forestry (1996), the National Forest Action Programme (1997), and the National Forest Act (1998).

a) The White Paper on Sustainable Forestry, 1996

In the White Paper of 1996, urban forestry is mentioned as a small component of community forestry. According to the White Paper, community forestry includes farm forestry, agroforestry, community or village woodlots and woodland management by rural people, as well as tree planting in urban and peri-urban areas. The aim of community forestry is to improve the living conditions of all South African people through projects such as school nurseries, urban and peri-urban tree plantings, individual fruit and shade tree plantings and transporting surplus wood to needy areas. The White Paper recognizes that community forestry can contribute to improving the environment, enriching resources, and creating income opportunities in previously disadvantaged communities in rural, peri-urban and urban environments. Under the community forestry policy, the White Paper indicates that people would be encouraged to plant trees, particularly indigenous trees in gardens and fields, on streets and in parks, and in managed plantations, to build the local resource base and improve the living environment.

b) The National Forest Action Programme (NFAP), 1997

The NFAP (1997) identifies urban forestry as a key element that could significantly contribute to enhancing the quality of life for urban residents. Urban forestry is recognized as a tool that could help enhance degraded urban environments, assist in social upliftment and contribute to urban communities' material needs. The NFAP (1997) presents the strategic actions and indicators of achievement towards promoting self-sustaining urban forestry initiatives that secure economic, environmental and social benefits for urban dwellers. The indicators of achievement include: understanding the benefits of urban forestry, understanding the factors that hamper or promote urban forestry, an effective agreed strategy for urban forestry development, and inclusion of urban forestry into urban planning. The NFAP (1997) also outlines the responsibilities of different key actors, including DWAF (currently called DAFF), local government, NGOs and Community Based Organizations (COBs) in achieving urban forestry strategic actions.

c) The National Forest Act (NFA), 1998

Chapter four, section three of the NFA (1998) allows communities that wish to engage in community forestry (either rural or urban and peri-urban), to enter into agreements with the Minister. The Act mentions that the Minister may make financial or other assistance available for community and other forms of forestry. This may include small scale plantation forestry by persons disadvantaged by discrimination, planting of trees by any person or organ of State for aesthetic reasons or to improve the quality of life, and sustainable use of a natural forest or woodland by a community in a rural or urban area, whether in or outside a state forest. According to the Act, the Minister may provide information, training, advice, management, and extension services for community forestry. The Minister may also establish and maintain nurseries and other facilities to provide seed and plants for community forestry, and provide material or financial assistance for this, including recovery from disaster, if no such grants are available from any other source.

Legislation indirectly regulating the use and removal of UTGS

I found no specific national or provincial legislation regulating the use or removal of UTGS. The following national legislation however, had some indirect regulating provisions for UTGS. Table 4.3 summarises the legislation that influences removal and use of UTGS at provincial level in the Limpopo and Eastern Cape Provinces.

a) National Forest Act (NFA), 1998

Chapter three, part three of the National Forest Act states that the Minister may declare a tree, a group of trees, woodland or species of trees as protected. The Minister may also declare to be a natural forest a group of indigenous trees, whose crowns are not largely contiguous, or where there is doubt as to whether or not their crowns are largely contiguous. According to the Act, forest trees or protected trees may not be cut, disturbed or destroyed, and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold except under license granted by the DAFF (NFA, 1998). Trees in urban and peri-urban areas are therefore partly provided for by the NFA (1998), when the Minister declares them protected or when a group of trees existing in an urban or peri-urban area is declared as a natural forest by the minister (NFA, Chapter three, 1998).

b) National Environmental Management Act (NEMA), 1998

According to NEMA (1998) everyone has the right to an environment that is not harmful to his or her health or wellbeing, and the state must, among other things protect the environment for the benefit of present and future generations. By definition in the Act, the environment includes land, plants and any part or combination thereof, as well as interrelations among and between them. Thus, trees and green spaces in urban and peri-urban areas may also be considered to be protected under this Act. The Act

sets out principles that apply throughout the Republic to the actions of all organs of state that may significantly affect the environment. It also spells out the need for environmental authorisations for certain activities with potential impact on the environment. In its preamble, NEMA provides a framework for integrating good environmental management into all development activities and that the law should establish procedures and institutions to facilitate and promote cooperative government and intergovernmental relations. Chapter five of the Act sets out environmental impact assessment regulations, which require that the potential impact on the environment of listed activities by any organ of State be considered, investigated, assessed, and reported on to the competent authority charged by the Act with granting relevant environmental authorisation.

c) National Environmental Biodiversity Act (NEMBA), 2004

The objective of the Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act of 1998. The Act provides for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. According to the Act, a person may not carry out a restricted activity or any activity that may negatively impact on the survival of a threatened or protected species, without a permit issued in terms of Chapter seven of the Act. Restricted activity may, among other things mean gathering, collecting, or plucking any specimen of a listed threatened or protected species, picking parts, cutting, chopping off, uprooting, damaging or destroying any specimen of a listed, threatened or protected species. Though it does not explicitly mention urban areas, the Act may be regarded as providing for the protection of threatened and protected tree species in urban and peri-urban areas.

d) National Environmental Management Protected Areas Act (NEMPA), 2004

The Act provides for the protection and conservation of ecologically viable areas that are representative of South Africa's biological diversity and its natural landscapes and seascape. According to the Act, areas with highly sensitive, outstanding ecosystems, species, geological or physical features with high significant natural features or biodiversity, and significant cultural, historic or archaeological interest can be declared as protected areas by the Minister. Protected areas may include special nature reserves, world heritage sites and mountain catchment areas. Under this Act, such areas existing in urban and peri-areas may be protected together with their biological resources. According to the Act, a biological resource may refer to any resource consisting of a living or dead animal, plant or other organisms of an indigenous species. The Act may therefore be regarded as providing for the protection of indigenous urban trees existing in the above stated protected areas. Part three of the Act states that no person may enter a special nature reserve, reside in or perform any

activity in the nature reserve except for the official responsible for maintaining the area and scientist or person recording news. In addition Chapter seven, No 87 of the Act states that the Minister may regulate, prohibit or restrict use of biological resources in protected areas. In respect of the provincial and local protected areas, the MEC may regulate use after publishing the draft regulations in the Gazette for public comment.

e) National Heritage Resources Act (NHRA), 1999

The National Heritage Resources Act provides for the protection of heritage sites and resources of national significance. A heritage resource, according to the Act, means any place or object of cultural significance. A place includes an open space, including a public square, street or park, whereas an object means any movable property of cultural significance which may be protected in terms of any provisions of the Act. For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate. The national estate may include landscapes and natural features of cultural significance. According to the Act, no person may destroy, damage, deface, excavate, alter, and remove from its original position, any heritage site or object, without a permit issued by the heritage resources authority responsible for protection of such a site. The Act also states that no person may destroy or damage, disfigure or alter any heritage object, or disperse any collection without a permit by the South African Heritage Resources Authority (SAHRA). Urban landscapes and natural features of cultural significance (for example big historic trees) can be considered to be protected under this Act.

f) Champion Trees Project

The then Department of Water Affairs and Forestry (DWAF) initiated a project to identify and protect trees worthy of special protection throughout South Africa. According to the DAFF (2011b), champion trees are trees of exceptional importance that deserve national protection because of their remarkable size, age, aesthetic, cultural, historic or tourism value. Any person or organization can nominate trees for Champion status (DAFF, 2011b). Nominated trees may be indigenous or non-indigenous. At the end of each nomination cycle, an expert panel evaluates all nominations and compiles a shortlist of proposed Champion Trees. The list is then published for comment, and after consideration of public comments, a final list is published by notice in the Government Gazette and newspapers (DAFF, 2011b). Once listed as protected by notice, Champion Trees have special protected status in terms of the NFA (1998). DAFF (2011b) reports that no such trees may be cut, disturbed or damaged without a license.

Table 4.3: Legislation regulating use and removal of UTGS at provincial level

LIMPOPO PROVINCE	EASTERN CAPE PROVINCE
<i>Limpopo Environmental Management Act (LEMA), 2004</i> The Limpopo Environmental Management Act (LEMA) prohibits any person without a permit to pick, sell, purchase, donate, receive as a gift, be in possession of, import into, export or remove protected plants, specifically protected or indigenous trees in the province (LEMA, 2004). The Act provides for the protection and conservation of protected areas including provincial parks, sites of ecological importance, protected natural environments, and resource areas. It provides for the protection of indigenous plants and endangered species of flora and fauna.	<i>Eastern Cape Environmental Conservation Act (ECECA), 2004</i> The Act provides for the protection of components of nature reserves, protected natural environments and sites of ecological importance. According to the Act, no person may, in the above mentioned areas, cut, damage, remove, chop off, uproot or destroy any plant, animal, or other organism. Chapter twelve of the Act also prohibits any person without a permit to be in possession of, sell, buy, donate or receive, pick, uproot, damage or destroy, import into, export from, or transport into or through the province any endangered species.
<i>Transvaal Nature Conservation Ordinance, 1983</i> The Ordinance provides for the protection of protected, specially protected, and indigenous trees. According to the Ordinance, no person shall pick a protected or indigenous plant from a nature reserve or public road without a permit to do so. The act also states that no person may donate, sell, purchase, receive, export or import protected, specially protected, or endangered plant species.	<i>Eastern Cape Heritage Resources Act, 2003</i> The Act provides for the protection of heritage resources in the province. According to the Act no person may destroy, damage, alter, restore, or remove an object of heritage importance from its place of storage except under the authority of a permit issued by Amafa Ethu. According to Chapter four, No 38 of the Act, any person wishing to undertake a development project that may affect heritage resources must at her or his own initiative and at the very earliest stages of initiating such a development, notify the Council and furnish it with details regarding the location, nature and extent of the proposed development.
	<i>Eastern Cape Provincial Parks Act, 2003</i> The Act only provides for protection of biodiversity in the provincial parks. According to Chapter five, Section 4 of the Act, no person may within a provincial park area cut, damage, remove, chop off, uproot or destroy any plant, including any marine plant; remove a flower, seed or any other part from any plant; be in possession of or exercise physical control over any animal, plant or other organism and biological resource.

4.4.3 Recognition of UTGS in planning and development policies and legislation

This study found no national land use or development plan with specific provisions for urban trees or green space planning in the country. However, the planning and development laws, policy and strategy documents presented below were reviewed because they had some provisions for the environment and natural resources in general, which in the context of urban and peri-urban areas, could include UTGS. Planning and development policy documents and plans with provisions for UTGS at provincial level in the Limpopo and Eastern Cape Provinces have been summarised in Table 4.4.

a) White paper on Reconstruction and Development Programme, 1994

The Reconstruction and Development Programme (RDP) is a policy framework that was developed in 1994 for integrated and coherent socio-economic progress. The programme sought to mobilise all of South Africa's people and resources towards the eradication of the results of apartheid. Its goal was to build a democratic, non-racial and non-sexist society. The programme presented a vision for the fundamental transformation of South Africa by creating among other things, a sustainable and environmentally friendly growth and development path. In section 1.4.3 (meeting basic needs), the White Paper recognized the need to meet the environmental needs of people, and section 2.2.3 required that the Special Cabinet of the RDP ensures that RDP projects comply with accepted environmental norms. Section 2.4 of the White Paper presented the scope of urban renewal projects as "integrated provision of infrastructure, housing, community facilities, job creation, environmental, and recreational facilities in communities selected according to national criteria". In chapter nine, the RDP presented departmental programmes to advance the RDP, and one of the policy objectives for the Department of Environmental Affairs and Tourism was to integrate environmental objectives with reconstruction and development.

b) White Paper on Housing Policy and Strategy for South Africa, 1994

The White Paper was developed as the beginning of the process of addressing housing challenges in the country. The national goal of the White Paper was to increase housings share in the total State budget within a five year period. In Section 4.2 of the White Paper (national housing vision), it was recognized that the environment within which a house is situated is as important as the house itself in satisfying the needs and requirements of the occupants. In addition, it was also stated that to meet the housing challenge in the country, government was to establish a sustainable housing process which would enable all South African people to obtain housing with secure tenure, and within a safe and healthy environment. The White Paper, in Section 5.7.1.3 also recognizes the importance of effective and integrated development in the land use development process. It states that policies, administrative practice and legislation are needed to promote efficient integrated development which, among other

things, facilitates and encourages environmentally sustainable development. It also adds that policies, administrative practice and legislation are needed to promote sustainable land development by recognising the impact of land development on the environment.

c) Development Facilitation Act (DFA), 1995

The DFA of 1995 was the first policy document to explicitly address spatial restructuring of apartheid cities. The Act sought to place a set of principles, central to the planning system of the country. The principles set out in Chapter one of the DFA, apply to all land development and spatial planning in South Africa. Among other things, the principles require that there is a harmonious relationship between settlements and the natural environment, with an emphasis on the importance of environmental sustainability. One of the general principles for land development outlined in the Act is that policy, administrative practice and laws should promote efficient integrated land development by, among other things, promoting sustained protection of the environment. According to the DFA (1995), a local government body or the MEC may require the persons or bodies determined by him or her to carryout environmental evaluations to assess the likely impact of any land development objective upon the environment. The Act also mentions that, in approving a land development application, a tribunal may, either of its own accord or in response to an application, impose any condition of establishment relating to the environment and environmental evaluations.

d) Urban Development Strategy, 1996

The aim of the urban development strategy was to ensure effective urban reconstruction and development within a consistent framework. The government's vision presented in the strategy was that by 2020, the cities and towns of the country would be environmentally sustainable. The vision mandated seven main goals for this urban strategy. One of these was to improve the overall quality of the urban environment by better integrating environmental concerns within development planning and urban management practices and also urgently confronting environmental hazards facing poorer urban dwellers, and ensuring sustainable use of resources. The strategy identified five mutually-reinforcing priority action areas, one of which included integrating cities and managing urban growth. A number of goals were presented for this priority action area, with one being the management of development in an environmentally sensitive manner. The strategy recognizes that environmental management must be integrated into local authority functions, and that environmental considerations must feature prominently in the development of new approaches to land use planning.

e) Housing Act, 1997

The purpose of the Act was to provide for the facilitation of a sustainable housing development process. The Act presents general principles applicable to housing development in all spheres of

government and defines the functions of national, provincial and local governments in respect of housing development. In Section 2(1) of the Act, a requirement was given that all spheres of government must, among other things:

- Take due cognisance of the impact of housing developments on the environment,
- In the administration of any matter relating to housing and development, respect, protect, promote and fulfil the rights in the Bill of Rights in Chapter two of the Constitution,
- Strive to achieve consensus in regard to the policies of the respective spheres of government in respect of housing development, and
- Observe and adhere to the principles in Chapter one of the Development Facilitation Act (Act No. 67 of 1995), with regard to housing developments.

f) Urban Development Framework, 1997

The Urban Development Framework was one of the first policy statements concerned explicitly with urban issues (SACN, 2009). It was initiated by the RDP office as an urban strategy, but was taken over by the Department of Housing when the RDP office was closed. The framework outlined the advantages of cities for economic and social development and called for more compact and coherent spatial development, with efficient and sustainable urban form. Integrated spatial and economic planning targeted at disadvantaged urban communities was said to be a priority, along with a more deliberate, planned approach to major physical projects. The framework highlighted the importance of environmental management in two of its key programmes. For example, one of its key programmes was to integrate cities to negate apartheid induced segregation, fragmentation and inequality, with the focus on upgrading informal settlements, reforming planning systems and improving transportation and environmental management. Another highlighted key programme of the framework was to improve housing and infrastructure by encouraging investment, increasing access to finance, maintaining safety and security and alleviating environmental hazards.

g) Municipal Systems Act, 2000

At the local authority level, the Municipal Systems Act No 32 of 2000 requires municipalities to provide municipal services that are financially and environmentally sustainable. The Act defines environmentally sustainable services as those services that minimize the risk to the environment and human health. Chapter five of the MSA requires all municipalities to develop an Integrated Development Plan (IDP) which is the principle planning instrument that guides and informs all planning and development in a municipality. Integrated Development Planning (IDP) is a participatory planning process aimed at developing a strategic development plan to guide and inform all planning, budgeting, management and decision-making in a municipality. It views development problems and solutions in an integrated, multi-dimensional way. It also seeks to support the

appropriate integration of sectoral strategies to achieve the optimal allocation of scarce resources between sectors and geographic areas and across the population in a manner that promotes sustainable growth, equity and the empowerment of the poor and marginalized.

h) Municipal Demarcation Act, 1998

Section two of the Municipal Demarcation Act (Demarcation Criteria, Demarcation Objectives) requires that the municipal demarcation board establishes a municipal area that would, among other things, enable the respective municipality to fulfil constitutional obligations including the promotion of a safe and healthy environment. The Act stresses that the board must take into account the topography, environmental and physical characteristics of the area to meet this objective.

i) National Urban Renewal Programme, 2001

The National Urban Renewal Programme (URP) was launched together with the Integrated Sustainable Rural Development Programme (ISRDP) in 2001 (DPLG, 2006). The purpose of the URP was to conduct a ‘sustained campaign against urban poverty and under-development, bringing in resources of all three spheres of government in a co-ordinated manner’. In the context of integrated development programmes, the URP focused on eight urban townships (so-called “urban nodes”), but the learning from these nodes was intended to improve the manner in which the government would support townships renewal across the whole country. According to (DPLG, 2006), the basic vision and principles set out in the ISRDP also applied to the URP, namely: ‘*To attain socially cohesive and stable rural (urban) communities with viable institutions, sustainable economies and universal access to social amenities, able to attract and retain skilled and knowledgeable people who are equipped to contribute to growth and development*’ (DPLG, 2006). Three main categories for urban renewal were outlined in the strategy, which included urban centre upgrades, informal settlement upgrading, and exclusion areas, by design or by decline. According to DPLG (2006), the following were identified as substantive outcomes of the URP:

- Integration of the areas into the city – focusing on socio-political integration, economic integration and spatial integration,
- Enhancing the autonomy of the areas, by improving intra-area access to services, infrastructure and information, and
- Enhancing human and social capital, focusing on crime and violence, education and skills, local economies and capacity of local institutions.

j) White Paper on Spatial Planning and Land Use Management, 2001

The ultimate goal of the White Paper was to provide a legislative and policy framework that enables government, and especially local government, to formulate policies, plans and strategies for land use

and land developments that address, confront and resolve the spatial, economic, social and environmental problems of the country. The White Paper outlines the minimum elements that need to be included in a spatial development framework. It sets out procedures for land development approvals and proposes the alignment of the procedures for land development approval with those required in terms of the Environmental Conservation Act for environmental impact assessments. It also sets out principles and norms aimed at achieving sustainability, equality, efficiency, fairness and good governance in spatial planning and land use management. The principles and norms outlined in the White Paper are to promote normative based spatial planning and land use management, and development systems first introduced by the DFA. The overall aim of the principles and norms is to achieve planning outcomes that, among other things, promote the sustainable use of land resources in the country and that take into account the fiscal, institutional and administrative capacities of role players, the needs of communities and the environment. The first principle on sustainability requires the sustainable management and use of the resources making up the natural and built environment. The White Paper proposes that every municipality compiles a spatial development framework for the area of the municipality which should include an element of a strategic environmental assessment. According to the White Paper, each of the components of the spatial development framework must guide conservation of both the built and natural environment and must ensure social, economic and environmental sustainability of the area.

k) National Urban Development Framework, 2009

The purpose of the National Urban Development framework was to provide a common nation-wide view of how to strengthen the capacity of South Africa's towns, cities and city-regions, whilst realising their potential in supporting shared growth, social equity and progress, and environmental sustainability as key components of the national agenda. The critical national goal at the heart of the framework was to ensure the integrated and proactive management of South Africa's towns, cities and city-regions in a manner that, among other things, minimizes the negative social and environmental consequences often associated with the urbanization process. On one hand, the framework recognized that cities play a fundamental role in the global economy and are increasingly linked and interdependent through flows of global activity. On the other, it recognized that they also generate large 'ecological footprints' and are at the same time exposed to increasing environmental risk including pollution and the consequences of global warming. The framework acknowledges that urban areas are vulnerable to natural disasters and threats from food insecurity, power cuts, water scarcity, flooding, and sanitation and environmental health problems, often exacerbated by the lack of resources. It adds that efforts to curb the use of non-renewable resources, reduce pollution and other forms of environmental degradation, and promote climate mitigation and adaptation should be targeted at urban areas, because most of them were poorly designed from an ecological perspective

and have large environmental impacts. The framework stressed the need for concerted national action to manage environmental risks flowing from growing natural resource pressures experienced by major cities and high density settlement areas.

Table 4.4: Land use and development plans with indirect provisions for UTGS in the Limpopo and Eastern Cape Provinces

LIMPOPO PROVINCE	EASTERN CAPE
<i>1. Limpopo Employment Growth and Development Plan (LEGDP), 2009-2014</i> The LEGDP provides a framework for provincial municipalities, private sectors and all organs of civil society to make rational choices in pursuit of strategic priorities as encapsulated in the Medium Term Strategic Framework (MTSF). The main objective of the LEGDP is to contribute to the economic debate in the province and nationally, by highlighting policy imperatives that should be addressed to promote growth and employment in an international and domestic economic environment (LEDET, 2009). In section 1.4 (key mandate), the LEGDP highlighted 10 priority areas to guide service delivery in the province in five years from 2009 to 2014. Among these priority areas was sustainable resource management and use. The plan recognized that, like the rest of the world, the Limpopo Province provincial economy was vulnerable to the impacts of climate change, biodiversity loss and diminishing water resources. As one of the interventions to mitigate these challenges, there is a commitment to enforce a zero tolerance approach to illegal and unsustainable exploitation of resources in the province. The LEGDP also contextualized and placed emphasis on 14 Key Action Programmes as the focus areas that should guide development path in the province. It highlighted the key challenges to each action programme, and identified the key strategic interventions that should be undertaken to mitigate these challenges. The relevant key action programmes identified in the LEGDP, with an influence on trees include the Agriculture and Rural Development Programme (section 2.2.7), the Environmental and Natural Resources Development Programme (section 2.2.10), and the Green Economy and Creation of green jobs programme (section 2.2.12). With regard to the Agriculture and Rural Development Programme, the LEGDP highlighted the use of limited resources as a key challenge. It recognized that most of the natural resources in the province are in a state of deterioration, as a result of over-cultivation, use of dangerous agricultural chemicals, soil erosion, overgrazing and over-harvesting of medicinal plants and firewood. The LEGDP pointed out the need for the province to respect the Land Use Planning and Zoning, Natural Resource Conservation, and National Environmental Act, such that land zoned for various uses should stay as such until there is Resolution/Record of Decision to change land use.	<i>Eastern Cape Provincial Growth and development Programme (ECPGDP), 2009-2014</i> In section 3.2, the ECPGDP recognized the province's natural resource base as a significant opportunity for social and economic development. In terms of principles underlying the ECPGDP (section five), the second last principle indicated that, "the needs and opportunities associated with the natural environment would be considered at all stages of planning, design, implementation, monitoring and evaluation of the ECPGDP." There is some recognition of forestry, in terms of Objective two on agrarian transformation and strengthening household food security. The section on programmatic implications (section 7.2.3) lists forestry as a commercial option. It also states that forestry in catchment areas can have significant impacts on biodiversity, water quantity and quality. The same section also notes that agricultural support programmes, land reform and the development of commercial enterprises must include assessments of the environmental impacts and recommend sustainable options for agricultural production. With regard to the third objective/strategy on consolidation, development and diversification of the manufacturing base and tourism potential, the section notes the importance of protecting new and existing conservation areas. <i>2. Eastern Cape Provincial Spatial Development Plan (ECPSDP), 2010</i> In section 1.3, the purpose of the ECPSDP is outlined, which includes protection of the natural environmental systems and efficient use of resources at provincial level. In Chapter two, the ECPSDP highlighted the environmental challenges that the province is facing. As one of its key spatial issues relating to the environment, the plan points out the need for the ECPSDP to reflect all other environmental policy frameworks in such a manner that alignment is achieved between environmental management, spatial planning and management of land use change. It recognizes that critical characteristics and implications of climate change and limited water resources across the province have a direct bearing on sustainable development potential. More importantly, the plan recognizes that urban and rural settlement sprawl is threatening sensitive ecosystems, biodiversity corridors, agricultural land and coastal areas.

<i>Limpopo Employment Growth and Development Plan (LEGDP), 2009-2014 'Cont...'</i>	<i>Eastern Cape Provincial Spatial Development Plan (ECPSDP), 2010 'Cont...'</i>
In terms of the Environmental and Natural Resources Development Programme, the LEGDP outlines the following as key strategic challenges of the programme; - Lack of instruments such as the conservation plan, environmental management frameworks and geographical information systems and geological surveys to map the Limpopo Province natural resources endowment which should inform spatial development planning in municipalities. - Lack of integration between land reform and infrastructural development activities to ensure sustainable land uses. - Lack of integrated planning between municipalities and provincial government. - Lack of resources in municipalities to effectively perform legislative mandates regarding waste and air quality management, and - Lack of resources in the department to monitor the degradation/rehabilitation caused by natural and anthropological activities. With regard to the Green Economy Key Action Programme, the LEGDP, clearly points out that the green economy includes service-related activities that contribute substantially to preserving or restoring environmental quality. It adds that, though not exclusively, this includes activities that that help to protect and restore ecosystems and biodiversity, reduce energy and water consumption, decarbonize the economy, and minimize or avoid altogether the generation of all forms of waste and pollution	In Chapter five, an environmental spatial framework has been presented whose objective is Protection of the core biodiversity areas, natural resources and the ecological system through integration and alignment of Spatial Development Frameworks (SDFs) with the environmental policy. The spatial distribution of environmental biodiversity areas of significance are considered to be critical to provide the spatial framework for future development planning, particularly indicating those areas where development needs to be avoided or at best, carefully managed. This was seen to focus on protecting the core biodiversity areas (reserves, wetlands, parks, steep slopes and special sensitive biodiversity areas) and conserving and managing the biodiversity corridors (buffer areas) which should link those core areas together. In addition, the framework emphasises the need to safeguard natural resources, achieve food security by preventing loss of valuable high potential agricultural land and connecting development to the availability of sustainable water resources. One of the major threats to the Eastern Cape biodiversity, particularly on the coastline, as indicated in Chapter three of the plan, is physical development pressure, focused especially on estuaries, particularly those within or close to urban centres. The plan points out that those natural resource areas of the province that need to be conserved and managed, and where no development at all is desired, be identified and preserved with appropriate demarcation in all SDFs and appropriate environmental guidelines. It also points out the need for detailed land use planning for the development nodes identified through the SDFs and clear procedures (and the associated legal framework) to evaluate development applications and proposals. The ECPSDP adds that planning measures and tools are needed to protect critical biodiversity hotspots, sensitive wetlands and coastal areas, such as indigenous forest and coastal dunes, from the impacts of development. The plan identifies urban edges and building regulations using the built edge as boundaries to development, as certain types of management tools that can be used to shape biodiversity corridors in the province.

4.5 Analysis of institutions influencing urban forestry

The implementation of the reviewed documents was analysed based on information from interviews with key actors involved in urban forestry, household surveys in the Limpopo and Eastern Cape Provinces, direct observations, and published literature (Table 4.5).

Table 4.5: Analysis of the institutions influencing urban forestry

INSTITUTIONS	IMPLEMENTATION ANALYSIS
Tree planting and greening programmes	-Due to insufficient human and financial resources, trees that are planted are not monitored and adequately maintained. This leads to reduced tree survival rates. -Key actors in urban forestry do not undertake their urban greening mandates presented in the national greening strategy. For example, most local municipalities do not integrate tree planting and greening programmes in municipal development plans. -Municipal participation in Arbor Week is limited by insufficient funds. -There is little knowledge of Arbor Week and limited participation in Arbor Week Campaigns by Urban Residents. Only 33.1 % of urban residents in the Limpopo and Eastern Cape Provinces were aware of Arbor Week, and only 19.4 % of these had ever participated in Arbor Week campaigns. -Unequal distribution of trees in the urban communities. Most (72.4 %) of the surveyed urban residents in three previously disadvantaged settlement areas of the Limpopo and Eastern Cape Provinces (i.e., informal, RDP, and old townships) were not aware of any tree related activities.
Policies and legislation influencing use and removal of UTGS	-Key actors responsible for implementing policies and laws influencing urban forestry are not clear about what their respective responsibilities are in urban forestry deliverance. -Key actors in urban forestry have limited knowledge of the benefits of UTGS. Only 8.9 % were very knowledgeable of UTGS benefits. -Key actors responsible for implementing the laws have limited human resources to monitor compliance to the laws. -Key actors in urban forestry have no record of threatened or endangered trees in urban areas or trees of cultural or historic value. -The laws that have an influence on urban forestry are lenient to violators. -Most of the surveyed urban residents (77.6 %) in Limpopo and Eastern Cape as well municipal officials are not aware of the laws that regulate use of UTGS.
Land use and development plans, policies and laws	-Only the environment in general is considered in land use and development plans, policies and laws. -However, the environment is considered as a low priority area in relation to new developments. -Some key actors in urban forestry declared that the EIA process takes too long and is difficult to comply with. -Other key actors indicated that monitoring of EIA proceedings was limited due to insufficient funds and human resources within responsible departments.

4.6 Discussion

4.6.1 Tree planting and greening programmes at national and provincial level

The study established that tree planting and greening initiatives occur at both national and provincial levels of government. This finding concurs with Shackleton (2006) who indicated that tree planting programmes occur in urban areas of South Africa although they remain fragmented and uninformed by a conceptual framework of urban forestry. The concern for this study however, is on the success of these tree planting and greening programmes and initiatives on the ground. The National Greening Strategy presented above indicated that urban greening programmes were to be planned and implemented through the local government process of preparing integrated development plans (IDPs) and land development objectives. However, interview responses obtained from key actors (Table 4.5) suggested that most local government municipalities had not integrated tree planting and greening in their municipal IDPs. Key actors from DAFF, Department of Environmental Affairs and Tourism (DEAT), and provincial environmental departments in the Limpopo and Eastern Cape Provinces indicated that tree planting and greening was generally considered as low priority in most municipalities hence, received limited support from municipal leaders. Consequently, this leads to the non-inclusion of tree planting and greening in municipal IDPs.

Furthermore, the interviews with key actors identified in this study also revealed that most of them were not meeting their urban greening mandates as required by the National Urban Greening Strategy presented herein (Table 4.5). These findings show that the strategy is not being adequately implemented at local level.

With regard to the Million Trees Programme, DAFF (2011a) indicated that the programme had resulted in the planting of over four million trees. However, the question remains as to what the survival rates of these trees are. None of the respondents from DAFF interviewed in this study could give details or any record on how many of the four million trees were actually surviving on the ground. Researchers stress that newly planted trees need regular monitoring and post-planting maintenance (FAO, 1995; Saretok, 2006). However, interviews with DAFF officials revealed that monitoring of trees that were planted and distributed by DAFF was limited by the department's under-staffing levels and insufficient funds. The DAFF officials indicated that there was normally one forest officer responsible for an entire district (with five or more municipalities), and in some cases one officer responsible for a district and metropolitan municipal area. However, these forest officers do not solely work on urban forestry activities on a full time basis (Shackleton, 2006); thus, DAFF's execution of duties in terms of monitoring tree performance, and regulating use of trees is limited. This finding suggests that even though four million trees may have

been planted under the Million Trees Programme as indicated by DAFF (2011a), it is likely that not all of these trees are actually surviving.

According to DAFF (2011a), trees that were planted in peoples homesteads under the Million Trees Programme, received more care than trees that were planted in public places and on the streets. The latter could be because authorities responsible for maintenance of trees in public places and streets (municipalities) are largely incapacitated both in terms of human and financial resources (Shackleton, 2006). Thus, they are unable to monitor performance of the trees that are planted in these areas. DAFF (2011a) however, indicated that in cases where the municipalities had fully fledged and competent units dealing with parks and recreational sections, the trees received maintenance and care and sometimes survived. This finding further raises questions about the survival rates of trees that are planted and distributed by DAFF and other key actors. The finding shows that tree survival is mainly dependant on the availability of resources, i.e. equipment, financial and human capital. Similar findings were reported by Profous (1992) in Beijing, China. Despite vast tree plantings in the Beijing Metropolitan Area, survival rates of the trees were often low due to management problems (Profous, 1992). In her study on street trees in three towns of the Eastern Cape, South Africa, Kuruneri-Chitepo (2011) also reported that the survival rates of street trees was to a large extent affected by the availability of staff and equipment (e.g. water tankers) for tree maintenance.

In terms of the National Arbor Week, DAFF (2011a) indicated that the programme had received major publicity and public participation throughout the country. However, the results obtained from household and municipal interviews conducted in this study suggest otherwise. Even though local government participation in Arbor Week is critical to ensure that the Arbor Week message reaches people, interviews with municipal officials indicated that participation in Arbor Week was not always on an annual basis. Some municipal officials indicated that municipal participation in Arbor Week was dependent on the budget and availability of trees for planting during the event. In addition, household survey results indicated that only 33.1 % of urban residents in the Limpopo and Eastern Cape Provinces were aware of Arbor Week, and only 19.4 % of these had ever participated in Arbor Week campaigns. The urban residents indicated that they did not participate in Arbor Week mostly because they did not know about it (31.3 %) or they were not involved or invited to participate in such activities (34.0 %). With these findings, it can be argued that Arbor Week is not as common a practice in municipalities and local communities as suggested by DAFF (2011a). A study by Guthrie and Shackleton (2006) indicated that Arbor Week was significantly less known in rural schools of South Africa compared to urban ones. However, a study by Parkin *et al.*, (2006) in Grahamstown, South Africa, found that most learners from their case study schools were aware of, and had participated in Arbor Week. The difference in findings

with the current study could be because Arbor Week campaigns in South Africa are generally targeted at institutions such as schools and community groups (Guthrie and Shackleton, 2006). Therefore, school learners are more likely to participate in Arbor Week than the non-school goers, such as the household heads, which were the target for this research. Guthrie and Shackleton (2006), as well as Parkin *et al.*, (2006) however, highlighted the need for Arbor Week to be extended to the broader community and not just schools.

The findings of this study also showed that tree planting and greening initiatives exist at provincial level in the two selected provinces. Compared to the Eastern Cape Gardening and Greening Human Settlements Project, the Greening Limpopo Programme was well recognized amongst the key actors involved in UTGS activities in the province. The programme had attracted support from government and prominent private sector companies in the province, mostly because the Premier of the province initiated the programme (Matamele, pers. comm., 2011). This is supported by the outcome of the snowball sampling approach which, excluding municipal officials, identified 25 key actors involved in UTGS activities in the Limpopo Province compared to 11 in the Eastern Cape. The finding also supports FAO (1995), Konijnendijk *et al.* (2004) and DAFF (2011a) who reported that political office bearers give recognition to tree planting and greening programmes. For example, the involvement of local mayors in urban forestry activities was found to have a strong influence on urban forestry in Latin America and China (FAO, 1995; Palijon, 2002). Unlike the Greening Limpopo Programme, the Eastern Cape Gardening and Greening Human Settlements Project by the provincial department of housing was only in its initial phases and was developed by a provincial department and not the provincial government office of the premier. This is likely to limit the support it will receive from other key actors in the province.

Finally, even though most of the tree planting and greening initiatives reviewed in this study indicated that the primary area of focus for such activities was disadvantaged communities, the results of the household surveys, as shown in Table 4.5, revealed that most urban residents (72.4 %) in three previously disadvantaged settlement areas of the Limpopo and Eastern Cape Provinces (i.e., informal, RDP, and old townships) were not aware of any tree related activities. This raises questions as to who really is involved in such activities, and who for example, receives the trees in these communities. Officials from both government departments and municipalities indicated that trees were distributed to the communities through ward councillors of a municipality. The question, therefore, is how the ward councillors distribute the trees in the communities. It is likely that prominent people benefit more in terms of receiving trees and taking part in greening projects, than other members of the community. This assertion can be supported by the following quote of one respondent from the RDP settlement area in Queenstown, Eastern Cape Province:

“Some of us are never involved in any projects; community leaders choose themselves and their relatives only”.

The finding suggests that there is unequal distribution of trees and greening projects amongst the urban communities. There is therefore, a need to develop a monitoring mechanism that will ensure equal and broader involvement of the local people in UTGS activities. This could be achieved through compiling and managing a database of households that participate in a UTGS project in a particular community. The latter would assist in identifying others within the community that did not participate in previous projects. Monitoring of trees that are planted and distributed is also needed, if the tree planting and greening initiatives are to be deemed successful. There is currently inadequate monitoring and maintenance of trees, which makes the national and provincial tree planting and greening initiatives ineffective.

4.6.2 Policies and legislations with provisions for UTGS at national and provincial level

With regard to policy and institutional analysis, urban forestry was only explicitly mentioned in three national governance institutions, with two of these (the National Forest Act, and the White Paper on Sustainable Forestry), only mentioning it in passing under community forestry. Urban forestry was more explicitly mentioned in the NFAP of 1997; however, as was also noted by Shackleton (2006), there has been little progress in meeting the urban forestry actions and objectives outlined in the programme. This could be because the key actors with a role to play in urban forestry do not quite understand the benefits of urban forestry and are also not clear about what their respective responsibilities are in urban forestry deliverance (Table 4.5). This assertion supports the NFAP review (2004) which indicated that there were many who believed that urban forestry or urban greening was not a strategic issue, and that many institutions (including the then DWAF) could not evaluate the importance of urban forestry, nor determine what their roles were in this regard. Such inefficiencies could answer the question of why most of the urban forestry objectives outlined in the NFAP of 1997 have not yet been met. However, it is also possible that the NFAP of 1997 did not sufficiently empower key actors, such as DWAF to carry out their urban forestry responsibilities in full. In other countries (e.g. United States and Europe) urban forestry policies are well institutionalized at federal, state and local level, and are accompanied by funding and research programmes (Konijnendijk and Gauthier, 2006). Thus, merely recognizing urban forestry in the national policies is not enough, as it should be backed by sufficient human and financial resources to enable the key actors involved to carry out their work.

In terms of legislation, the study found none specific to UTGS at both national and provincial level. This finding supports Knuth (2005) who reported that there were no national laws with explicit provisions for UTGS in the six countries that she surveyed, one of which was South Africa. The review conducted

herein revealed that UTGS were mainly dependant on other existing pieces of legislation such as the NFA, NEMA, NHRA, and NEMBA at national level, and LEMA, ECECA, ECHRA, and ECPPA at provincial level. This finding is in line with Knuth (2005) and Lawrence *et al.* (2011) who indicated that components of urban forestry could be found in different forms of legislation, including forestry and environmental legislation. The review however, showed that the above pieces of legislation only provided partial protection for UTGS. For example, when trees exist in a natural forest or protected area (NFA, 1998) that is within the urban or peri-urban region, or when a tree species is threatened or endangered (NEMBA, 2000), and/or considered to be of heritage and cultural importance (NHRA, 1999; Champion Trees Programme). This means that urban trees outside a natural forest or protected area are not fully provided for in these legislations.

Even with the above mentioned partial provisions for UTGS in the NFA, NEMA, NHRA, and NEMBA at national level, and LEMA, ECECA, ECHRA, and ECPPA, the extent to which the legislation is being implemented to protect UTGS can be disputed. Firstly because there have been no inventories conducted in urban areas to show the numbers of urban trees that are indigenous, endangered, threatened or of cultural and historic importance. Thus, there is no information base to support the notion that UTGS are actually protected under the above Acts. Secondly, the government departments (e.g. DAFF, DEAT, LEDET, and DEDEA) responsible for monitoring compliance to these laws are faced with challenges which limit the execution of their duties. Some department officials interviewed in the study also declared that monitoring and regulating use of UTGS was the responsibility of local government and not theirs. Further, other department officials indicated that legislation such as the NFA (1998) was lenient, with similar penalties for minor and major non compliances. The latter was said to encourage people to cut down trees, knowing that they will manage to pay once they are charged. Anecdotal evidence showed that in certain instances, people would not be charged or penalised because of the leniency of the Act. Some key actors from DEAT and LEDET also indicated that Environmental Acts were generally silent on individual non-compliances in urban areas. According to one respondent from LEDET, illegal harvesting of medicinal plants was high in certain urban and peri-urban areas of the Limpopo Province. However, such non-compliances were said to be difficult to handle because of the inadequacy of the Acts.

Finally, the fact that most local people, including some municipal officials were unaware of the above laws and what they stipulate, makes it difficult to believe that the laws are active and are being implemented to regulate use of urban trees. As indicated in Table 4.5, most local people (77.6 %) in the Limpopo Province and Eastern Cape were unaware of the rules regulating use of urban trees. According to one volunteer in the Limpopo Province:

“There are no rules regulating use of urban trees, people cut down trees and nothing is done to them.”

Some municipal officials interviewed in the study indicated that DAFF, through the NFA (1998) was responsible for regulating use and removal of urban trees, but that they were unaware of what the NFA (1998) states. According to Dietz *et al.*, (2003) providing information about the rules regulating use of a resource, and involving interested parties in an informed discussion of the rules (analytical deliberation) are essential for robust governance of environmental resources. The findings of this study indicate that although there are some provisions for UTGS in the above laws, the fact that they are not known by others, makes them non-working rules (Ostrom, 1990). As also noted by Knuth (2005), the dependency of UTGS legislation on the general legal structure and the existence of these regulations in different areas of law makes the protection of UTGS questionable and difficult to implement. Consequently, it can be concluded that the pieces of legislation with an influence on UTGS, reviewed herein, are inadequate for the protection of UTGS.

4.6.3 Recognition of UTGS in planning and development policies and legislation

There was no mention of UTGS in all planning and development policies and legislation that were reviewed in this study. This is regrettable as successful urban forestry requires that UTGS are recognized and integrated within the planning and development control system (Baycan-Levent and Nijkamp, 2009; Dandy, 2010; Lawrence *et al.*, 2011). There was a commitment by government in certain environmental, land use and development policies and plans to protect the environment in general, and ensure a healthy and safe environment for the people. For example, in the DFA (1995) and Housing Act (1997), there was commitment to protect the environment in general, which according to NEMA (1998) also includes urban landscapes and plants. In other policies like the White Paper on Spatial Planning and Land Use Management (2001), and the White Paper on Reconstruction and Development (1994), there was also a requirement that development activities be consistent with NEMA (1998) regulations, and environmental authorisation procedures. One could argue that the term “environment” stated in these policies and legislation, would, in the context of urban areas, include urban trees and green spaces. However, the results of the current study revealed that the commitments made in the above policies and plans are not being implemented to promote urban trees and green spaces.

For example, with regard to the implementation of the Environmental Impact Assessment (EIA) regulations prior to development, a number of concerns were noted from interviews with municipal, DEAT, LEDET and DEDEA officials. Most municipal officials interviewed in the study indicated that they were aware of the Environmental Impact Assessment (EIA) procedures and regulations; however, some municipal town planners pointed out that it was usually difficult to comply with the EIA process

because the process was long and complicated. This is in line with the South African City Network report (SACN, 2011), which revealed that environmental authorisation processes in South Africa take over 12 months. One municipal planner interviewed in this study openly admitted that municipal development activities usually proceed before final authorisation to do so is given. The following quotes the exact words of one town planner from the Limpopo Province:

“We know the environmental regulations, but we often do not implement them, because the procedures involved take too long.” “We know about protecting trees, but if we don’t chop, we won’t shop”.

The town planner cited above indicated that it was difficult to protect the environment because there was more pressure to build houses for people and create jobs. This finding supports Schäffler and Swilling, (2012) who stated that ecological issues in South Africa receive low priority in relation to social and economic issues, which are often perceived as more pressing on political agendas. The finding also mirrors that of Lawrence *et al.* (2011) who revealed that retention of UTGS is often overpowered by new developments.

Another concern noted in this study was in relation to monitoring compliance to the Record of Decision passed during the environmental authorisation process. Once permission for development is granted through the Record of Decision, it comes with environmental conditions (e.g. replacing certain indigenous tree species that will be lost in the development process), which the developers have to follow. However, some officials from LEDET and DEDEA indicated that monitoring compliance to the Record of Decision was usually limited by insufficient staffing levels within the departments. In most cases, environmental performance of the developer was not monitored. According to SACN (2011), there is an overlap between planning requirements and environmental impact requirements. The overlap often leads to a situation where an applicant for land has to apply to two separate authorities (DLA and DEAT) for permission to use or develop land. This consequently results in institutional conflicts between the two departments (SACN, 2011), which additionally affects the reliability of environmental authorisation processes.

The study noted one more concern regarding the engagement of EIA practitioners in conducting EIAs for the developers. One respondent from LEDET indicated that since the EIA practitioner is contracted by a developer, the practitioner usually takes sides with the developer, and often does not report the exact state of the environment on the ground. This respondent additionally pointed out that it was difficult to monitor and follow up all EIA proceedings because of staff shortages within the department. These findings show that the environmental authorisation processes are currently inadequate in promoting the retention of UTGS during developments.

In terms of the Housing Act (1997), there was a commitment in Section 2(1) (f) that all government spheres take due cognisance of the impact of housing developments on the environment, and that they respect, protect, promote and fulfil the rights in the Bill of Rights in Chapter 2 of the Constitution in the administration of any matter relating to housing and development (Section 2(1) (h)). A concern regarding this Act comes when one considers section 2(1) (g) of the Act which requires that the spheres of government do not inhibit housing developments in rural or urban areas. Housing was generally mentioned to be one of the priority areas at local government level by most municipal officials with others being electricity and water supply. In order to win the political will from local people, municipalities tend to be overwhelmed with meeting housing and other basic service needs. Therefore, the extent to which they are likely to take due cognisance of the impact of housing developments on the environment is questionable, especially because environmental issues were seen to have low priority in municipalities by most key actors interviewed in the study.

Most unfortunate was the lack of recognition and integration of UTGS (or green infrastructure) in urban planning and development documents reviewed herein. Though some of the urban development plans and strategies, e.g. the National Urban Development Framework of 2009 highlighted the importance of integrating environmental issues in land use and development activities, it is evident on the ground, that trees and green spaces are not part of the environment referred to in these plans. This can be seen especially in the recent housing projects under the RDP initiative. This study observed that there were only small pieces of land or none at all left as green spaces in some RDP residential areas. This is in line with McConnachie and Shackleton (2010) who found that RDP areas only had 3.5 m² of public green space per capita. These findings are disappointing because the UN-World Health Organization recommends at least 9m² of urban green space per capita, to mitigate a number of undesirable environmental effects and provide other benefits (Deloya, 1993). The current study also observed that RDP houses were built close together with no space for tree planting and greening. This corroborates findings by McConnachie and Shackleton (2010), which revealed that RDP plots were smaller in size, compared to other formal residential areas in South Africa. Comparing old townships of the apartheid era and today's RDP houses, one would conclude that old township areas had better planning in terms of green spaces than RDP settlement areas of today. Much as this may be because of the high demand for houses in urban areas today, it also shows that the promotion of green spaces in urban development is weak, when in competition with new developments (Lawrence *et al.*, 2011).

With regard to provincial land use and development plans of the Limpopo Province and Eastern Cape reviewed in this study, the impression created was that the natural environment is only important or valuable in areas such as nature reserves, catchment areas, and protected parks with no recognition of

other natural environments. For example, the Eastern Cape Provincial Spatial Development Plan (ECPSDP) emphasised the need to consider environmental biodiversity areas of significance in future spatial development planning. This was seen to focus on protecting the core biodiversity areas (reserves, wetlands, parks, steep slopes and sensitive biodiversity areas), conserving, and managing the biodiversity corridors (buffer areas) which should link those core areas together. The role of the natural environment outside of these areas was not recognized. The ECPSDP identified urban edges and building regulations using the built edge as boundaries to development. However, the “urban edge” does not effectively protect sensitive core areas and buffer areas because these also exist within the urban built up areas.

For the reason that it is party to the Convention on Biological Diversity (CBD), South Africa has to ensure that development planning is environmentally sustainable; thus, there is a need for development and planning policies and processes in South Africa to recognize UTGS (Shackleton, 2006; Schäffler and Swilling, 2012). In countries like the UK, the value of trees is clearly recognized within the planning control system (Dandy, 2010). Lawrence and Dandy (2012) also report that the planning policy in the UK is increasingly promoting urban forestry, as a part of development, regeneration, urban greening and green infrastructure policy. Palijon (2004) reported that developing countries such as Singapore have also strongly institutionalized urban green space planning and management. Planning authorities in South Africa need to learn from such examples and ensure that development work is sustainable, and is carried out in a manner that protects and retains UTGS.

4.7 Conclusions

This study established that governance institutions that may potentially promote urban forestry in the country were not being implemented to this effect. The study found that tree planting and greening initiatives occur at both national and provincial level in the Limpopo Province and Eastern Cape. Unfortunately the trees that are planted and distributed under most of these initiatives are not monitored in terms of their performance and survival rates. In addition maintenance of the trees distributed to municipalities for example, is limited due to a lack of sufficient resources. It can be concluded therefore, that these tree planting and greening initiatives are currently inadequate in promoting urban forestry in the country.

Some policies and legislation reviewed in this study, for example the NFAP, (1997), NFA (1998) and NEMA (1998) had some provisions for UTGS; however, none of them are currently being implemented to promote the full potential of UTGS. There was no mention of UTGS or urban forestry in the planning and development policies and plans reviewed herein. Although the importance of protecting the environment was recognized in almost all the former documents, findings of this study have revealed that

the environment as a whole is insufficiently protected during environmental authorisation processes prior to development. This lack of recognition of UTGS at the higher levels of government is likely to have a negative impact on the formulation of urban tree strategies, tree policies and bylaws at the local level of government.

Chapter Five

Management of urban trees and green spaces at local government level

5.1 Introduction

Urban trees and green spaces need to be managed well if they are to offer optimal benefits to local people and the environment (Johnston and Rushton, 1998; Dwyer *et al.*, 2003; Nowak, 2006; Britt and Johnston, 2008). According to Konijnendijk (2003), urban forestry involves managing trees within urban environments so that they contribute to the physiological, sociological, and economic well-being of urban populations. Kuchelmeister (1997) defined urban forestry as the “planned, integrated and systematic approach to managing urban and peri-urban forests for their contribution to the economic, environmental, sociological and psychological well-being of urban society”. The above definitions acknowledge that UTGS should be managed for the benefit of the urban population and the environment. Researchers in the field of urban forestry stress the need for planned, systematic and integrated management of the urban forest resource (Kuchelmeister, 1997; Miller, 1997; Johnston and Rushton, 1998; Konijnendijk *et al.*, 2005; Britt and Johnson, 2008). To perform well, urban trees require proper management from planting throughout their life until they are felled (Urban, 2008). For optimal management, urban trees need to be listed, categorised and monitored, and objectives and aims need to be clearly defined (Randrup, 2000; Saretok, 2006). Johnston and Rushton (1998) reported that urban trees require scheduled and regular maintenance, without which, the management of urban trees becomes inefficient and ineffective. Britt and Johnson (2008) added that regular maintenance and inspections of urban trees should be conducted to avoid the occurrence of dangerous or hazardous trees in the future. Due to the complexity of the man-made urban landscape, researchers stress the need to involve professionals and other key actors in the management of UTGS (Hobbs and Lambeck, 2002; Lawrence *et al.*, 2011).

The management of UTGS is one of the primary strategies available to improve urban environments, while at the same time promote regular human contact with nature (Louv, 2006). There is, however, a dearth of information on the management of UTGS in Africa. According to DWAF (2005), the responsibility to manage UTGS in South Africa mainly lies in the hands of local government. Therefore, this chapter addresses the key questions “How are UTGS being managed in selected municipalities of South Africa?” The purpose of the study was to:

1. Determine the extent to which local municipalities in the Limpopo and Eastern Cape Provinces of the country had adopted planned, systematic and integrated management of UTGS,
2. Determine the major challenges to UTGS management, and

3. Based on the above information, make recommendations and provide direction for future research.

5.2 Methods

The research question was addressed through face-to-face interviews and an online survey method. Face-to-face interviews were conducted in selected municipalities of the Limpopo and Eastern Cape Provinces (see Chapter three; section 3.1.2 for details on sampling strategy). Nine local municipalities out of 25 were randomly selected in the Limpopo Province, whereas 10 out of 39 were selected in the Eastern Cape Province. To cover a broader study area, an online questionnaire was also sent to all other municipalities in the country. Email contacts for the municipalities were obtained from the Government Communication and Information Systems (GCSI) department website (GCIS, 2011).

A covering letter that explained the aim of the study and its importance was sent to 263 email contacts. The letter provided a link which the person responsible for the management of UTGS was required to follow in order to participate in the survey. Respondents were promised complete confidentiality, to ensure a more honest result.

Management elements derived from similar studies conducted in other parts of the world (Miller, 1997; Saretok, 2006; Britt and Johnson, 2008; Gerhardt, 2010) were used as benchmarks to find out how UTGS were being managed in the surveyed municipalities. These included the presence of: a budget for tree related activities; a person specifically responsible for trees; tree inventory records or knowledge of the urban tree stock; a tree or greening strategy; a tree planting schedule; a tree maintenance and inspection schedule; an urban tree management plan; urban tree bylaws; and municipal procedures protecting trees during development. In order to complement and counter check responses from the face-to-face and online survey methods, a municipal website review of bylaws was also conducted.

5.3 Data analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS, Inc., 2007). The chi square test of independence was used to test for significant relationships among different categorical variables. Where variable cells had an expected count of less than 5, Fisher's exact test was used (Winter, 2012)².

²<https://courses.washington.edu/dphs568/DAW/SPSS%20handout%20Version%2019%20%201-12-12.pdf>

5.4 Findings

5.4.1 Response rates

Out of the 263 online surveys that were distributed, 98 were undeliverable or had wrong addresses. After sending two reminders, only nine municipalities (three from the Western Cape Province, two from the Gauteng Province, two from the Eastern Cape Province, one from the KwaZulu Natal Province, and one from the Mpumalanga Province) responded to the survey, at a response rate of only 5.5 %. Two municipalities from the nine that responded to the online survey were metropolitan municipalities from the Gauteng Province. In total, the study involved 28 municipalities, out of which 19 were face-to-face surveys (9 in the Limpopo Province and 10 in the Eastern Cape Province), whereas nine were online surveys. Out of the 28 municipalities, four were metropolitan, and the rest (24) were local municipalities. There was a fairly good distribution of the surveyed municipalities in terms of municipal population size (Table 5.1).

Table 5.1: Number of municipalities surveyed in each province by population size

Population category	Number of municipalities			Total
	Limpopo Province	Eastern Cape Province	Other Provinces	
Less than 100 000	2	4	4	10
100 001 to 300 000	4	4	2	10
More than 300 000	3	2	3	8
Total	9	10	9	28

5.4.2 Information about the respondents to the study

The study found differences in terms of the respondent's official designations and professional background. Respondents from the face-to-face interviews included: Environmental Officers; Horticulturists; Urban Planners; Environmental Education Officers; an Environmental Health Practitioner; and Managers (Community Services, Engineering, Parks and Recreation). Respondents from the online survey included: a Municipal Manager; a Mayor; Deputy Director Urban Forestry; Area Superintendent Parks and Amenities; Divisional Head Parks, Recreation and Cemeteries; Technical Support and Horticultural Specialist; and an Environmental Manager.

In terms of professional background, the responses given also varied among respondents. Eleven respondents, six from the online survey and five from the face-to-face interviews did not state their professional or educational backgrounds. The remaining respondents stated: Certificate in Horticulture; Training in Commercial Tree Services; Training in Landscaping; Diploma in Teaching; Diploma in Environment and Waste Management; Diploma in Forestry; National Diploma Parks and

Recreational Management; BSc Horticulture; BSc Biology; and BSc Hon in Environmental Science as their professional backgrounds.

5.4.3 Resources for UTGS management

a) Budget for UTGS

Most of the municipalities (82.1 %) had a budget for UTGS (Table 5.2). Municipalities in the Limpopo Province that had these budgets were significantly more than those in the Eastern Cape ($\chi^2 = 11.08$; $df = 1$; $p < 0.001$). There was no association between population size of a municipality and presence of a budget for UTGS ($\chi^2 = 3.5$; $df = 2$; $p = 0.18$). A majority of respondents (92.9 %) indicated that the budget for UTGS was a lump sum covering the purchase of trees and flowers, maintenance of already existing trees, parks and cemeteries, and purchase and maintenance of all equipment.

Table 5.2: Presence of UTGS management elements in surveyed municipalities (%)

UTGS management element	Limpopo Province (n=9)	Eastern Cape Province (n=10)	Other provinces (n=9)	All provinces (n=28)
<i>Resources</i>				
Budget for UTGS related activities	88.9 ^a	70.0 ^b	88.9	82.1
Person (s) specifically responsible for UTGS	44.4 ^a	40.0 ^a	44.4	42.9
<i>Planned management</i>				
Estimate of urban tree stock	0.0 ^a	0.0 ^a	22.2	7.1
Tree inventory records	0.0 ^a	0.0 ^a	11.1	3.6
UTGS management plan	0.0 ^a	0.0 ^a	22.2	7.1
Tree planting or greening strategy	55.6 ^a	40.0 ^b	55.6	50.0
Tree policy	22.2 ^a	30.0 ^a	44.4	32.1
Tree bylaws	11.1 ^a	30.0 ^b	44.4	28.6
Municipal procedures protecting UTGS during development	33.3 ^a	30.0 ^a	44.4	35.7
<i>Systematic management</i>				
Tree planting schedule	11.1 ^a	20.0 ^a	33.3	21.4
UTGS maintenance schedule	0.0 ^a	10.0 ^a	22.2	10.7
Tree inspection schedule	0.0 ^a	0.0 ^a	11.1	3.6
<i>Integrated Management</i>				
Participates in Arbor Week every year	55.6 ^a	40.0 ^b	77.8	57.1
Involves the public in UTGS activities	66.7 ^a	70.0 ^a	88.9	75.0
Involves other actors (org) in UTGS activities	66.7 ^a	50.0 ^b	66.7	60.6

Different superscript letters represent significant differences between the Limpopo and Eastern Cape Provinces

None of the respondents were very satisfied with the budget for UTGS. A majority were either unsatisfied (47.8 %) or very unsatisfied (21.7 %) (Figure 5.1). There was no association between population size and level of satisfaction with the budget for UTGS ($\chi^2 = 7.75$; $df = 4$; $p = 0.13$). Respondents that were unsatisfied with the budget for UTGS were significantly more than those who were satisfied ($\chi^2 = 18.01$; $df = 1$; $p < 0.001$).

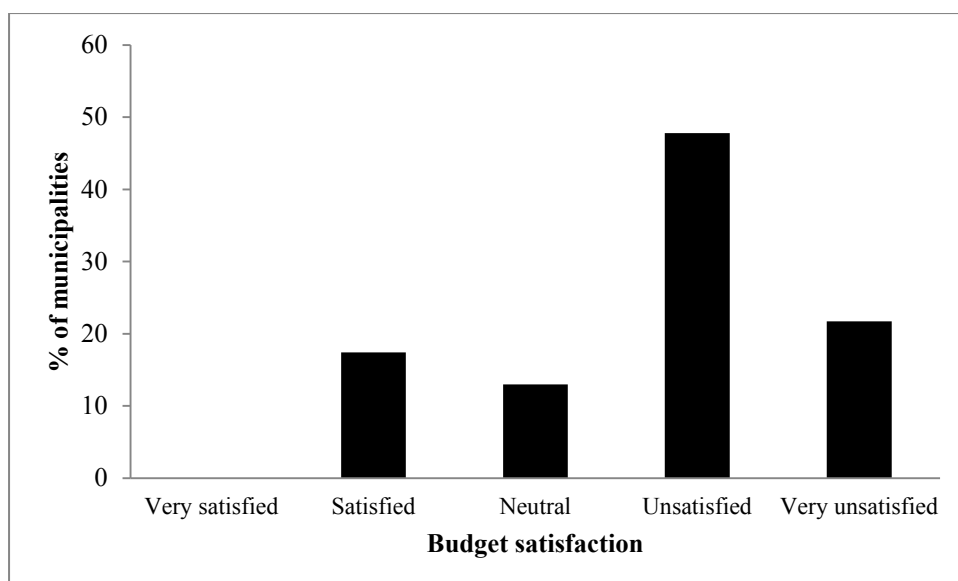


Figure 5.1: Respondents level of satisfaction with UTGS budget (n=23)

b) Presence of a person(s) specifically responsible for UTGS activities

Only 42.9 % of the municipalities had a person(s) specifically responsible (PSR) for UTGS (Table 5.2). There was no significant difference in terms of presence of a PSR for UTGS between the Limpopo Province and Eastern Cape municipalities ($\chi^2 = 0.33$; $df = 1$; $p = 0.57$). There was however, a significant association between population size and presence of a PSR for UTGS ($\chi^2 = 17.9$; $df = 2$; $p < 0.001$). The bigger the municipality, the more likely it had PSR for UTGS (Table 5.3). There was also a significant association between presence of a budget for UTGS and presence of PSR for UTGS ($\chi^2 = 4.57$; $df = 1$; $p = 0.033$). All the municipalities that had no budget for UTGS also had no PSR for UTGS (Table 5.4).

Table 5.3: Test of independence between population size of a municipality and presence of a PSR for UTGS activities

Population category	Observed		Expected	
	Has PSR	No PSR	Has PSR	No PSR
Less than 100, 000	1	9	4.3	5.7
100, 001 to 300, 000	2	7	3.9	5.1
More than 300, 000	9	0	3.9	5.1

$$\chi^2 = 17.9; df = 2; p < 0.001$$

Table 5.4: Test of independence between presence of a budget for UTGS activities and presence of a PSR for UTGS activities

Budget for UTGS	Observed		Expected	
	Has PSR	No PSR	Has PSR	No PSR
Has budget	12	11	9.9	13.1
Has no budget	0	5	12.0	16.0
$\chi^2 = 4.57; df = 1; p = 0.033$				

5.4.4 Planned management of UTGS

a) Knowledge of urban tree stocks and inventories

None of the municipalities surveyed from the Limpopo Province and Eastern Cape had estimates of the urban tree stocks or had carried out inventories of different urban trees existing on municipal property. A few respondents from the online survey indicated that they had an estimate of the urban tree stock (22.1 %) and urban tree inventory records (11.1 %). None of these respondents however, could make available a copy of the urban tree inventory records. Some of the reasons for not having tree inventories included: shortage of personnel; lack of funds; poor understanding on why urban trees should be looked after; inventory has never been requested for; trees are not considered as an asset to municipality; and tree inventories are not needed.

b) Tree planting or greening strategies

On average, only 50 % of the surveyed municipalities had a tree planting or greening strategy (TPGS) (Table 5.2). Out of these, 17.9 % had their own municipal funded tree planting strategies whereas the rest (32.1 %) had greening strategies funded by an external source. The TPGS that were mentioned included: planting of a specific number of trees every year; planting of trees with communities during Arbor Week; planting of trees in newly built RDP houses; and establishing parks within the municipality. The Limpopo Province had more municipalities (55.6 %) with tree planting and greening strategies than the Eastern Cape (40 %) (Table 5.2), and the difference was significant ($\chi^2 = 5.13; df = 1; p = 0.0235$). There was a significant association between population size of a municipality and presence of a tree planting or greening strategy ($\chi^2 = 6.2; df = 2; p < 0.041$). The bigger the municipality, the more likely it had a TPGS (Table 5.5). There was no association between presence of a budget for UTGS and presence of a TPGS ($\chi^2 = 1.71; df = 1; p = 0.33$). Some municipalities (14.3 %) with a budget for UTGS indicated that the funds were only sufficient for tree maintenance activities hence; there was no need for a TPGS.

There was, however, a significant association between presence of a person specifically responsible for UTGS and presence of a TPGS ($\chi^2 = 6.89$; $df = 1$; $p < 0.001$). Municipalities with a person specifically responsible for UTGS were more likely to have a TPGS (Table 5.6).

Table 5.5: Test of independence between population size of a municipality and presence of a TPGS

Population category	Observed		Expected	
	Has TPGS	No TPGS	Has TPGS	No TPGS
Less than 100, 000	2	8	4.6	5.4
100, 001 to 300, 000	4	5	4.2	4.8
More than 300, 000	7	2	4.2	4.8
$\chi^2 = 6.2$; $df = 2$; $p = 0.041$				

Table 5.6: Test of independence between presence of a person specifically responsible for UTGS activities and presence of a TPGS

Presence of a PSR	Observed		Expected	
	Has TPGS	No TPGS	Has TPGS	No TPGS
Has a PSR	9	3	5.6	6.4
No PSR	4	12	7.4	8.6
$\chi^2 = 6.89$; $df = 1$; $p < 0.001$				

c) Municipal urban tree policies

On the whole, only 32 % of the respondents indicated that their municipalities had urban tree policies. Municipalities with an urban tree policy in the Limpopo Province (22.2 %) did not significantly differ from those in the Eastern Cape (30 %). There was a significant association between the population size of the municipality and the presence of an urban tree policy ($\chi^2 = 11.33$; $df = 2$; $p = 0.02$). The bigger the municipality, the more likely it had an urban tree policy (Table 5.7). Presence of a budget for UTGS was not significantly associated with the presence of an urban tree policy ($\chi^2 = 2.88$; $df = 1$; $p = 0.144$). There was, however, a significant association between presence of a person(s) specifically responsible for UTGS and presence of an urban tree policy (Table 5.8).

Table 5.7: Test of independence between population size of a municipality and presence of an urban tree policy

Population category	Observed		Expected	
	Has policy	No policy	Has policy	No policy
Less than 100, 000	1	9	3.2	6.8
100, 001 to 300, 000	1	8	2.9	6.1
More than 300, 000	7	2	2.9	6.1
$\chi^2 = 11.33; df = 2; p = 0.02$				

Table 5.8: Test of independence between presence of a PSR for UTGS and presence of an urban tree policy

Presence of a PSR	Observed		Expected	
	Has policy	No policy	Has policy	No policy
Has a PSR	8	4	3.9	8.1
No PSR	1	15	5.1	10.9
$\chi^2 = 11.48; df = 1; p = 0.001$				

d) Municipal bylaws influencing UTGS

Only 28.6 % of the respondents indicated that they had municipal bylaws relating to UTGS (Table 5.2). Out of these, only 10.7 % mentioned the penalties involved for the violators of the bylaws. The respondents indicated that the violators were either arrested or fined depending on the value of the trees removed. Respondents indicated that the bylaws were communicated to the public via the ward councillors, through the municipal public participation process, through local newspapers and via municipal websites. Most respondents without bylaws relating to UTGS did not state the reasons why they had no bylaws. Two respondents from the Limpopo Province stated that their municipalities had not yet found a need to formulate the bylaws. One of these respondents claimed that there were no problems of illegal removal of trees in the municipal area, hence no need for formulation of the bylaws. Other respondents indicated that the bylaws were still in the development phase.

The Eastern Cape had more municipalities (30 %) with bylaws relating to UTGS than the Limpopo Province (11.1 %) and the difference was significant ($\chi^2 = 10.9; df = 1; p = 0.001$). A significant association between population size of a municipality and presence of bylaws relating to UTGS was also noted ($\chi^2 = 11.7; df = 4; p = 0.003$). The bigger the population of a municipality the more likely it had a bylaw relating to UTGS (Table 5.9). There was no significant association between presence of a budget for UTGS and presence of a bylaw relating to UTGS ($\chi^2 = 2.74; df = 2; p = 0.408$). There was

however, a significant association between presence of a person specifically responsible (PSR) for UTGS, and presence of a bylaw relating to UTGS ($\chi^2 = 11.22$; $df = 2$; $p = 0.001$). Municipalities with a PSR for UTGS also had bylaw(s) relating to UTGS (Table 5.10).

Table 5.9: Test of independence between population size of a municipality and presence of a bylaw relating to UTGS

Population category	Observed		Expected	
	Has bylaw(s)	No bylaw	Has bylaw(s)	No bylaw
Less than 100, 000	1	9	2.9	7.1
100, 001 to 300, 000	1	8	2.6	6.4
More than 300, 000	6	3	2.6	6.4
$\chi^2 = 11.7$; $df = 4$; $p = 0.003$				

Table 5.10: Test of independence between presence of a person specifically responsible for UTGS activities and presence of a bylaw relating to UTGS

Presence of PSR	Observed		Expected	
	Has bylaw(s)	No bylaw	Has bylaw(s)	No bylaw
Has a PSR	7	5	3.5	8.5
No PSR	1	15	4.5	11.5
$\chi^2 = 11.22$; $df = 2$; $p = 0.001$				

A review of bylaws published on websites of the surveyed municipalities found that 11 (39.3 %) municipalities had bylaws relating to UTGS. It was observed that some municipal officials who took part in this study were not aware of these bylaws (Table 5.11). Some bylaws had the same contents but different bylaw names in different municipalities.

Table 5.11: Bylaws relating to planting and use of trees accessible on municipal websites

Bylaw name	Content of bylaw	% of municipalities with the bylaw on website (n=11)	% of municipal officials that mentioned bylaw (n=8)
Bylaw relating to streets/roads and traffic	The bylaw prohibits people from planting, trimming, or cutting trees on the streets without written permission from the municipality. The bylaw also prohibits people from marking or displaying advertisements on trees on the streets	17.9	7.1
Trees causing an interference or obstruction/bylaw relating to prevention of nuisances	The bylaw provides for removal of any tree which interferes with overhead wires or is a source of annoyance, danger or inconvenience to persons using a street, obstructs the view of a driver, or obscures a road traffic sign	25.0	10.7
Cemeteries and crematoria bylaw	The bylaw prohibits people from planting or uprooting trees in a cemetery. without written permission from the municipality or officer-in-charge	14.3	7.1
Townlands bylaw	The bylaw prohibits people from destroying or removing trees and shrubs, growing on the townlands without a license from the Council. The bylaw also prohibits the planting of large rooted trees within the servitude for sewerage and other municipal purposes	3.5	0.0
Public open spaces	The bylaw prohibits people from disturbing, damaging, destroying or removing any vegetation within a public open space	10.7	3.5
Public amenities bylaw	The bylaw prohibits people from disturbing, damaging, destroying or removing anything on a public amenity without a permit from the municipality	3.5	0.0

e) Municipal procedures protecting trees during development

On average, only 35.7 % of the respondents had municipal procedures protecting trees during development. Table 5.12 shows some of the development procedures that were mentioned by respondents. Most of the respondents indicated that their municipalities relied on the EIA authorisation procedures conducted by the government departments during developments. Municipalities with no development procedures stated various reasons for not having these procedures in place. Some of the reasons included: lack of understanding of trees and their importance; absence of competent or qualified staff in the field; still in the process of developing the procedures; town planning section does not care about trees.

Table 5.12: Municipal procedures protecting trees during development

Type of procedure	% of Municipalities with procedure
Consultations with different departments of the municipality for comments on a development proposal. The department responsible for UTGS has a right to comment on concerns relating to trees on the area being developed	10.7
No development is permitted without the site development plan and a municipal environmental report on the said site	7.1
Local open space development plan	3.6
New development before an approval must indicate their landscaping plan in the development plan for consideration by the municipality and approval.	3.6
If an existing tree cannot be accommodated in the new development, the municipality opts for transplanting of the tree	7.1
A plant rescue organization is engaged to rescue plants before developments. The organization covers approximately 35% of proposed development sites.	3.6

Municipalities in the Limpopo Province and Eastern Cape did not significantly differ with regard to the presence of municipal procedures protecting UTGS during development ($\chi^2 = 0.21$; $df = 1$; $p = 0.648$). There was a significant association between the population size of a municipality and the presence of municipal procedures protecting UTGS ($\chi^2 = 24.13$; $df = 2$; $p < 0.001$). The bigger the municipality, the more likely it had the procedures in place (Table 5.13). Presence of a budget for UTGS was not significantly associated with the presence of procedures protecting trees during development ($\chi^2 = 3.38$; $df = 1$; $p = 0.128$). However, a significant association between presence of a PSR for UTGS and presence of procedures protecting trees during development was observed ($\chi^2 = 20.74$; $df = 2$; $p < 0.001$). Municipalities that had a PSR for UTGS were more likely to have procedures protecting trees during development (Table 5.14).

Table 5.13: Test of independence between population size of a municipality and presence of municipal procedures protecting trees during development

Population category	Observed		Expected	
	Has procedure	No procedure	Has procedure	No procedure
Less than 100, 000	0	10	3.6	6.4
100, 001 to 300, 000	1	8	3.2	5.8
More than 300, 000	9	0	3.2	5.8
$\chi^2 = 24.13$; df = 2; p < 0.001				

Table 5.14: Test of independence between presence of a person specifically responsible for UTGS activities and presence of municipal procedures protecting trees during development

Presence of a PSR	Observed		Expected	
	Has procedure	No procedure	Has procedure	No procedure
Has a PSR	10	2	4.3	5.7
No PSR	0	16	7.7	10.3
$\chi^2 = 20.74$; df = 1; p < 0.001				

5.4.6 Systematic management of UTGS

Only 21.4 % of the surveyed municipalities followed a tree planting schedule when conducting tree planting activities. Most respondents (71.4 %) indicated that they planted trees randomly at any time of the year depending on the availability of trees to be planted. There was no significant difference in terms of presence of a tree planting schedule between the Limpopo Province and Eastern Cape municipalities ($\chi^2 = 3.09$; df = 1; p = 0.079). However, population size of a municipality was significantly associated with the presence of a tree planting schedule ($\chi^2 = 8.13$; df = 2; p = 0.007). The bigger the municipality, the more likely it had a tree planting schedule (Table 5.15). Presence of a budget for UTGS was not significantly associated with the presence of a tree planting schedule ($\chi^2 = 1.66$; df = 1; p = 0.553). There was, however, a significant association between presence of a PSR for UTGS and presence of a tree planting schedule (Table 5.16). Municipalities with a PSR for UTGS were more likely to conduct tree planting activities in a scheduled manner.

Table 5.15: Test of independence between population size of a municipality and presence of a planting schedule

Population category	Observed		Expected	
	Has planting schedule	No planting schedule	Has planting schedule	No planting schedule
Less than 100, 000	0	10	2.1	7.9
100, 001 to 300, 000	1	8	1.9	7.1
More than 300, 000	5	4	1.9	7.1
$\chi^2 = 9.52$; df = 2; p = 0.009				

Table 5.16: Test of independence between presence of a PSR for UTGS activities and presence of a tree planting schedule

Presence of a PSR	Observed		Expected	
	Has planting schedule	No planting schedule	Has planting schedule	No planting schedule
Has a PSR	6	6	2.6	9.4
No PSR	0	16	3.4	12.6
$\chi^2 = 10.18$; df = 1; p = 0.002				

Except for 10.7 %, most municipalities had no schedule to guide tree maintenance operations (Table 5.2). None of the municipalities in the Limpopo Province had a tree maintenance schedule and only one municipality (3.6 %) from the Eastern Cape. Most respondents indicated that maintenance of trees, except for the newly planted ones, was random and mostly complaint based. The majority of respondents mentioned “lack of equipment, insufficient personnel, and insufficient funds” as the main limiting factors to systematic or scheduled maintenance of urban trees.

Tree inspections were virtually non-existent except for one municipality from the online survey that had a tree inspection schedule. Some respondents (33.3 %) indicated that they observed the status of trees at any time during their working hours. Most others (66.7 %), however, indicated that they entirely depended on the public with regard to the status of the trees. The respondents stated that the public informed them of trees that were likely to be posing a threat to humans or property.

5.4.7 Integrated management of UTGS

a) *Involvement of the local people in UTGS activities*

More than three quarters of the respondents (78.6 %) indicated that their municipalities involved local people in UTGS activities (Table 5.2). There were five types of involvement with the local people that were mentioned (Figure 5.2). The most frequently mentioned was that of local people providing information on potentially hazardous trees within municipal areas (64.3 %). A considerable number of respondents also indicated that the local people were provided with trees for planting within their areas of residence (42.8 %). Providing information on the importance of UTGS (awareness-raising) was the least stated type of involvement with local people (7.1 %). There was a significant difference between municipalities that involved local people in the Limpopo and Eastern Cape Provinces ($\chi^2 = 7.57$; $df = 1$; $p = 0.005$). Municipalities in the Limpopo Province (55.6 %) involved more local people in UTGS activities than those in the Eastern Cape (40 %). There was no significant association between population size and the number of municipalities involving local people in UTGS activities ($\chi^2 = 1.33$; $df = 2$; $p = 0.639$). There were also no significant associations between other UTGS management elements and involvement of local people in UTGS activities.

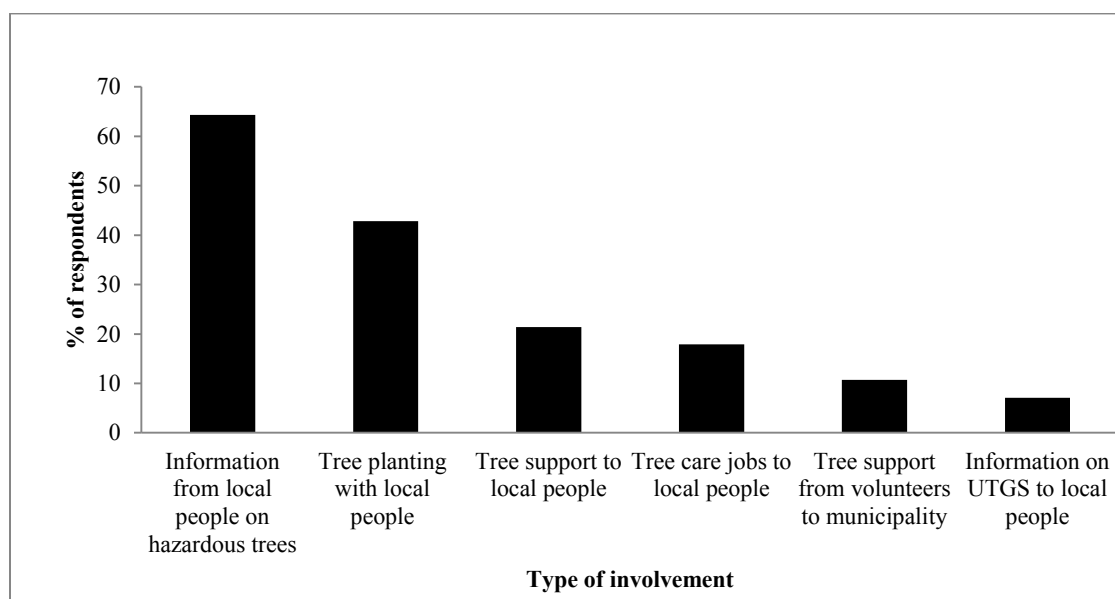


Figure 5.2 Type of involvement with the local people (n=28)

b) *Involvement of other actors in UTGS activities*

More than half (60.7 %) of the respondents stated that they involved other actors in tree related activities (Table 5.2). The most commonly mentioned actors were: national departments such as DEAT and DAFF;

provincial departments such as the LEDET; private sector companies such as the National Lottery, NGOs such as the Wildlife and Environment Society of South Africa (WESSA) and Food and Trees for Africa (FTFA), churches and schools. There were five main types of involvement mentioned by the respondents (Figure 5.3). The most frequent type of involvement mentioned was other actors providing municipalities with tree seedlings (71.4 %). The least mentioned type of involvement was municipal consultations with other actors on UTGS activities (17.9 %).

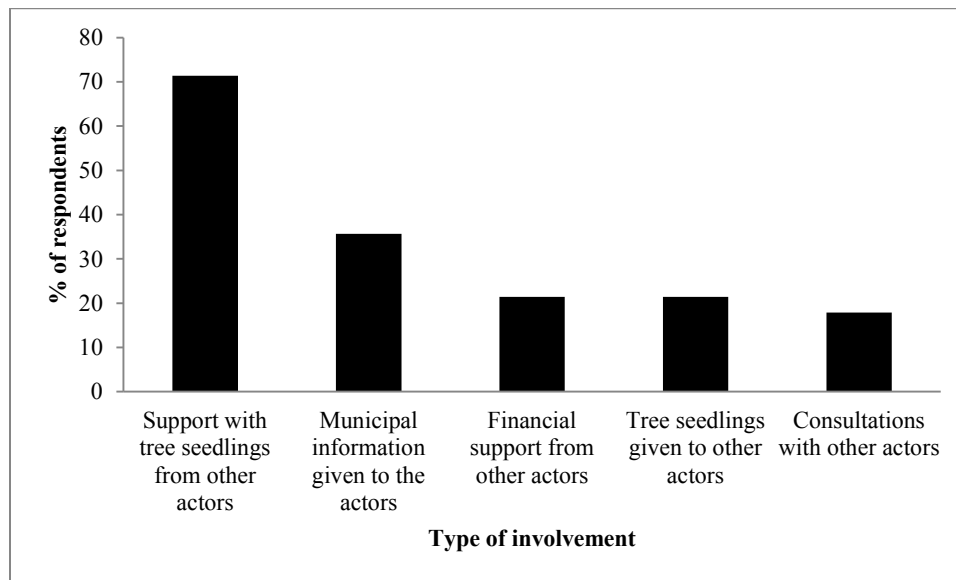


Figure 5.3: Type of involvement with other key actors (n=28)

Municipalities in the Limpopo Province that involved other key actors in UTGS activities were significantly more than those from the Eastern Cape ($\chi^2 = 5.95$; $df = 1$; $p = 0.015$)(Table 5.2). There was no significant association between population size and involvement of other actors in UTGS activities ($\chi^2 = 0.81$; $df = 2$; $p = 0.704$). Presence of a tree planting or greening strategy was, however, significantly associated with the involvement of other actors in UTGS activities (Table 5.17). There were no significant associations between other UTGS management elements and involvement of other actors in UTGS activities.

Table 5.17: Test of independence between presence of a tree planting or greening strategy (TGS) and involvement of other actors in UTGS activities

Presence of TPGS	Observed		Expected	
	Actors involved	Not involved	Actors involved	Not involved
Has TPGS	11	2	7.9	5.1
No TPGS	6	9	9.1	5.9
$\chi^2 = 5.81$; df = 1; p = 0.024				

5.4.8 Municipal participation in Arbor Week

More than half (57.1 %) of the respondents stated that their municipalities participated in Arbor Week campaigns annually, while respondents from the remaining municipalities stated that this was not on an annual basis. There was a significant difference in terms of annual participation in Arbor Week between municipalities in the Limpopo Province and those in the Eastern Cape ($\chi^2 = 5.13$; df = 1; p = 0.024). The Limpopo Province had a higher percentage (55.6 %) of municipalities participating annually, than the Eastern Cape (40 %). A significant association between population size of a municipality and annual municipal participation in Arbor Week was also established ($\chi^2 = 10.35$; df = 2; p = 0.005). The bigger the municipality, the more likely it participated in Arbor Week campaigns on an annual basis (Table 5.18). Presence of a budget for UTGS was also significantly associated with annual municipal participation in Arbor Week campaigns ($\chi^2 = 8.12$; df = 1; p = 0.008). All the municipalities that had no budget for tree related activities indicated that they did not participate in Arbor Week annually (Table 5.19). There was also a significant association between presence of a person specifically responsible for UTGS and annual municipal participation in Arbor Week campaigns ($\chi^2 = 15.75$; df = 1; p < 0.001). Most municipalities with a person specifically responsible for trees also indicated that they participated in Arbor Week every year (Table 5.20).

Table 5.18: Test of independence between population size of a municipality and annual municipal participation in Arbor Week

Population category	Observed		Expected	
	Annual participation	Not annual	Annual participation	Not annual
Less than 100, 000	3	7	5.7	4.3
100, 001 to 300, 000	4	5	5.1	3.9
More than 300, 000	9	0	5.1	3.9
$\chi^2 = 10.99$; df = 2; p = 0.005				

Table 5.19: Test of independence between presence of a budget for UTGS activities and annual municipal participation in Arbor Week

Budget for UTGS	Observed		Expected	
	Annual participation	Not annual	Annual participation	Not annual
Has budget	16	7	13.1	9.9
No budget	0	5	2.9	2.1
$\chi^2 = 8.12$; df = 1; p = 0.008				

Table 5.20: Test of independence between presence of a person specifically responsible for UTGS activities and municipal participation in Arbor Week

Presence of a PSR	Observed		Expected	
	Annual participation	Not annual	Annual participation	Not annual
Has PSR	12	0	6.9	5.1
No PSR	4	12	9.1	6.9
$\chi^2 = 15.75$; df = 1; p < 0.001				

5.4. 9 Challenges relating to UTGS management

Seven challenges relating to the management of UTGS were mentioned by the respondents (Figure 5.4). These included: insufficient funds; low public support; lack of knowledge of the benefits of UTGS; insufficient personnel; low political support; lack of equipment and poor ecological conditions. On

average, the three most mentioned challenges by municipal officials from the Limpopo Province, Eastern Cape and other provinces were insufficient funds (75.2 %), insufficient personnel (64.4 %), and lack of equipment (53.3 %).

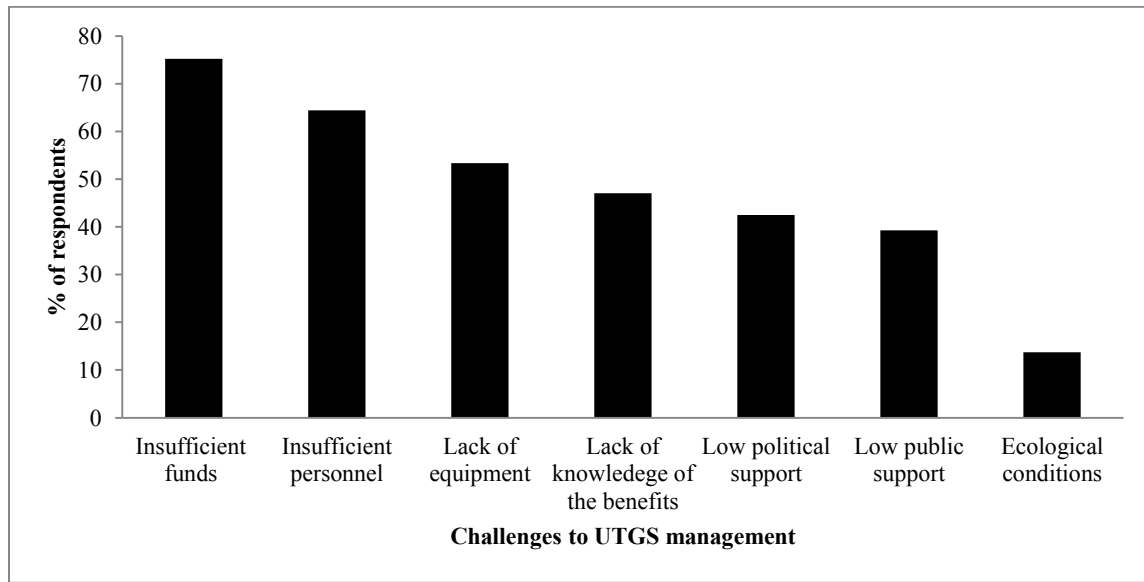


Figure 5.4 Municipal challenges to UTGS management (n=28)

Respondents from the Eastern Cape who mentioned low political support as a challenge were more than those from the Limpopo Province (50 % and 33.3 % respectively) and the difference was significant ($\chi^2 = 5.95$; $df = 1$; $p = 0.015$) (Figure 5.5). Similarly, respondents who mentioned poor ecological conditions as a challenge were significantly more in the Eastern Cape compared to the Limpopo Province (30 % and 11.1 % respectively) ($\chi^2 = 11.08$; $df = 1$; $p < 0.001$).

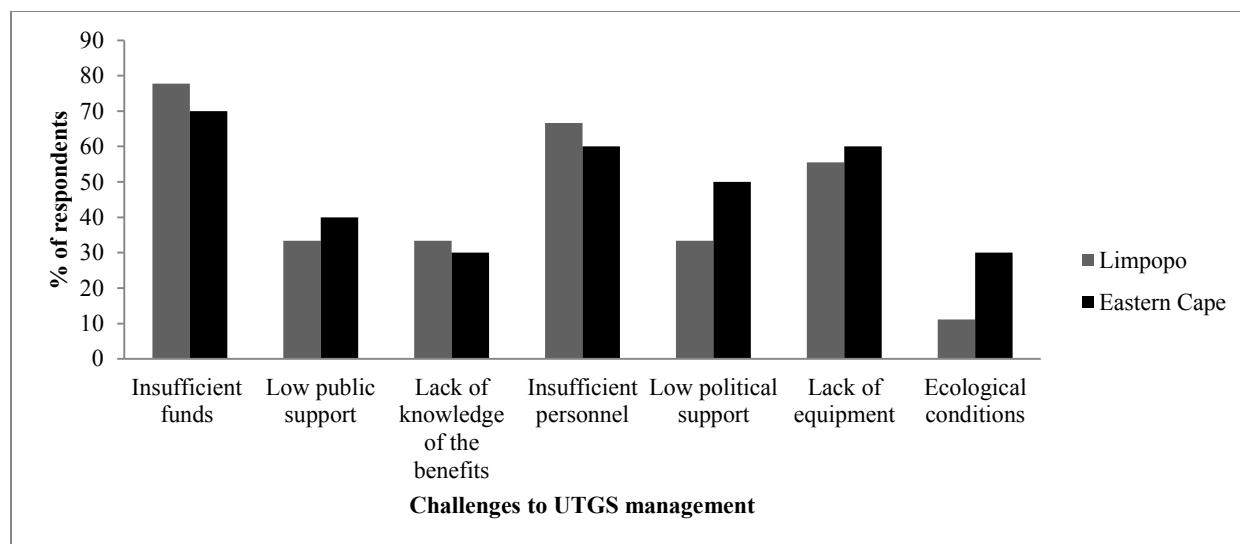


Figure 5.5: Challenges to UTGS management in the Limpopo Province (n=9) and Eastern Cape (n=10)

5.5 Discussion

5.5.1 General information on UTGS management across municipalities

Consistent with other researchers (Zhang *et al.*, 2007; Gerhardt, 2010), this study found that UTGS are spread within different departments in different municipalities. This could be partly due to the diverse and complex nature of UTGS and its associated/perceived benefits. For example, in some municipalities, UTGS are viewed as important for community benefits, hence fall under the responsibility of the community services department whilst in other municipalities they are perceived as more important for social benefits, and hence fall under the parks and recreation department. Others view UTGS as the responsibility of the engineering department, probably because of tree maintenance and removal requirements. In her study on commonage management and governance in eastern South Africa, Martens (2009) also found that the responsibility for green spaces such as commonages was allocated to different departments within a local municipality. These findings suggest that the municipal departments with an influence on UTGS need to work in collaboration with one another to ensure effective management of UTGS. According to Dwyer *et al.* (2003) and Lawrence *et al.* (2011), the complex and diverse nature of the urban forest resource requires an integrated approach, drawing together all those with a responsibility for any part of the urban forest.

Findings on educational backgrounds of the respondents give an indication that there is a lack of expertise or professionals in the field of urban forestry in the country. There was no respondent with an arboriculture or urban forestry background, implying that urban forestry is a relatively new discipline in the country. However, some respondents had some horticulture and forestry background, or some training

in tree care services and landscaping. This shows that some municipal officials responsible for UTGS have a general understanding on tree maintenance and care. It is important to note though, that the urban forest resource is complex and unique in its nature (Lawrence *et al.*, 2011); therefore, effective management of the resource requires professionals or at least some form of consultation with experts in the field. Without expertise or technical training in hazardous tree identification for example, it is doubtful that the person responsible for UTGS could reliably identify hazardous trees and make wise choices about trees that present a danger to the public (Treiman and Gartner, 2004).

5.5.2 Resources for UTGS management

Implementation of any tree programme is to a large extent influenced by the resources that it receives. This study sought to find out how equipped municipalities were in terms financial and human resources available for the management of UTGS. Although most municipalities, except for five (17.9 %) had a budget for UTGS activities, the findings of the study revealed that budgets allocated to UTGS were inadequate to support the proper management of UTGS. This is authenticated by the reason that most respondents, regardless of the population size of the municipality they represented, were either unsatisfied or very unsatisfied with the budget allocated to UTGS (Figure 5.1). Other researchers have also reported that UTGS activities often receive little funds (Gerhardt, 2010; Lawrence *et al.*, 2011) or none, from the overall municipal budget. Unfortunately, these budgets are also the most affected when local municipalities face increasing pressure on their budgets. For example, a study by Gerhardt (2010) in Germany found that 60 % of the local authorities were experiencing decreasing budgets for UTGS. In addition, a study of Nordic cities by Randrup and Persson (2009) also revealed that a majority of the local authorities had experienced decreasing budgets for green space management. The results of this study showed that some municipalities actually had no budgets at all allocated for UTGS management. This is quite unfortunate because the management of UTGS has to be proactive (Saretok, 2006), but where there are no funds or where funds are insufficient, this is difficult to implement.

It is without question that the presence and amount of funds allocated to UTGS will determine the municipality's ability to conduct urban tree inventories as well as adopt a planned and systematic management approach to UTGS. As can be seen from Figure 5.4, most of the respondents stated lack of sufficient funds as the major challenge to UTGS management. This means that municipalities need to explore external sources of funding for the management of UTGS, which include grants from national and provincial government and charitable organizations or sponsorship from commercial companies (Lawrence *et al.*, 2011).

With regard to human resources, the study sought to find out if municipalities had a person(s) specifically responsible (PSR) for UTGS. The results revealed that less than half (42.9 %) of the municipalities had a PSR for UTGS. This finding was slightly better than a study conducted by Treiman and Gartner (2004), which found that 75 % of Missouri communities had no full-time person employed for tree related activities. It is evident from the results of the current study that where there was a PSR for UTGS, there was more likelihood that UTGS would receive more attention in terms of management, than where there was none. This can be supported by the finding that the presence of a PSR for UTGS was significantly associated with other UTGS management elements including; presence of a tree or greening strategy (Table 5.6); presence of a tree policy (Table 5.8); presence of tree bylaws (Table 5.10); presence of procedures protecting trees during development (Table 5.14); and annual municipal participation in Arbor Week campaigns (Table 5.20). Municipalities that had a person specifically responsible for UTGS also had the former UTGS elements. These findings substantiate those of Saretok (2006) in Sweden and Gerhardt (2010) in Germany which revealed that the presence and the number of staff employed for UTGS activities influenced municipal adoption of planned and systematic management of UTGS.

The significant association between population size of a municipality and presence of a PSR for UTGS (Table 5.4) gives an impression that those municipalities smaller in size are less likely to have a PSR for UTGS. The finding is in line with Green *et al.* (1998), and Gerhardt (2010) who found that bigger local authorities were more likely to have staff employed for UTGS activities than smaller ones. Most respondents to this study from the smaller municipalities indicated that the municipal officials that conducted UTGS activities also carried out other activities within the municipality. Therefore, it could be possible that smaller municipalities do not have as much UTGS as the bigger municipalities, hence do not require a PSR for the resource (Saretok, 2006). However, it is also likely that smaller municipalities, unlike bigger ones, may have smaller budgets allocated to UTGS and hence cannot afford to employ a PSR for UTGS. This could be supported by the finding that the municipalities that had completely no budget for UTGS in this study also had no PSR for UTGS (Table 5.4). Similar to budgets and insufficient funds, the lack of sufficient staff was mentioned as one of the challenges to UTGS management (Figure 5.4). Some respondents indicated that they had not carried out urban tree inventories because they lacked personnel to carry out the activity. In summary, the findings on resources generally suggest that the implementation of planned and systematic management of UTGS is difficult, where the resources allocated to UTGS are insufficient or lacking (Saretok, 2006; Gerhardt, 2010; Lawrence *et al.*, 2011).

5.5.3 Planned management of UTGS

To be sustainable, UTGS management has to be planned. A first glance at Table 5.2 shows that most municipalities are far from doing this. To begin with, none of the municipal officials from the Limpopo Province and Eastern Cape had knowledge of the extent of tree cover within their municipalities (Table 5.2) and none (except one from the online survey) indicated that its municipality had an inventory of urban trees. According to FAO (1995), the systematic planning of urban forest management is difficult, if not impossible, without a sound information base on the number of trees within the city, their species composition, age, and condition. Britt and Johnston (2008) and Gerhardt (2010) also stated that urban tree management starts with the exact knowledge of the extent and nature of the resource to be managed, without which, developing a planned approach to tree management is almost impossible. Such information was non-existent in most of the municipalities surveyed in this study. The results were however, similar to findings of other researchers. For example, Gerhardt's (2010) study on urban tree management in local authorities in Germany found less than 25 % with accurate knowledge of the extent of urban tree cover. A similar study by Saretok (2006) on urban forestry in Sweden also found that only 28% of the respondents had accurate records of street and park trees.

The difference between these two studies and the current study however, is that the respondents from the two studies could at least give an estimate of the urban tree stock. In this study, only two respondents (7.1%) from the online survey could give an estimate of the urban tree stock. The majority of respondents were not aware of their tree resources, which makes it difficult if not impossible for them to make informed and long term decisions on UTGS. Information on tree inventories and knowledge of the extent of urban tree stocks is important to justify budgets, to locate planting sites, to identify management needs and to locate hazardous trees in need of repair or removal (Miller, 1997). The lack of information on the extent and state of UTGS therefore, does not only make the management of UTGS difficult, but can also have potentially dangerous consequences in the future. For example, as cited by FAO (1995), if Hong Kong did not conduct an urban tree survey which found that two thirds of the street trees in Hong Kong and Kowloon had arboricultural problems, these would probably have gone unnoticed thus posing a potential threat to property and local residents.

The lack of knowledge on the extent of urban tree cover, and the lack of proper urban tree inventories in the surveyed municipalities, also indicates that UTGS could be vulnerable to exploitation. This is especially so because there were no bylaws regulating use of UTGS in most (71.4 %) of the surveyed municipalities (Table 5.2). Additionally, in some cases where there were bylaws (on municipal websites); these were not known even by the municipal officials themselves (Table 5.11). The latter indicates that

these bylaws are to some extent non-operational. The finding substantiates a study by Martens (2009) which found that there were no rules regulating access to and use of public open spaces (i.e. commonages) at local municipal level in three municipalities of the Eastern Cape, South Africa. According to FAO (1995), the effective, planned and systematic management of trees in cities requires a measure of legal control. Laws are necessary both to protect trees from removal and to protect residents from hazardous trees.

Some studies from different parts of the world indicate that a considerable number of local municipalities have tree protection orders, tree ordinances or bylaws relating to UTGS, with well-defined penalties in case of any violations (Schmied and Pillmann, 2003; Spathelf and Nutto 2004; Conway and Urbani, 2007; Gerhardt, 2010). For example, a large majority of the 34 European cities surveyed by Schmied and Pillmann (2003) had laws in place for protecting trees in public and private areas. If trees were protected, through tree preservation orders for example, felling was subject to official authorisation. Spathelf and Nutto (2004) also reported that in Brazil the Curitiba municipal code specified that tree removal in urban areas required prior authorization from the secretariat for the environment, and that such authorization was subject to tree replacement. Most of the municipalities surveyed in this study had no such laws in place. Some (35.7 %) indicated that they had municipal procedures that protected trees during development (Table 5.12), but most (64.1 %) did not and mainly relied on EIA procedures which as was shown in Chapter four are inadequate for protecting trees during development. Interestingly, some of the respondents who stated that their municipalities had bylaws and procedures that protected trees, could not state the penalties involved for the violators of the laws. This suggests that the enforcement of these laws and procedures is possibly weak.

The results showed that bigger municipalities were more likely to have bylaws relating to UTGS (Table 5.9), as well as municipal procedures protecting trees during development (Table 5.13). These findings suggest that municipalities bigger in size are more likely to have the required resources (more revenue) to develop bylaws and procedures to protect UTGS. These findings substantiate those of Kenney and Idziak (2000) and Conway and Urbani (2007) in Canada, who also revealed that municipalities with higher populations were more likely to have tree protection bylaws than the smaller municipalities. More recent studies by Stevenson *et al.* (2008) and Gerhardt (2010) also found the presence of a tree ordinance significantly associated with the population size of the municipalities in Pennsylvania and Germany respectively.

Central to the planned management of UTGS is also the formulation of UTGS management plans. The results showed that only two municipalities (7.1 %) from the online survey had these plans in place. The

finding was similar but slightly worse than studies conducted in the United States. For example, a national survey by Kielbaso (1990) found that only 16 % of the surveyed municipalities had an urban forest management plan. Similarly, Treiman and Gartner (2004) found that only 10 % of the communities of Missouri had written tree management plans. However, a Pennsylvania study by Stevenson *et al.*, (2008) found slightly more (27 %) of the surveyed municipalities with urban tree management plans.

Nine respondents (32.1 %) in this study indicated that their municipalities had tree policies, but only three of these provided copies of the policies. After a careful review, these policies were found to be merely tree removal guidelines, providing employees for example, with information on how to go about removing a tree of a certain height, with no specified aims or objectives and/or action plans. According to Saretok (2006), what is more useful to the overall management of UTGS is a plan or strategy that specifies aims and objectives and gives an indication of how these will be achieved. Booth (2005) indicated that a strategic plan for UTGS is essential if UTGS are to gain an internal municipal advantage over other services and secure necessary funding. The lack of UTGS management plans in almost all the municipalities surveyed in this study also shows how far the local municipalities are in adopting a planned approach to UTGS management.

With regard to greening programmes and initiatives, half (50 %) of the municipalities had these in place. It was observed however, that most of these programmes were funded by an external source and not the municipality. For example, one respondent from the Limpopo Province and two from the Eastern Cape indicated that their municipalities were running greening programmes funded by the Department of Environmental Affairs and Tourism (DEAT). Two other municipalities from the Limpopo Province indicated that they were running greening programmes funded by private companies. Interestingly, the results showed that municipalities in the Limpopo Province that had greening programmes were significantly more than those in the Eastern Cape. A possible explanation is that some municipalities in the Limpopo Province had, through the Greening Limpopo programme initiated by the Premier of the province (see Chapter four; section 4.3.1.2), managed to access funds for tree planting and greening activities.

Findings from the study also revealed that population size of a municipality as well as the presence of a PSR for UTGS were significantly associated with the presence of a tree planting or greening programme (Table 5.5). These findings additionally show that bigger municipalities are more likely to have more resources for tree planting or greening activities, as well as the human resources that can influence municipal adoption of a tree planting or greening programme.

5.5.4 Systematic management of UTGS

Effective UTGS management requires that all operations are conducted in a scheduled and systematic manner (Miller, 1997; Saretok, 2006; Gerhardt, 2010). Results of this study showed that only 21.4 % of the municipalities conducted tree planting activities in a scheduled manner, with the rest indicating that they planted trees randomly whenever they were available and wherever they thought trees were needed. The results were disappointing because tree planting activities can only be successful with careful planning on for example, what tree species should be planted in which specific locations (FAO, 1995; Britt and Johnston, 2008). Improper planting of trees can increase costs and reduce the benefits of these trees. It is possible that some challenges to UTGS management that were mentioned by respondents, such as low public support (section 4.3.8) could be as a result of poor tree planting activities (i.e. wrong selection and planting of trees in the wrong places).

It is important to note though that planning for tree planting activities is quite difficult for municipalities with no budgets for UTGS or for those that depend entirely on tree donations. It would be unrealistic to expect these municipalities to plan for tree planting activities when they have no resources at hand to meet their plans. This reinforces the earlier statement that systematic UTGS management is highly dependent on the availability of resources.

Systematic maintenance and inspections of urban trees fared worse than systematic tree planting. The results showed that only three municipalities (10.7 %) conducted tree maintenance activities in an ordered manner, and only one (3.6 %) had a tree inspection schedule. The level of credibility of these responses can however be questioned. This is because none of the respondents indicated how often the inspections were done, and only one respondent mentioned that trees were pruned every winter in order to prevent weak branches from falling onto people and property. From these findings, it could safely be concluded that systematic maintenance and inspections of trees was missing in the municipalities that were surveyed in this study. Most respondents indicated that maintenance of trees, except for newly planted ones, was mostly complaint based. With regard to tree inspections, most respondents indicated that they entirely depended on the public for information on the status of trees within a municipality. These findings were similar to those of Conway and Urbani (2007) in Canada, who found few municipalities with tree monitoring programmes, and that where the programmes were in place these were said to be in the form of passive collection of information from residents. Two studies from Europe however had different results. A national survey by Saretok (2006) in Sweden found that more than 60 % of the local authorities carried out tree maintenance work in a systematic manner, and about 60 % also inspected their street trees

on a systematic basis. A more recent study by Gerhardt (2010) in Germany found that over 75 % of local authorities conducted systematic inspection of street trees, and over 50 % inspected park trees.

It is true that South Africa, unlike the cited countries is only in its development phase. However, in order to attain sustainable development, local municipalities in South Africa should learn from the developed world and start to make a more concerted effort to manage UTGS more effectively. The lack of regular maintenance in most municipalities has serious implications in that trees may end up posing a serious threat to property and also people's lives. When trees are regularly maintained, they grow well, are healthy and unlikely to pose as much of a threat to people and property. Therefore, the more work is identified early on and carried out in a scheduled and systematic way, the less need there will be for residents to complain or for situations to become hazardous (Saretok, 2006). According to Johnston and Rushton (1998) if planning allows for the majority of tree maintenance work to be conducted in a proactive manner, the amount of re-active management is also minimized, hence reducing the expense.

5.5.5 Integrated management of UTGS

Also essential to effective UTGS management is the principle of integrated management. Researchers stress that the practical management of UTGS requires involvement of other key actors including various individuals and groups that play a role in urban tree management, both within and outside the local authority (Kuchelmeister, 1999; Konijnendijk and Gauthier, 2006; Lawrence *et al.*, 2011).

The finding that over 78 % of the surveyed municipalities involved local people in UTGS activities was encouraging. A study by Saretok (2006) found similar, though lower figures (64 %) from local authorities in Sweden who involved the public in tree related activities. The difference between the two studies could be because the sample size of the current study was smaller than that of Saretok (2006) which was a national survey. Thus, the 78 % found in my study may not give the exact picture of what the situation is in South Africa, nationwide. The most frequent type of involvement mentioned was the public informing the municipalities of potentially hazardous trees (64.3 %). The finding substantiates an earlier finding which showed that most municipalities relied on information from local people with regard to tree maintenance activities. It was noted that some municipalities from the current study (17.9 %) offered part time jobs in tree maintenance and care, to the local people. This is important because it increases the level of ownership of UTGS resources (Lawrence *et al.*, 2011) while at the same time offers a means of living for some local people. Interestingly though, none of the respondents in the study indicated that their municipalities consulted the local people on UTGS management activities (e.g. desired tree species). In addition, none of the respondents stated that they consulted local people during the formulation of tree strategies, tree policies or tree bylaws. This was also reflected in the statistical analyses that found no

significant associations between presence of the former UTGS management elements and involvement of local people in UTGS activities.

This finding shows a deficiency with regard to the integrated management of UTGS. Some consultation with the local people on issues such as species choice for example, is desirable as this should reflect the needs and desires of local people, as well as the characteristics of the particular site (FAO, 1995; Johnston, 2009). Most municipalities surveyed in this study indicated that the commonly planted tree species were indigenous trees and fruit trees, but none of them mentioned that the local people were consulted in terms of the tree species they preferred. As Fuwape *et al.* (2011) pointed out, “It is essential to identify needs of local people with focus on alleviating poverty, providing livelihoods and environmental services such as wastewater handling and combating desertification, in the management of UTGS”. There is therefore, a need for local municipalities to approach the public and get their views on UTGS management activities. As Johnston (1989) stated, local authorities should not assume that a tree service is appreciated if there are no complaints from the public. Public consultation is important to ensure that the urban forest resource makes a positive contribution to local people and to avoid any possible conflicts in the future (Lawrence *et al.*, 2011).

The results of the current study showed that most municipalities (60.7 %) also involved other key actors in UTGS activities. This finding was again slightly higher than that of Saretok (2006) who found only 40.1 % of the local authorities in Sweden involving other key actors in tree related activities. In the current study, the most frequent type of involvement mentioned by respondents was obtaining tree support from national government departments, NGOs and private companies (71.4 %). This is supported by the point that most municipalities have limited resources for UTGS, hence the reliance on external support. Unfortunately, few municipalities (25 %) consulted other key actors on UTGS management. This was also reflected in the tree policies and bylaws that were reviewed in this study, which had no indication of who was consulted or involved during the formulation of the policies and bylaws. These findings are contrary to those of Saretok (2006) who found that the most frequent type of municipal involvement with other key actors was receiving UTGS management ideas and views. Sharing of information and ideas amongst key actors involved in UTGS activities is crucial to enhancing the quality of decision making with regard to the management of UTGS (Lawrence *et al.*, 2011). There is a need therefore, for municipalities in South Africa to extend consultations with other key actors on issues relating to UTGS management.

The current study established a significant association between the presence of a tree planting or greening programme and the involvement of other actors in UTGS activities (Table 5.17). This is because

municipalities that had tree planting or greening programmes in this study, probably involved other key actors to support these programmes. In addition, municipalities that involved key actors in UTGS activities in the Limpopo Province were significantly more than those in the Eastern Cape. This could be due to the Greening Limpopo Programme which, as indicated in Chapter four, had gained publicity amongst local businesses, NGOs and government departments in the Limpopo Province.

In summary, the findings of the study indicate that involvement with local people and other key actors in UTGS activities is one-sided in most municipalities. Municipalities are helped to identify trees that may be hazardous by local people, they receive material support in form of tree seedlings from other key actors, but most of them do not consult local people and other actors to get their views and ideas on UTGS management. Saretok (2006) shared similar sentiments and stressed the need for the public to be given a voice in influencing the management of their trees in order that tree programmes may be successful.

5.5.6 Municipal participation in Arbor Week campaigns

Municipal participation in Arbor Week and Arbor City Award campaigns could not be seen as planned, systematic or integrated management, but should be considered as relevant governance activities of national importance for UTGS. Participation in national programmes such as Arbor Week also gives an indication of the extent to which local municipalities are adopting national tree planting and greening programmes. The finding that more than half (57.1 %) of the municipalities participated in Arbor Week campaigns every year was encouraging and was slightly more than what Allen (1995) found, where only 37 % of the Municipalities in Missouri celebrated Arbor Day. A study by Elmendorf *et al.* (2003) revealed similar results to the current study, with 50 % of the surveyed cities in the United States participating in Arbor Day on an annual basis. In the current study, municipalities that did not participate in Arbor Week annually stated a lack of trees and sufficient funds as constraints to their participation. The study found that municipal participation in Arbor Week was significantly associated with population size (Table 5.18), presence of a budget for UTGS (Table 5.19), and presence of a PSR for UTGS (Table 5.20). The bigger the municipality, the more likely it participated in Arbor Week on an annual basis. Municipalities that had no budget for UTGS did not generally participate in Arbor week campaigns every year and this was also true for municipalities which had no PSR. The impression created from these findings is that bigger municipalities have more resources which enable them to participate in Arbor Week on an annual basis (Kenney and Idziak, 2000; Conway and Urbani, 2007).

5.5.7 Challenges to UTGS management

A total of seven challenges relating to the management of UTGS were mentioned by the respondents (Figure 5.4). The results showed that insufficient funds (75.2 %), lack of equipment (67.9 %), and insufficient personnel (60.7 %) were the three most frequently mentioned challenges. These were also the most mentioned barriers to tree programmes in a Pennsylvania study (Stevenson *et al.*, 2008), and a Mississippi study (Grado *et al.*, 2006). Most respondents to this study stated that UTGS received little or no funds at all from some municipalities. The lack of sufficient funds allocated to UTGS consequently affects the overall management of UTGS, as it will determine the amount of equipment which is bought and the number of personnel deployed for UTGS activities. Challenges such as low public support (39.3 %) and ecological conditions (13.7 %) were less frequently mentioned by the respondents, suggesting that the challenges to UTGS management were mostly in-house prioritization rather than external. Close to half (42.3 %) of the respondents indicated that low political support was affecting the management of UTGS. Most indicated that environmental issues, including UTGS were considered to be of low priority by politicians, hence received little or no funds. Some respondents stated that the politicians were more concerned about keeping their political positions than issues to do with the environment. According to one municipal official from the Eastern Cape:

“Politicians cannot stop people from cutting down trees and grazing their livestock in open spaces, because they want to be voted back in power.”

The challenge of low political support is quite unfortunate because it also gives an indication that UTGS are seldom considered in municipal development processes and as a result they are threatened by urban development in these municipalities.

The results showed a significant difference between respondents that mentioned poor ecological conditions as challenges to UTGS in the Limpopo and Eastern Cape Provinces. Some respondents from the Eastern Cape (30 %) indicated that erratic climatic conditions and soil and water quality, affected tree performance. The Limpopo Province on the other hand is characterized by semi-arid and subtropical climatic conditions (Mucina and Rutherford, 2006) with high annual rainfall patterns, ranging from 300 mm to 900 mm; hence tree performance in the Limpopo Province could be expected to be generally better than in the Eastern Cape.

5.6 Conclusions

Though not surprising, because of a lack of full recognition at the national and provincial levels of government, the results obtained in this chapter raise major concerns regarding the way in which UTGS are being managed at local government level in the country. Management of UTGS in most local government municipalities can neither be said to be planned, systematic nor integrated. The major drawback to adopting planned, integrated and systematic management was found to be limited resources in most municipalities. Due to a lack of political support, UTGS receive limited funds and this consequently affects the deployment of personnel and maintenance equipment for UTGS. There is therefore a need to bring to the attention of local political leaders the benefits of UTGS in improving both the environment and the livelihoods of local people.

Chapter Six

Key actors involved in urban forestry: their roles and their knowledge and perceptions of its benefits

6.1 Introduction

An integrated approach to the management of urban trees and green spaces (UTGS) requires the involvement and participation of different actors, including government and non-governmental organizations, community groups and individual urban residents (Kuchelmeister, 1999; Konijnendijk and Gauthier, 2006; Lawrence *et al.*, 2011). According to FAO (1995), for urban forestry to gain momentum in developing countries, the capabilities, roles and practices of different actors involved must be addressed. Unclear roles and overlapping responsibilities within and among different actors often results in poor management of UTGS (Mayers, 2002). As noted by Knuth (2005), Gerhardt (2010) and Lawrence *et al.* (2011), responsibilities for urban forests are usually divided within different departments, hence making it difficult for key actors to play out their respective roles. For example, in South Africa the National Forest Action Programme review (NFAP review, 2004) indicated that the then Department of Water Affairs and Forestry (DWAF) had trouble making clear decisions on what its role was in respect to urban forestry. This shortcoming is one of the many that has formed the basis for research on understanding the key actors involved in urban forestry, their roles and their capabilities in the deliverance of UTGS objectives.

Decisions on UTGS are influenced by the knowledge, values and perceptions of those who make them. While research on perceptions of citizens of urban forestry has received significant attention in other parts of the world (Dwyer and Miller, 1999; Gorman, 2004; Zhang *et al.*, 2007), there has been limited research on the knowledge and perceptions of municipal officials, and other key actors in this regard. The little that has been done emanates from the United States. For example, Elmendorf *et al.* (2003) found that the values and benefits of public trees, and their management, were not fully understood by either residents or leaders in northeastern Pennsylvania. Grado *et al.* (2006) established that most community leaders were not aware of funding sources for urban and community forestry projects in the Mississippi (Grado, *et al.*, 2006). A Pennsylvania study by Stevenson *et al.* (2008) which explored municipal officials' attitudes towards street tree programmes found that most municipal officials regarded tree programmes as less important than other civic responsibilities. More recently, Young (2010) examined at how municipal foresters perceived managing municipal green spaces for ecosystem services in northern America. The study found that municipal foresters perceived the management of green spaces to enhance ecosystem services to be increasingly significant to the goals and actions of their departments.

This study sought to determine key actors' knowledge levels and perceptions of UTGS benefits. The answers could help explain why urban forestry in South Africa is in a state of neglect, and create a basis for developing more effective ways by which municipal officials and other key actors could be more supportive to urban forestry. The researcher hypothesized that a lack of knowledge of UTGS benefits, as well as inconsistent (or limited) support from key actors has resulted in negative perceptions and limited implementation of UTGS objectives across the country, and in the selected provinces. In this study, organizations and individuals involved in UTGS activities were considered as the key actors in the delivery of urban forestry programmes in the country.

The study attempted to answer the following key questions:

1. Who are the key actors involved in UTGS activities at different levels of government?
2. What roles do the key actors play in relation to UTGS?
 - Are the key actors meeting their urban greening mandates as required by the national greening strategy?
 - What roles are they capable of playing to enhance urban forestry in the country?
3. How knowledgeable are key actors with regard to both tangible and intangible benefits of UTGS?
4. Which benefits of UTGS are most appreciated by the key actors?

6.2 Methods

The snowball sampling approach (see Chapter three for broad details on the method) was used to identify actors other than municipal officials involved in UTGS activities (e.g. tree planting, tree maintenance, green space planning and establishment, green space management, providing financial or material support to UTGS, using UTGS, regulating use of UTGS, and conducting awareness of the importance of UTGS). Respondents responsible for UTGS activities in each of the selected municipalities in the Limpopo and Eastern Cape Provinces were asked to identify other actors taking part in the afore-mentioned activities. A questionnaire was developed for key actors, other than municipal officials, involved in UTGS activities (see Appendix 2). This questionnaire was however, also attached to a municipal official's questionnaire (see Appendix 1) in order to get an understanding of the officials' roles, knowledge, and perceptions of UTGS benefits. The questionnaire was administered in three ways: face-to-face, telephone and via email. Face-to-face interviews were conducted with key actors within the selected study areas in the Limpopo and Eastern Cape Provinces, whereas telephone and online surveys were conducted with actors that were outside the study areas. Each questionnaire took approximately 20 minutes to complete.

Respondents were asked to state the benefits of UTGS that they were aware of, without being prompted. A list of 18 benefits of UTGS (prepared by the interviewer, after a thorough literature

search), was then used to tick answers provided by the respondents. The number of UTGS benefits that an individual respondent knew out of the total of 18 was then classified in the following way:

- Respondents scoring between the ranges of 1 to 6 were classified as “less knowledgeable”, while those;
- Scoring between 7 to 13 were classified as “knowledgeable”, and those;
- Scoring between 14 to 18 were classified as “very knowledgeable”.

Using the above categories, percentages of the respondents that were knowledgeable, less knowledgeable and very knowledgeable were calculated. To allow for statistical analyses, the different actors identified through the snowball approach were categorised into three groups. That is, municipal officials, government department officials (national and provincial departments), and other actors (which included NGOs, private companies, churches, schools and individual volunteers).

To determine key actors’ levels of appreciation of UTGS benefits, a 5 pointer Likert scale with 1 = very important, 2 = moderately important, 3 = neutral, 4 = slightly important, and 5 = not important was used to rate the importance of a set of tangible and intangible benefits of UTGS.

6.3 Data analysis

The data on key actors’ roles collected during interviews were used to analyse their performance against their urban greening roles and mandates presented in the National Urban Greening Strategy of 2005. Chi square (χ^2) tests were used to examine significant differences in levels of knowledge among different key actors involved in UTGS activities and the Kruskal-Wallis test was used to examine significant mean differences in the levels of appreciation of UTGS benefits among these key actors.

6.4 Findings

6.4.1 Response rate and information about the respondents

The study yielded a total of 79 interviews (Table 6.1). Out of these, 68 were conducted face-to-face with key actors in the Limpopo (40) and the Eastern Cape (28) Provinces. Nine were online surveys, and the remaining two (2) were conducted via telephone. Online and telephone interview responses came from different provinces of the country.

Table 6.1: Number of interviews conducted with different key actors

Actor type	No. of interviews conducted			Total
	Limpopo Province	Eastern Cape Province	Other Provinces	
Municipal officials	15	17	9	41
Department officials (national and provincial)	15	8	0	23
Other actors	10	3	2	15
Total	40	28	11	79

Municipal officials that were interviewed were from local municipalities (n=27), metropolitan (n=8), and district municipalities (n=6). The officials included environmental officers, horticulturists, town planners, managers (community services, parks and recreation, and engineering services), and a municipal mayor. The department officials interviewed were from both national and provincial government departments. These included the Departments of Agriculture, Forestry and Fisheries (DAFF) (n=6); Environmental Affairs and Tourism (DEAT) (n=4); Local Economic Development, Environment and Tourism (LEDET) (n=3); Economic Development and Environmental Affairs (DEDEA) (n=3); Agriculture (DoA) (n=2); Public Works (DPW) (n=2); Local Government and Housing (DLGH) (n=2); and Education (DoE) (n=1). The other actors included respondents from NGOs (n=5), private companies (n=4), schools (n=2), a church (n=1), traditional healers association (n=1), and individual volunteers (n=2).

6.4.2 Key actors involved in UTGS activities at different levels of government

Key actors involved in UTGS activities differed across levels of government (Figure 6.1). At national level, there were mainly two national government departments and one national NGO. These included DAFF, DEAT, and Food and Trees for Africa (FTFA). Other national departments such as DoE, DPW and DLGH were also identified as actors that occasionally took part in greening and tree planting activities.

In the Limpopo and Eastern Cape Province, provincial departments LEDET and DEDEA were found to be the main departments taking part in UTGS activities (Figure 6.1). Other provincial departments such as the Departments of Agriculture, Local Government and Housing in the Limpopo Province, and Human Settlements in the Eastern Cape were also identified as key actors in UTGS activities.

At local level, metropolitan and local municipalities were the main key actors involved in UTGS activities. However, some district municipalities were also supporting tree planting and greening in local municipalities existing within their jurisdiction. Local NGOs and private sector companies were additionally identified as key actors. Ward councillors and community development workers (CDW) were identified as mediators through which some NGOs, national, provincial, and local government bodies communicated tree planting and greening activities to local people. Schools, churches,

individual volunteers, and local residents were other key actors involved in tree planting, greening and use of UTGS.

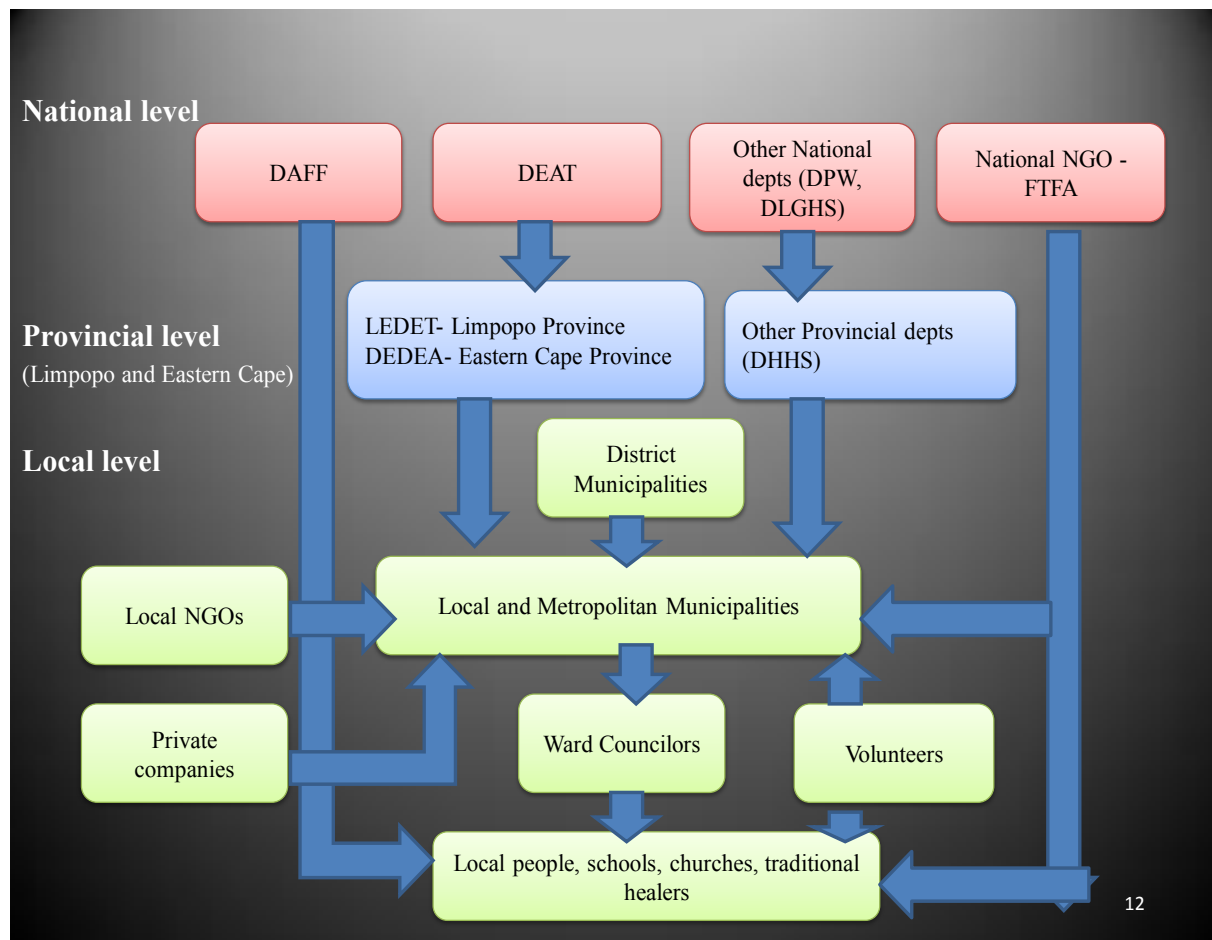


Figure 6.1: Key actors involved in UTGS activities at different levels of government

6.4.3 Roles played by key actors in UTGS activities

It was found that key actors in UTGS activities played seven roles. These included planting trees, planning for green spaces, providing tree support, providing financial support for UTGS, maintaining UTGS, regulating use of UTGS, and conducting awareness on the importance of UTGS (Table 6.2). Most key actors either planted trees or provided tree seedlings.

Table 6.2: Summary of roles being played by key actors in UTGS activities

Actor name	Roles played						
	Planting trees	Tree support	Financial support	Planning for UTGS	Maintaining UTGS	Regulating use of UTGS	Awareness on UTGS
DAFF	√	√				√	√
DEAT	√	√	√			√	√
LEDET/DEDEA	√	√				√	√
DHSs	√	√					
DLGH	√	√					
DPW	√	√					
FTFA	√	√					√
District Mun.	√	√	√				
Local and Metro Mun.	√	√		√	√	√	√
Local NGOs	√	√					√
Private companies	√	√	√				
Local schools/churches	√						√
Individual volunteers	√	√					

a) Department of Agriculture Forestry and Fisheries

The study established that DAFF provides trees (fruit and indigenous trees) to schools, disadvantaged communities, municipalities and other government departments on request. DAFF is the official custodian of the National Greening Programme, Million Trees Programme and National Arbor Week (see Chapter four; section 4.3.1.1). Officials from DAFF indicated that the department also conducts awareness programmes on tree planting, tree care and general benefits, on radio stations or physically in identified communities.

In terms of regulating use of trees, DAFF was found to be the department responsible for enforcing the National Forest Act of 1998. Through this Act, DAFF regional offices are responsible for issuing permits and ensuring compliance to the NFA (1998). A forest officer for a specific region issues permits for cutting down indigenous or protected trees. Protected trees such as the yellow wood (*Podocarpus latifolius*) require a permit to be removed on either public or private property. A permit from the department is also required for removal of protected trees during development activities. The developer is required to apply for a permit from the department, after which DAFF officials survey the area to determine protected species that exist in the area. The developer is at times required to replant the trees removed after development.

b) Department of Environmental Affairs and Tourism

The Department of Environmental Affairs and Tourism is involved in tree planting and supporting establishment of green spaces. It provides material and financial support to municipal projects (including greening projects), as part of its corporate social responsibility programme, and also in response to the Expanded Public Works Programme (EPWP)³. Land rehabilitation and greening projects, such as the establishment of parks in municipalities, and food gardens in schools are also funded by DEAT. DEAT also takes part in planting of trees on environmental events such as World Environment Day, and World Biodiversity Day. In terms of regulating use of UTGS, DEAT is the national department responsible for implementing and enforcing compliance to NEMA (1998), NEMBA (2004), and NEMPA (2004) which, as illustrated in Chapter four (section 4.3.2.2) have some regulatory provisions for protecting trees and green spaces in urban areas.

c) Provincial departments LEDET and DEDEA

Provincial departments LEDET and DEDEA were identified as the main departments responsible for environmental issues in the Limpopo and Eastern Cape Provinces, respectively. The two are involved in tree planting at schools, churches, community buildings, government/tribunal offices, and in areas hit by natural disasters. Both LEDET and DEDEA plant trees during environmental cleaning campaigns and on environmental events such as World Environment Day. The departments conduct greenest municipality and Enviro-schools competitions, which encourage tree planting and greening in municipalities and in schools (see Chapter four; section 4.3.1.2). They also conduct awareness programmes on the importance of planting and conserving trees.

In terms of regulation, LEDET and DEDEA are responsible for implementing provincial environmental laws, i.e. Limpopo Environmental Management Act (LEMA, 2004) and Eastern Cape Environmental Conservation Act (ECECA, 2004), respectively. The two departments are also responsible for implementing all other national environmental legislations (e.g. NEMA, 1998). Both LEDET and DEDEA have compliance/law enforcement units which are responsible for monitoring compliance to the environmental regulations. Officials from LEDET and DAFF indicated that the removal of wet or live indigenous trees whether in urban or rural areas is not allowed. Once found with live trees, an individual is charged with an admission of guilt fine (J534), depending on the value of the particular tree removed. A permit for removal of indigenous dry or dead trees for commercial purposes is also required. Local people are only allowed to collect a head load of dry wood without a permit. Officials from both LEDET and DEDEA indicated that trees on municipal land are a responsibility of the municipality which ideally should regulate their use. Guided by national and

³The EPWP is a government programme that was launched in April 2004 to promote economic growth and create sustainable development. The programme is aimed at providing poverty and income relief through temporary work for the unemployed, to carry out socially useful activities. The environmental sector is required to contribute to the EPWP.

provincial laws, municipalities are supposed to formulate their own bylaws and regulate use and removal of trees on municipal property.

d) Other national and provincial government departments

National government departments such Department of Public Works (DPW) and Department of Local Government and Housing (DLGH), occasionally take part in tree planting activities in the two surveyed provinces. The provincial department of public works in the Limpopo Province, during the reign of the previous Member of the Executive Council (MEC) (2006-2010), was the implementer of the Greening Limpopo Project initiated by the premier of the province. The programme has however, been languishing since the MEC left office. The provincial department of housing and human settlements in the Eastern Cape initiated a programme aimed at promoting the planting of trees in newly built residential areas. Respondents from DPW and DLGH however, indicated that they were not mandated to budget for or support tree planting activities.

e) Food and Trees for Africa (FTFA)

The national NGO (FTFA) as earlier alluded to in Chapter four, carries out a number of tree planting and greening activities in the country. Among its many tasks, FTFA runs and coordinates the Food Gardens for All Programme, Trees for Africa Programme, Trees for Homes Programme, and the EduPlant School Competition Programme. With the help of sponsors (e.g. Total company), FTFA establishes permaculture gardens and also provides indigenous and fruit trees to schools and low-income communities (FTFA, 2011). This NGO has in the past 22 years been making recommendations to local government (municipalities) to incorporate greening in their development plans.

f) District municipalities

The study established that some district municipalities (two) supported and funded local municipal greening projects. One district municipality in the Eastern Cape set aside funds for greening local municipalities within its jurisdiction, in response to the Expanded Public Works Programme (EPWP) mandate. Another district municipality in the Limpopo Province supports and provides trees to its local municipalities on an annual basis during events such as Arbor Week. Most other district municipalities (four) however, indicated that tree planting and greening was not their mandate but that of local municipalities.

g) Local and metropolitan municipalities

Local and metropolitan municipalities were found to be responsible for managing UTGS under their jurisdiction. These municipalities are responsible for planting and maintaining trees in public parks,

public open spaces, municipal buildings, and on streets. Through the Integrated Development Plan (IDP) and Spatial Development Plan (SDP) formulation processes, local and metropolitan municipalities are also responsible for integrating urban tree and green space planning in the aforementioned plans. In addition, some municipalities (see Chapter five; section 5.4.5.4) also have bylaws that specifically address trees in streets, cemeteries and public amenities. Other municipalities however, indicated that regulating use of trees was not their mandate, but that of national and provincial departments such as DAFF, LEDET and DEDEA. Municipal ward councillors act as mediators through which tree planting and greening projects are communicated to the local people. Ward councillors have an additional task of identifying who in the communities should receive trees, be involved in a greening project, and/or where the trees should be planted in the targeted community areas.

h) Local NGOs

The study found some NGOs involved in greening and tree related activities at the local level. These included: Greenpop, Wildlife Environmental Society of South Africa (WESSA), and the Millennium Tree Planting Project (MTPP) group. Greenpop focuses on tree planting activities in schools, communities, and deforested areas, with the aim to spread environmental awareness, uplift under-greened communities, make greening enjoyable and combat climate change (Greenpop, 2011). Organizations such as WESSA integrate tree planting activities in different environmental and sustainability projects. For example, tree planting had been integrated in the organization's permaculture project at a school in the Eastern Cape Province (Wilkinson, pers. comm., 2011). The MTPP group supports greening and cleaning activities in the Makana Municipality in Grahamstown, Eastern Cape.

i) Private companies and service provider organizations

Private companies (e.g. Total Company, Eskom, SABC, and private nurseries) fund and/or support tree planting and greening activities on request. This support is often in the form of trees or funds for greening initiatives. Two municipalities in the Limpopo Province had received greening support from private companies on request; the Polokwane Municipality received support with trees from the Polokwane Rotary Club, Telkom, Silicon Smelter, and Konica Minata, while the Mogalakwena Municipality received funds from the National Lottery Club to support a greening initiative that the municipality developed. Private companies such as Total, Eskom, and PicknPay also support and fund national greening programmes such as Arbor Week. Other private companies provide service to greening activities as consultants, or as greening project implementing partners. For example, Silver Stars Environmental Consultancy contributed to park establishment in the Lukhanji local municipality in the Eastern Cape Province. Some private nurseries such as Amalinda Nursery in East London,

Eastern Cape, and Retsene Nursery in the Limpopo Province occasionally donate trees to schools, or in certain instances reduce prices for trees during events such as Arbor Week. Private nurseries also provide guidance and information on types of trees and maintenance requirements on request.

j) Local schools, churches, traditional healers and other urban residents

Local schools, churches and urban residents are the recipients of urban trees and are the overall users of the urban forest resource. Some local people take part in tree planting and greening activities within their household plots, whereas others may be involved in municipal, NGO, school, work or community related tree planting and greening activities. I witnessed two schools receiving trees from DAFF during the 2011 Arbor Week campaign. Some private individuals also provide tree seedlings (fruit trees) out of goodwill to local people at no charge. For example, one volunteer from the Modimolle municipal area in the Limpopo Province, occasionally distributed trees to local people in RDP settlement areas. Vander Merwe (pers. comm., 2011) indicated that his love for trees and his background of having grown up in a treed environment moved him to buy and donate trees to local people. Further, Vander Merwe (pers. comm., 2011) indicated that “local people loved trees, and that some were even willing to pay for the trees”. Urban residents, such as traditional healers also use trees in urban and peri-urban areas for medicinal purposes. For example, a traditional healer from the Limpopo Province indicated that he used the bark and roots of trees to treat his patients. The traditional healer mentioned that he had attended a workshop organised by DEAT, where he was trained on sustainable methods of harvesting these tree products. Apart from taking part in tree planting activities, local people also maintain and in certain instances regulate use of urban trees within their household plots, through the household head.

6.4.4 Analysis of key actors’ practical performance against urban greening mandates

This study established that only a few actors were meeting their urban greening mandates as required by the national urban greening strategy (Table 6.3).

Table 6.3: Analysis of key actors' practical performance against urban greening mandates

Key actor	Where powers are derived from	Mandates	Roles (UTGS)	Practice
DAFF	Parliament/Constitution	<u>Forestry Branch</u> Ensure the sustainable management of the country's forest resources in order to realize their optimal social, environmental and economic benefits.	- Lobby for greening funds from other key actors and provide them to local government and urban communities	- Lobbying is carried out. However, none of the local municipalities surveyed had received greening funds from DAFF
			- Support the establishment of a network of advice and information on urban forestry issues, including legislation and opportunities for local economic development, and make these available to local government	- No networks have been established over the years and none of the local municipalities surveyed had received information on legislation relating to urban forestry
			- Support a more effective local government planning process with particular attention to opportunities for the incorporation of urban forestry in local development plans	- DAFF has been delivering on this. However, only a few municipalities have incorporated greening in development plans
			- Develop a limited number of urban greening models to demonstrate effective community participation and the potential of trees to contribute to urban livelihoods	- No evidence to suggest that this is being done
		<u>Agriculture Branch</u> Ensure food security	- Support the urban agriculture aspects of urban greening	- Being done. Fruit trees are incorporated in urban greening
			- Provide a means of including a tree component in urban agriculture	- Being done. Fruit trees are incorporated in urban agriculture
DEAT	Parliament/Constitution	Ensure the protection of the environment and conservation of natural resources, balanced with sustainable development and equitable distribution of benefits derived from natural resources.	- Support EduPlant school greening projects	- Support is given, but not on an annual basis. It is done as and when resources are available
			- Support the planting of indigenous trees in urban areas	- Being done. DEAT plants indigenous trees on environmental calendar dates (e.g. World Environment Day World Biodiversity Day)
			- Support integrated environmental planning	- Not adequately supporting green space planning
			- Manage a department nursery in Bloemfontein	- DEAT is managing the nursery
Department of Education (DoE)	Parliament/Constitution	Oversee primary and secondary education in South Africa	- Provide specialist knowledge in horticulture and landscaping	- None of the DEAT officials indicated that this was being done
			- Link urban greening issues to the curriculum for (2005) or its successor	- Hasn't been done (In the process)
			- Support EduPlant school greening projects	- Support is given on request
			- Provide a link to educational institutions throughout provinces	- Is done on request
Department of Housing	Parliament/Constitution	Ensure sustainable human settlements	- Provide a means of distributing materials to educational institutions, teachers and pupils within a province	- Is done on request
			- Establish new housing projects with a tree component	- Not always done; was only done once in RDP areas in the Limpopo, and is in the process of being done in the Eastern Cape

Key actor	Where powers are derived from	Mandates	Roles (UTGS)	Practice
LEDET	Legislature	Develop the provincial economy and promote and manage environmental and tourism activities in the Limpopo Province	- Ensuring compliance to all national environmental Acts and LEMA - Ensure sustainable development in the Limpopo Province by implementing the National Environmental Act and issuing environmental authorisations	- Inadequately done in urban areas. Monitoring compliance to laws is limited by staff shortages - Inadequate in ensuring green space planning at local municipal level - Inadequate protection of UTGS in development and environmental authorisations processes (see Chapter four)
DEDEA	Legislature	Spearhead economic development and environmental management in the Eastern Cape	- Ensure sustainable development through EIAs - Ensure compliance to environmental legislations - Ensure conservation of biodiversity and protection of the environment for sustainable development in the Eastern Cape Province	- Inadequate in ensuring that UTGS are protected during development and environmental authorisations processes (see Chapter four) - Inadequately done in urban areas. Monitoring compliance to laws is limited by Staff shortages
NGOs	Memberships	Community empowerment and mobilisation	- Support community mobilization and empowerment, and act as a conduit for their participation in local development planning	- Being done, however few NGOs were involved in UTGS activities in the study areas. National NGO FTFA is not active in most areas of the Eastern Cape
			- Initiate and manage community nurseries where viable	- Only one NGO was managing a community nursery. Very few NGOs were involved in UTGS activities in the study areas.
			- Initiate and manage community awareness campaigns and specific interventions	- Being done by the surveyed NGOs
Local and metropolitan municipalities	Council	Ensure that municipal services are financially and environmentally sustainable. Promote a safe and healthy environment	- Act as a hub through which all local development interventions are planned, implemented and managed, often through the LDO/IDP process	- Green space planning is not integrated in most municipalities' LDO and IDP processes
			- Collect rates and taxes which could be channelled to urban greening	- Insufficient or no funds at all are allocated for UTGS management in most municipalities
			- Manage municipal nurseries	- Only a few municipalities have nurseries (i.e. six out of 28 surveyed in the study)
			- Provide support to the watering and aftercare of trees in urban areas	- Not being done effectively because of lack of funds, equipment and personnel (see Chapter five)
Department of Health (DoH)	Parliament	Ensure a long and healthy life for all South African citizens	- Develop and support the management of urban parks and open spaces, including a tree component	- Not being done effectively because of lack of funds, equipment and personnel (see Chapter five)
			- Implement a national food gardening programme including a tree component in order to improve nutrition - Support a fruit tree programme, to which community forestry can link for fruit tree support	- None of the key actors mentioned that this was being done. None identified DoH as a key actor in UTGS activities - DoH was not identified as a key actor in UTGS activities in the surveyed municipalities
Other private companies	Owners	Support greening initiatives	- Provide sponsorship support to specific areas of urban greening	- Being done by some private companies in the Limpopo. However, support is mostly in form of tree seedlings

Source: Compiled by the author based on information gathered from the National Urban Greening Strategy (2005) and through interviews with key actors.

6.4.5 Constraints to key actors' involvement in UTGS activities

Key actors, other than municipal officials mentioned some constraints that limited their involvement in UTGS activities (Figure 6.2). Over two thirds of the respondents (68.4 %) mentioned low municipal support as a major limiting factor to their involvement in UTGS activities. Respondents from DAFF, DEAT, LEDET and DEDEA (55. 2%) also mentioned staff shortages within their departments as a constraint. According to some DAFF and LEDET officials (13.2 %), the inadequacy of the NFA and other Environmental Acts in regard to UTGS also constrains the officials from regulating use of UTGS. A few respondents from private companies (5.3 %) mentioned that they did not participate in UTGS activities because municipalities did not request them to participate.

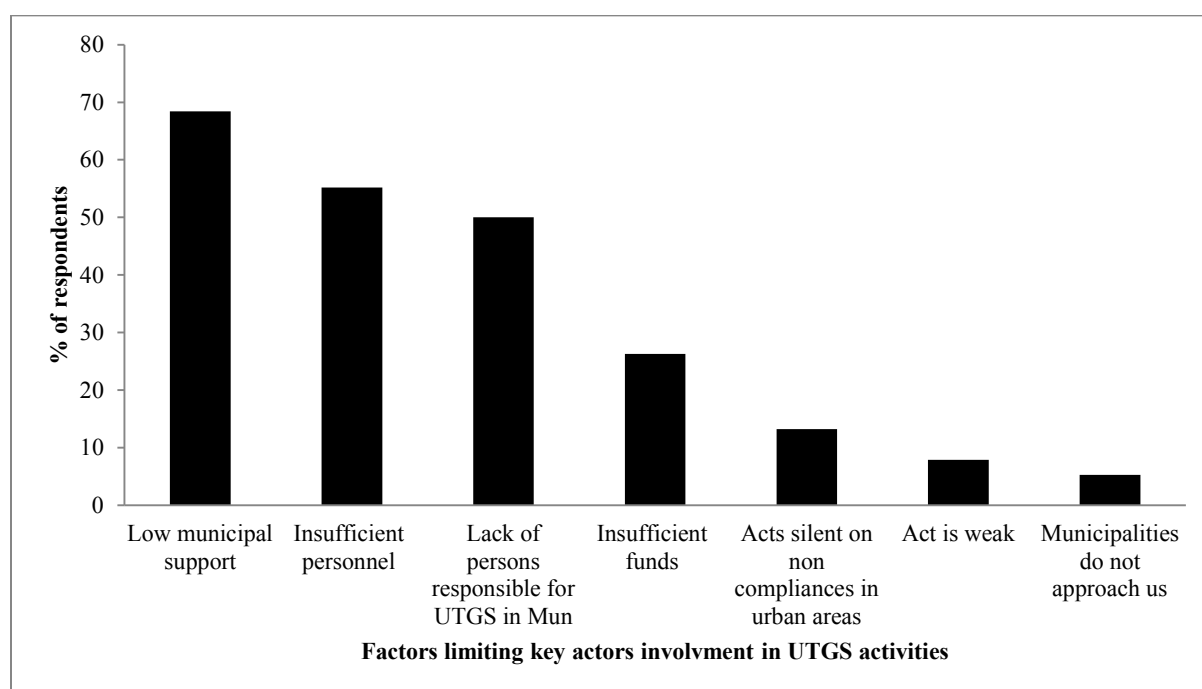


Figure 6.2: Constraints to key actors' involvement in UTGS activities (n=38)

6.4.6 Key actors' knowledge and perceptions of UTGS benefits

a) Benefits of UTGS that key actors were most and least aware of

Key actors identified 16 benefits of UTGS without being prompted (Figure 6.3). The top four benefits of UTGS that respondents were most aware of were providing food (71.4 %), providing shade (68.9 %), climate change mitigation (65.6 %) and enhancing beauty (65.1 %). Awareness of benefits such as providing medicines (9.2 %) and building materials (3.7 %) was low amongst the key actors. None of the respondents mentioned increasing property value or relieving stress as benefits of UTGS.

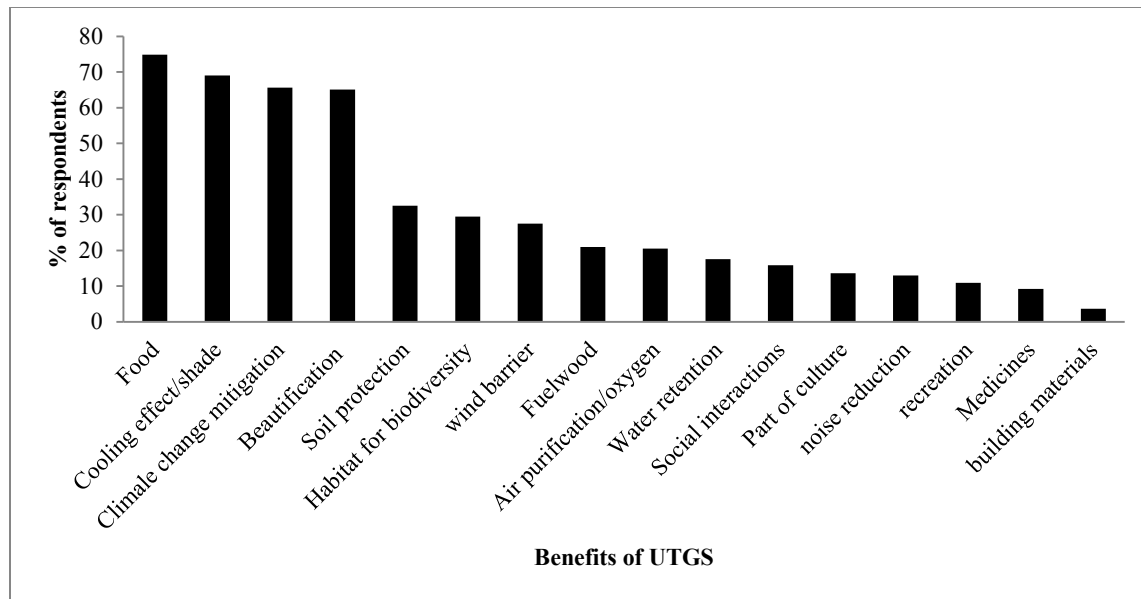


Figure 6.3: Benefits of UTGS mentioned by key actors in descending order (n=79)

Key actors in the Limpopo Province were significantly more aware of the fuelwood benefit of UTGS than those in the Eastern Cape ($\chi^2 = 6.64$; $df = 1$; $p = 0.010$) (Table 6.4). In addition, key actors in the Limpopo Province were also more aware of the medicinal value of trees than those in the Eastern Cape ($\chi^2 = 53.65$; $df = 1$; $p < 0.001$). There were however more key actors (42.8 %) in the Eastern Cape that were aware of the soil protection benefit of UTGS than those in the Limpopo Province (27.5 %) and the difference was significant ($\chi^2 = 4.91$; $df = 1$; $p = 0.027$). Additionally, key actors in the Eastern Cape Province were significantly more aware of the wind barrier ($\chi^2 = 4.50$; $df = 1$; $p = 0.034$) and water retention ($\chi^2 = 4.42$; $df = 1$; $p = 0.036$) benefits of UTGS than those in the Limpopo Province.

Table 6.4: Benefits of UTGS that key actors in different provinces were most and least aware of (%)

Benefits of UTGS	Limpopo (n=40)	Eastern Cape (n=28)	Other provinces (n=11)	All provinces (n=79)
Tangible benefits				
Food	75.0 ^a	67.9 ^a	81.8	74.9
Fuelwood	25.0 ^a	10.7 ^b	27.3	21.0
Medicines	15.0	3.6	9.1	9.2
Building materials	7.5	3.5	0.0	3.6
Intangible benefits				
<i>Regulating services</i>				
Cooling effect/shade	70.0 ^a	64.3 ^a	72.7	68.9
Climate change mitigation	72.5 ^a	60.7 ^a	63.6	65.6
Soil protection	27.5 ^a	42.8 ^b	27.3	32.5
Habitat for biodiversity	32.5 ^a	28.6 ^a	27.3	29.5
Wind barrier	25.0 ^a	39.3 ^b	18.2	27.5
Air purification/oxygen	20.0 ^a	14.3 ^a	27.3	20.5
Water retention	7.5 ^a	17.9 ^b	27.3	17.6
Sound barrier	10.0 ^a	10.7 ^a	18.2	12.9
<i>Cultural services</i>				
Beautification	67.5 ^a	64.3 ^a	63.6	65.1
Social interactions	15.0 ^a	14.3 ^a	18.2	15.8
Part of culture	17.5 ^a	14.2 ^a	9.1	13.6
Recreation	7.5 ^a	7.1 ^a	18.2	10.9

Different superscript letters indicate significant differences between actors who mentioned benefit in the Limpopo and Eastern Cape at 0.05 level of confidence.

b) Levels of knowledge of UTGS benefits

Over half of the respondents (54.4 %) were less knowledgeable of UTGS benefits (Table 6.5) and only 8.9% were very knowledgeable. Overall, there was a significant difference between key actors that were less knowledgeable and those that were knowledgeable ($\chi^2 = 5.83$; $df = 1$; $p = 0.016$). There was also a significant difference between key actors that were knowledgeable and those that were very knowledgeable of UTGS benefits ($\chi^2 = 22.13$; $df = 1$; $p < 0.001$). Government department officials were more very knowledgeable (17.4 %) of the benefits of UTGS than municipal officials (4.9 %) and the difference was significant ($\chi^2 = 7.35$; $df = 1$; $p = 0.007$).

Table 6.5: Levels of knowledge of UTGS benefits by different types of actors (%)

Level of knowledge	Department officials (n=23)	Municipal officials (n=41)	Other actors (n=15)	All actors (n=79)
Less knowledgeable	39.1	58.5	66.7	54.4 ^a
Knowledgeable	43.5	36.6	26.7	36.7 ^b
Very knowledgeable	17.4 ^a	4.9 ^b	6.7 ^{ab}	8.9 ^c

Different superscript letters indicate significant differences in levels of knowledge between key actors at 0.05 level of confidence.

c) Key actors' perceptions of tangible and intangible benefits of UTGS

Out of 18 benefits of UTGS prepared by the author, most respondents (79.7 %) perceived food as the most important benefit. Other tangible benefits of UTGS such as the provision of fuelwood (41.7 %), building material (37.9 %) and medicines (35.4 %) were perceived as less important. There were significantly more municipal officials than department officials that perceived fuelwood as a very important benefit of UTGS ($H = 9.36$; $P = 0.042$) (Table 6.6). Other actors also perceived fuelwood as a very important benefit of UTGS significantly more than the department officials ($H = 9.36$; $p = 0.032$). In addition, other actors more significantly perceived provision of medicine as an important benefit of UTGS than department officials ($H = 14.22$; $p = 0.004$), and municipal officials ($H = 16.73$; $p = 0.009$).

With regard to intangible benefits of UTGS, the regulating services of UTGS that were perceived to be very important by most respondents were providing shade (83.5 %) and climate change mitigation (70.9 %). More than half of the respondents also perceived wind barrier (63.3 %) air purification (60.8 %), soil protection (56.9 %), habitat for biodiversity (53.1 %), and sound barrier (51.8 %) as very important regulating services of UTGS. The cultural benefit that was perceived to be very important by most respondents was enhancing beauty (74.7 %). Enhancing property value was the least intangible benefit of UTGS which was perceived as very important (26.7 %). More than half of the respondents (51.8 %) could not rate this benefit. Department officials significantly perceived habitat for biodiversity ($H = 10.89$; $P = 0.012$), soil protection ($H = 10.99$; $p = 0.005$), wind barrier ($H = 16.68$; $p = 0.008$), and enhancing social interactions ($H = 8.61$; $p = 0.042$) as important benefits of UTGS more than municipal officials.

Table 6.6: Importance of tangible and intangible benefits of UTGS as rated by different actors (mean±sd)

Benefits of UTGS	Department officials (n=23)	Municipal officials (n=41)	Other actors (n=15)
Tangible			
Food	4.5±1.1 ^a	4±1.2 ^a	4.7±0.9 ^a
Fuelwood	2.8±1.3 ^a	3.8±1.4 ^b	4.2±1.3 ^b
Provides medicines	3.7±1.4 ^a	3.2±1.5 ^a	4.5±1.3 ^b
Provides building materials	4.2±1.1 ^a	3.9±1.4 ^a	4.3±1.1 ^a
Intangible			
<i>Regulating services</i>			
Cooling effect/shade	4.8±0.7 ^a	4.5±0.9 ^a	5.0±0.0 ^a
Climate change mitigation	4.9±0.4 ^a	4±1.3 ^a	4.7±0.8 ^a
Soil protection	4.6±0.9 ^a	3.5±1.5 ^b	4.4±1.1 ^a
Habitat for biodiversity	4.3±1.5 ^a	3.5±1.4 ^b	4.2±1.2 ^a
Wind barrier	4.9±0.4 ^a	3.7±1.4 ^b	4.7±1.1 ^a
Air purification	4.5±1.3 ^a	3.9±1.4 ^a	4.1±1.4 ^a
Water retention	4.3±1.2 ^a	3.6±1.4 ^a	4.2±1.1 ^a
Sound barrier	4.4±1.2 ^a	3.2±1.5 ^b	3.8±1.4 ^a
<i>Cultural services</i>			
Enhances beauty	4.9±0.5 ^a	4.1±1.3 ^a	4.8±0.6 ^a
Promotes social interaction	4.4±1.1 ^a	3.5±1.4 ^b	4.2±1.5 ^a
Part of culture	3.9±1.4 ^a	3.7±1.4 ^a	4.3±1.1 ^a
Enhances recreation	4.1±1.1 ^a	3.2±1.4 ^b	4.2±1.3 ^a
Relieves stress	3.9±1.4 ^a	3.2±1.5 ^a	3.9±1.4 ^a
Enhance property value	3.4±1.3 ^a	3.3±1.4 ^a	3.8±1.5 ^a

Different superscript letters indicate significant differences in key actors' importance rating of UTGS benefits at 0.05 level of confidence.

6.5 Discussion

6.5.1 Key actors involved in UTGS activities: their roles and their capabilities

Consistent with FAO (1995) and Lawrence *et al.* (2011), this study established that State government departments, local government municipalities, NGOs, the private sector, local groups (churches and schools), volunteers and urban residents at large played certain roles that influenced UTGS (Table 6.2). However, it was observed that in practice most key actors did not meet their urban greening mandates as required by the national urban greening strategy (Table 6.3). The key actors do not work in collaboration with each other, and most play the same function which is tree planting or providing material support in the form of tree seedlings (Table 6.2). These findings support Shackleton (2006) who reported that key actors, such as DAFF were more focussed on facilitating tree distribution in the country, with less attention given to the planning and management of these trees. The impression created from these findings is that there are multiple efforts by different actors in promoting tree planting and greening activities in the country. The concern, however, remains on the roles that different actors could play to complement each other and promote effective management of UTGS.

As stated by Shackleton (2006), most municipalities in South Africa are largely incapacitated in terms of equipment, human and financial capital, and are consequently unable to effectively manage trees and green spaces under their jurisdiction. It is therefore quite unfortunate that only a few key actors offer financial support to UTGS and that none at all offer support with maintenance equipment (Table 6.2). In essence, municipalities receive and plant trees which they find difficult to maintain and manage because of their limited resources. For example, after receiving 500 trees from DEAT during the 2010 FIFA Soccer World Cup, one municipality in the Eastern Cape Province of South Africa had not planted them six months later, due to staff shortages (Kuruneri-Chitepo, 2011). In another municipality, a large proportion of the trees that were planted died eight months later, due to a lack of water tankers for watering the trees (Kuruneri-Chitepo, 2011). A question the key actors need to ask therefore is “why plant trees and establish green spaces if they will not be effectively managed?” As bemoaned by other researchers in South Africa (Shackleton 2006; Parkin *et al.*, 2006), the gap in urban tree management calls for more involvement of other actors in UTGS management activities. Instead of every key actor planting trees and providing tree support, some could partner with local municipalities and play a role in the management of UTGS.

Studies from other parts of the world show that some local government bodies partner with the State, with private companies and other NGOs in managing UTGS (Knuth, 2005; Lawrence *et al.*, 2011). In London for example, a London Tree and Woodland Grant Scheme was being administered by an NGO, because the NGO was more able to maintain an urban presence than the state (Lawrence *et al.*, 2011). In Finland and Sweden, National Urban Parks were established in partnership with State and municipal authorities, as well as other stakeholders (Lawrence *et al.*, 2011). As illustrated by Handavu (2011) local private companies within a municipality could also adopt and manage municipal parks as their corporate social responsibility. Since local municipalities are overwhelmed with other activities, including provision of basic services such as housing, electricity and water, another alternative would be leasing out tree maintenance activities to private companies to improve the management of UTGS. One example is the Johannesburg Metropolitan Municipality’s initiative of engaging an agency (Johannesburg City Parks) to manage its regional parks, open spaces and cemeteries. Although Johannesburg City Parks is owned by the Johannesburg Metropolitan Municipality, the agency is responsible for the maintenance and development of all parks, open spaces and cemeteries in the municipality (Knuth, 2005). The agency then charges the municipality for the services rendered. For the reason that the agency runs on its own, with its own managing director, better management of UTGS is being achieved.

Gaps were also found in regard to integrated planning for UTGS (Table 6.2 and 6.3). This responsibility mainly lies in the hands of municipalities which according to the urban greening strategy, are mandated to

plan and implement urban greening developments through the local government process of preparing IDPs and land development objectives (Table 6.3). However, findings of the current study revealed that only a few municipalities have incorporated green space planning in their IDPs (DAFF, 2011a; FTFA, 2011). This is quite unfortunate as the successful incorporation of trees into the social and physical structure of cities and towns requires integrating forestry into overall urban planning (FAO, 1995). Baycan-Levent and Nijkamp (2009) concluded that “in general, cities which integrated green structure planning in city development planning succeeded more in reaching green policy targets, than those that did not”. Urban trees and green spaces improve the quality of life for urban residents (Nielsen and Nilsson, 2007; Jim, 2010) and if planning and development does not take this into consideration, then urban residents are being denied a healthy quality of life. The Department of Agriculture, Forestry and Fisheries and FTFA indicated that they had been lobbying for the integration of green space planning in municipal IDPs; however, there has been little response and progress to date in terms of achieving this end (Matsea, 2011; Park, 2011, Tele. comm.). This is largely because most municipalities do not prioritise environmentally related issues, including UTGS.

The lack of recognition of UTGS in urban planning at municipal level also stems from the point that national and provincial level policy and planning do not fully recognize the importance of UTGS in towns and cities (see Chapter four). The government at the national and provincial levels can impact on the management and governance of UTGS at local government level (Knuth, 2005). For example, key actors such as DEAT and provincial departments LEDET and DEDEA, who have the authority to approve development plans (see Table 6.3), could play an important role in ensuring that UTGS are incorporated in municipal development planning.

Findings of this study also showed that awareness campaigns on the importance of trees and green spaces were seldom conducted by the key actors involved in UTGS activities. Awareness-raising was mainly done on big calendar events such as Arbor Week, World Environment Day, Weedbuster Week, Biodiversity Day, and on Public Participation Indabas by some municipalities. The lack of regular and consistent awareness-raising of the benefits of UTGS may lead to low public support thereof. Urban residents are unlikely to support tree planting activities if they do not understand the benefits that trees provide (Kuchelmeister, 2000). Non-Governmental Organizations can play a huge role in promoting awareness of the importance of UTGS among local communities; however, this study found few NGOs involved in UTGS activities in the study areas. For example, one national NGO which has particular influence on tree planting activities in the country (FTFA) was said to be inactive in most areas of the Eastern Cape Province. In addition, government entities such as the South African National Biodiversity

Institute (SANBI) with responsibility to promote and conserve biodiversity, was also not involved in UTGS activities in both the Limpopo and Eastern Cape Provinces.

The role of politicians in raising awareness of UTGS related activities amongst local communities could be useful (Konijnendijk *et al.*, 2004). For example, the impact of America the Beautiful Programme by former President George H.W. Bush of the United States was seen to be successful in raising awareness of the importance of trees and other vegetation in beautifying the environment (Johnston, 1996). The involvement of Chairman Mao Zedong in a beautification programme also had a similar impact on awareness-raising of the importance of vegetation in China (Palijon, 2002). In this study, as earlier alluded to in Chapter four, the involvement of the Premier of the Limpopo Province in the Greening Limpopo Programme seemed to have attracted a number of stakeholders including private companies to support tree planting activities in the province (Matamele, pers. comm., 2011). Unfortunately, most municipal officials, as was seen in Chapter five, stated low political support as a challenge to UTGS management which implies that there is generally limited support to UTGS activities by most politicians at local municipal level. In order to increase awareness of the importance of UTGS amongst urban residents, there is a need for more involvement of local and high level politicians in UTGS activities.

In terms of regulating use and removal of UTGS, it can be safely said that none of the key actors is effective in this regard as there is a lack of clarity and understanding of responsibilities within and amongst the key actors. Some municipalities have bylaws regulating planting and use of trees, most of which are not known even by the municipal officials themselves (see Chapter five). Officials from other municipalities indicated that regulating use of trees was not their mandate or area of competence, but that of the national and provincial departments. On the other hand, DAFF, LEDET and DEDEA officials interviewed in the study indicated that trees existing on municipal land were a responsibility of the municipality to manage and regulate use thereof. This finding shows a lack of clarity amongst key actors about who is responsible for regulating use of UTGS. As indicated in Chapter four through the NFA (1998), NEMA (1998), NEMBA (2004), LEMA (2004), ECECA (2004), and NHRA (1999) officials from DAFF, DEAT, DEDEA, LEDET, and SAHRA could regulate the use of UTGS; however, the probability of this being done in practice is doubtful. Firstly, as earlier alluded to in Chapter four, the former Acts do not explicitly mention urban trees, and only provide partial protection of UTGS; secondly, the finding that DAFF, DEAT, DEDEA and LEDET face staff shortages makes compliance monitoring to the Acts difficult; and lastly some officials from the former departments view the Acts as lenient and silent on individual non-compliances in urban areas. The latter further shows that these Acts are largely non-operational in urban areas.

These findings call for a national urban forest policy and legislation, which defines responsibilities for UTGS between state and local government, and also provides clear guidance and direction to local municipalities on how to plan and manage their UTGS. State departments such as DAFF could aid or create a platform for the formulation of such a policy in the country. In England for example, the government department for Communities and Local Government (CLG) gave local authorities clear guidance on a wide range of urban forest policies and management practice (Britt and Johnston, 2008). The department also set management targets which it hoped all local authorities would achieve within five years (Lawrence *et al.*, 2011). With such guidelines and requirements by the state, local municipalities can easily adopt and implement UTGS policies and laws.

In summary, trees are being planted in urban areas, and green areas such as parks are being established but when it comes to management and overall governance of these trees (including monitoring, maintenance and regulating use), none of the key actors is playing a significant role. As much as efforts to plant or support tree planting and greening are evident from a wide range of actors, these are likely to be in vain if the trees and green spaces are not well managed. There is therefore a need for key actors involved in UTGS activities, not only to provide support with tree planting materials, but also to support and play a significant role in other governance and management aspects of UTGS.

6.5.2 Key actors knowledge and perceptions of UTGS benefits

a) Knowledge and perceptions of tangible benefits of UTGS

Most key actors were aware of food as a tangible benefit of UTGS, and most also perceived it to be a very important benefit of UTGS. These findings suggest that key actors involved in UTGS activities acknowledge the role that these can play in improving food security and consequently reducing urban poverty. Several researchers attest to the point that fruits from urban trees serve as an immediate source of food and can improve food security of urban residents (Uddin, 2006; Frank *et al.*, 2011; Fuwape and Onyekwelu, 2011). Sadly, however, most key actors were unaware of and did not appreciate the other tangible benefits of UTGS such as provision of fuelwood, medicines and building materials. According to some DAFF and LEDET officials interviewed in this study, use of trees for fuelwood in urban areas was not encouraged because urban areas are considered to have relatively fewer trees than rural areas. However, a complementary study by Kaoma (2012) found that a considerable number of urban residents from RDP, informal and old township residential areas in the Limpopo and North Western Provinces of South Africa used fuelwood from trees on household plots (33.8 %) and on edges of towns (42.2 %), as a

source of energy. The study by Kaoma (2012) also revealed that urban residents used wood from UTGS for building and fencing.

Studies from West Africa (Fuwape and Onyekwelu, 2011) and other African countries (Botswana, Malawi and Zimbabwe) also revealed that poor households collected fuelwood from trees within urban areas and on urban edges (Nkambwe and Sekhwela, 2006; Openshaw, 2010; Murwendo, 2011). Key actors in the Limpopo Province were more aware of the fuelwood and medicinal value of trees than those in the Eastern Cape Province probably because there are more trees in the former than the latter. A study by Shackleton and Shackleton (2004) revealed that different plant species ranging between 200 and 300 were used for numerous purposes in the Limpopo Province; therefore, the occurrence of different tree species in the province with multiple uses could have led to more actors from the Limpopo Province knowing and appreciating the fuelwood and medicinal benefits of UTGS. Although several researchers have documented that urban trees increase property values (Dwyer *et al.*, 1992; Dombrow *et al.*, 2000; Tyrväinen, 2001), none of the key actors surveyed in this study were aware of this benefit. This finding was also reflected by Young (2010), where only 25.1 % of municipal officials perceived enhancing property value as a very important green space management objective. Most of the respondents in the current study (51.8 %) were neutral on rating the importance of this benefit perhaps because they lacked an understanding of how UTGS could increase the value of property.

b) Knowledge and perceptions of intangible benefits of UTGS

The finding that the cooling effect (shade benefit) of UTGS was the intangible benefit that key actors were most aware of (68.9 %) was not surprising. This is because most other researchers have documented that this benefit is well known amongst urban residents (Tyrväinen, 2001; Gorman, 2004; Young, 2010; Fuwape and Onyekwelu, 2011). Most respondents (83.5 %) in this study also perceived it to be a very important benefit of UTGS. This result mirrors findings of a study conducted by Lohr *et al.* (2004), where the highest ranked reason to have trees in cities was said to be their importance in shading and cooling downtown areas. It was noted that a high number of respondents (65.6 %) were more aware of, and also appreciated the importance of UTGS in reducing global warming and mitigating climate change, compared to other regulating services such as air purification (60.8 %), soil protection (56.9 %), and a habitat for biodiversity (53.1 %), and a sound barrier (51.8 %). This could be because of the 17th Conference of Parties (Cop 17) to the United Nations Framework Convention on Climate Change (UNFCCC) which was underway in the country at the time of study. It is possible that most key actors became more aware of the role of urban trees in mitigating climate change during this time, because Cop 17 was the first conference to be held in southern Africa, and was therefore the talk of most governing

bodies in the region. Perhaps through government's initiatives and programmes such as the Urban Greening Strategy and National Arbor Week, more actors may also have become aware of the benefits of urban trees in mitigating climate change.

The current study showed that enhancing beauty (cultural benefit) was the third most intangible benefit known and appreciated by most key actors (74.7 %). Important to note though is that regulating services of UTGS were generally better known and appreciated by most key actors compared with cultural benefits such as enhancing social interactions (15.8 %), UTGS being part of culture (13.6 %) and enhancing recreation (10.9 %). Young (2010) found similar results in North America, where even though beautification was perceived as very important by most municipal officials (52.8 %), cultural benefits such as recreation were less perceived as very important (38.6 %) compared to regulating services such as water quality enhancement (45.2 %) and energy and climate management (41.1 %). Findings by Grado *et al.*, (2006) show a similar trend with more community leaders in the Mississippi aware of regulating services such as erosion reduction (46.5 %) slightly more than recreational benefits (42.8 %). The results of this study showed that department officials significantly perceived habitat for biodiversity, soil protection, and wind barrier as very important benefits of UTGS more than municipal officials. This is probably because department officials that were interviewed in the study were from the forestry and environmental departments. It can be assumed therefore that because they work in such departments, they are likely to be more aware and knowledgeable of the overall benefits of UTGS to the environment than municipal officials.

Interestingly, key actors in the Eastern Cape were significantly more aware of soil protection, wind protection and water quality enhancement benefits of UTGS than those in the Limpopo Province. This concurs with Lohr *et al.*'s (2004) finding that people were generally aware of the tree benefits that influenced their welfare. It is possible therefore, that actors in the Eastern Cape Province were more aware of these benefits because of the location and biophysical characteristics of the province. Because the Eastern Cape is located near the ocean, it is more prone to strong winds than the Limpopo Province, hence the higher awareness amongst key actors in that province of the benefits of urban trees as wind barriers.

c) Levels of knowledge of UTGS benefits

Although a total of 16 benefits were identified by key actors without being prompted, the study found that the overall level of knowledge of UTGS benefits among actors was low. Most respondents could not go beyond mentioning five or more benefits of UTGS. As also alluded to above, some actors mentioned the benefits that most concerned their wellbeing. The results showed that key actors differed significantly in

their levels of knowledge of UTGS benefits. Unlike department officials, most municipal officials interviewed in this study, were also involved in other municipal activities besides UTGS management (see Chapter five). This leaves them with limited time to learn more about the benefits of UTGS, and consequently appreciate these benefits. Another factor that could affect differences in levels of knowledge between the two actors could be educational backgrounds, but this is subject to further research. Even though this study looked at professional backgrounds of respondents, the various responses obtained could not allow for statistical analyses to be conducted.

6.6 Conclusions

Key actors involved in UTGS activities included DAFF, DEAT, and FTFA at national level. Provincial departments such as LEDET and DEDEA were found to be active in UTGS activities in the Limpopo and Eastern Cape Provinces respectively. Some district municipalities, NGOs and private companies sponsor tree planting and greening activities on request; while local and metropolitan municipalities are responsible for the overall management of UTGS. Local urban residents, schools and churches are the recipients of urban trees and are also the users of UTGS. On the whole, key actors involved in UTGS activities, as shown in Table 6.3, do not effectively carry out their roles and mandates stipulated in the National Urban Greening Strategy of 2005. The key actors mostly plant and distribute trees to municipalities and urban residents, with little concern as to how the trees will be managed afterwards. Provision of food was the most widely known and highly appreciated benefit of UTGS amongst the key actors. Key actors, however, were generally more aware and highly appreciative of the intangible regulating services of UTGS than other tangible benefits (e.g. provision of wood for fuel and building) and intangible cultural benefits (e.g. promoting social interactions and recreation). Overall, key actors were less knowledgeable of the benefits of UTGS, as most could not mention more than five without being prompted.

Chapter Seven

Governance institutions influencing local people's ability to plant trees, access and use UTGS

7.1 Introduction

Research over the years has established that certain institutions (e.g. land tenure systems, and informal institutions) although not codified or written down in law, influence the use of natural resources (Ostrom, 1990; Pokorny and Johnson 2008; Pacheco, 2008). These institutions are often derived from custom or practice and are more likely to exist at a local (village or community) level than at higher official levels (FAO, 1997). While formal institutions are backed by the law, with enforcement of rules conducted by the state or government, informal institutions are upheld by mutual agreement or by relations of power or authority (Cousins, 1997). In other words, informal institutions include socially accepted moral rules or norms of a society. Of particular importance to UTGS is land ownership or security of tenure (Knuth, 2005; Lawrence *et al.*, 2011). Whether actual (in legally defined terms) or perceived (by common local consent) land ownership has been recognized as a critical factor in planting, managing, and conserving trees. Evidence from rural studies indicates that people are usually unwilling to plant and tend trees on land over which they have no security of tenure (FAO, 1995).

There is limited information in the literature on how land ownership influences local people's ability to plant trees, access and use UTGS (Lawrence and Dandy, 2012). Lawrence *et al.* (2011) reported that people were more likely to benefit from publicly (government) owned trees than from those on privately owned land. McPherson (1998) indicated that urban forest institutions working on private property were likely to have a larger influence on urban trees as opposed to those limited to publicly owned land. This was said to be pertinent in cities that had more urban trees on private than on public land (McPherson, 1998). Thus, it could be argued that tenure rights can potentially influence planting, use, management and conservation of UTGS. However, in developing countries like South Africa where illegal occupation of land is a norm (Stats SA, 2001), circumstances dictating people's behaviour towards planting and use of trees may differ as they may be used as a means to stake claims. The main purpose of this study was to determine the influence of tenure security and informal institutions on planting, access and use of UTGS. The study, however, also aimed to establish the level of enforcement of formal institutions (presented in Chapter four and five) at local level by determining local people's knowledge of such institutions. The following key questions were addressed:

1. What institutions influence local people's ability to plant and use trees on private land (residential plots)?

2. What institutions influence local people's ability to plant, access and use trees on public land (streets, public parks and public open spaces)?
3. Do local people know the formal (government) rules relating to UTGS and the penalties involved when these rules are violated? What are local people's views on such rules?
4. Do local people know of any tree planting or greening activities? Are they involved in these activities? What are their reasons for participating or not participating in such activities?

7.2 Methods

The study was conducted in six main towns of six randomly selected local municipalities. Broader methods on the selection of study sites are presented in Chapter three; section 3.1.2. The towns that were surveyed included; Bela Bela, Polokwane, and Tzaneen in the Limpopo Province; and Port Alfred, Fort Beaufort, and Queenstown in the Eastern Cape Province. A household questionnaire was used as a tool for data collection (see Appendix 3). The questionnaire was divided into four main sections: Section A had questions pertaining to institutions influencing planting and removal of trees on private residential plots; Section B encompassed questions on institutions influencing access to, planting and removal of urban trees on public land; Section C had questions on local people's knowledge of and views on government rules and penalties relating to UTGS; and Section D contained questions on local people's knowledge and participation in UTGS activities. The questionnaire was administered to respondents from three different residential areas in each town, i.e. informal residential areas, Reconstruction Development Programme (RDP) housing units, and the township residential areas⁴. The household head was the main focus for the interview, but where absent, any adult member of the household was interviewed. In instances where nobody was present at a selected household, the next randomly selected household on the sample frame was interviewed. A total of 30 interviews were conducted in each of the above residential areas, adding up to 90 interviews in each town/municipality, 270 interviews in each province, and 540 interviews for the whole survey. Interviews were conducted in English or translated into a preferred local language. Each interview lasted approximately 15 minutes.

7.3 Data Analysis

Data collected from the interviews were coded and entered into Microsoft Excel (2007). The data were then analysed using Statistica Version 10. Chi square tests in the form of contingency tables were used to determine statistical differences between responses obtained from the two selected provinces (Limpopo and Eastern Cape) and among the three different residential areas (informal, RDP and old township).

⁴RDP and the old township are formal urban residential areas which are structured, organized, and have permanent houses. Informal residential areas (slums or squatter camps) are unstructured, and are mostly located on the periphery of towns.

7.4 Findings

7.4.1 Institutions influencing people's ability to plant and use trees on private land

a) Permission to plant and remove trees on residential plots

On average, only 20.2 % of respondents from the two provinces indicated that permission was required to plant trees on their residential plots. Of these 31.7 % were from the informal settlement areas, 18.9 % from RDP areas, and 11.1 % from the old township areas (Table 7.1). Respondents from informal areas who stated that permission was required to plant trees on their residential plots differed significantly from those from RDP ($\chi^2 = 4.45$; $df = 1$; $p = 0.035$) and township areas ($\chi^2 = 5.11$; $df = 1$; $p = 0.024$).

Table 7.1: Percentage of respondents that required permission to plant trees on residential plots

Residential area	Limpopo (n=270)	Eastern Cape (n=270)	Mean±sd
Informal	28.9	34.4	31.7±2.3 ^a
RDP	16.7	21.1	18.9±3.1 ^b
Old township	13.3	8.9	11.1±3.1 ^b
Mean±sd	19.6±8.2 ^a	20.7±12.8 ^a	20.2±10.5

Different superscript letters indicate significant differences in means at 0.05 level of confidence

Overall, only a quarter (25 %) of respondents from both the Limpopo and Eastern Cape Provinces indicated that they required permission to cut or remove trees on their residential plots (Table 7.2). About 38.9 % of these were from the informal residential areas, 22.4 % from RDP, and 13.8 % from the old township areas. There were significantly more respondents from the informal residential areas that required permission to remove trees on their residential plots compared to those from RDP ($\chi^2 = 6.82$; $df = 1$; $p = 0.009$) and old township areas ($\chi^2 = 13.31$; $df = 1$; $p < 0.001$).

Table 7.2: Percentage of respondents that required permission to cut or remove trees on residential plots

Residential area	Limpopo (n=270)	Eastern Cape (n=270)	Mean± sd
Informal	42.2	35.6	38.9±4.7 ^a
RDP	26.0	18.9	22.4±5.0 ^b
Old township	13.3	14.4	13.8±0.8 ^b
Mean±sd	27.2±14.5 ^a	22.9±11.2 ^a	25.0±12.8

Different superscript letters indicate significant differences in means at 0.05 level of confidence

On the one hand, respondents that required permission to remove a tree within the household plot indicated that permission was obtained from the municipality (69.5 %) and from the community leader (30.5 %). On the other, respondents that did not require permission mostly stated that the household head

(76.6 %) determined when to plant or remove a tree within the household plot. Other respondents (23.4 %) indicated that anyone within the household could plant or remove a tree.

b) Factors preventing planting of trees on residential plots

Respondents from the Limpopo and Eastern Cape stated a number of factors that prevented them from planting trees on their residential plots (Figure 7.1). The four most frequently mentioned factors in both provinces were limited space (38.4 %), insufficient water (12.9 %), poor soil type (11.5 %), and lack of knowledge of how to plant trees (10.2 %). Some respondents (8.3 %) from the informal residential areas also indicated that they did not plant trees because they did not own the land on which they were residing. There were significantly more respondents in the Eastern Cape than in the Limpopo who mentioned poor soil type ($\chi^2 = 5.94$; $df = 1$; $p = 0.015$), and lack of seedlings ($\chi^2 = 5.84$; $df = 1$; $p = 0.016$) as factors preventing tree planting on residential plots.

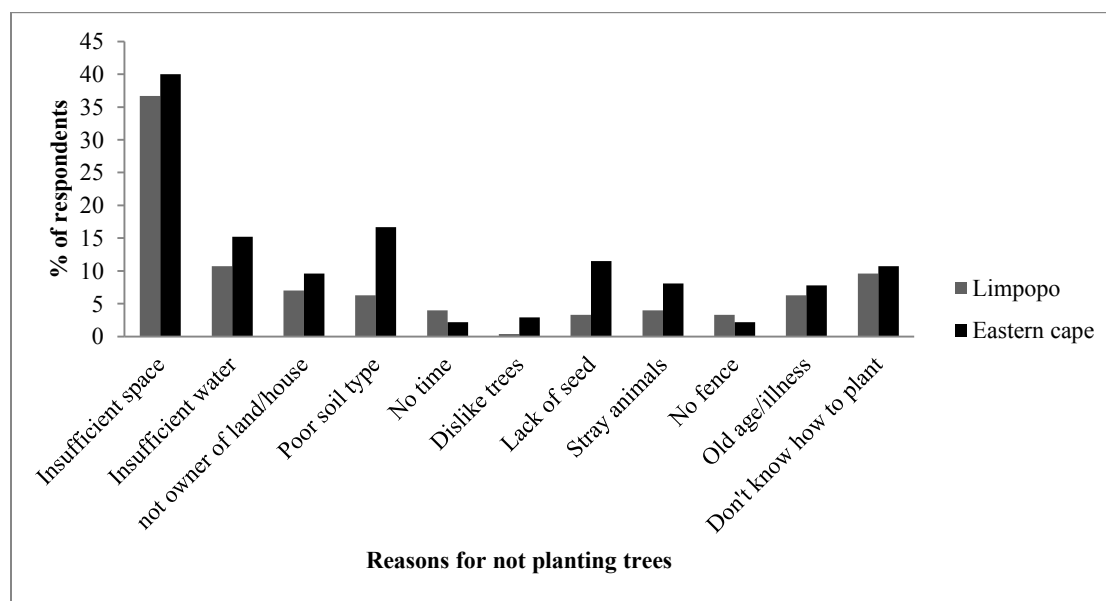


Figure 7.1 Reasons for not planting trees on residential plots (n=270 in each province)

7.4.2 Institutions influencing people's ability to plant and use trees on public land

a) Permission to plant and remove trees on streets

About three quarters (74.8 %) of respondents from both the Limpopo and Eastern Cape Provinces indicated that they required permission to plant trees on the streets (Table 7.3). Similarly, more than three quarters of respondents (78.9 %) from the two provinces stated that permission was required to cut or remove trees on the streets. The proportion of respondents who stated that permission was required to

remove trees on streets in the Limpopo Province did not significantly differ from that in the Eastern Cape ($\chi^2 = 0.91$; $df = 1$; $p = 0.339$). There were also no significant differences among respondents from the three different residential areas. Respondents who stated that permission was required to cut or remove trees on the streets indicated that permission was mostly obtained from the municipality (58.6 %) and from the community leader (30.2 %). A few other respondents indicated that permission was obtained from the household head (9.5 %), and from their neighbours (1.7 %).

Table 7.3: Percentage of respondents that required permission to plant, access and use UTGS on public land

Permission to plant, access and use trees	Limpopo and Eastern Cape provinces			Mean±sd
	Informal (n=180)	RDP (n=180)	Township (n=180)	
On streets				
Permission to plant	77.2	67.8	79.4	74.8±6.2
Permission to remove	75.6	77.2	83.9	78.9±4.4
In public parks				
Permission to access	33.3 ^a	27.8 ^a	13.3 ^b	24.8±10.3
Permission to plant	80.6	83.9	87.3	83.9±3.4
Permission to remove	79.5	89.5	88.9	85.9±5.6
In public open spaces				
Permission to access	17.3	19.5	18.3	18.4±1.1
Permission to plant	39.4	43.9	55.0	46.1±8.0
Permission to remove	39.4 ^a	48.9 ^a	65.0 ^b	51.1±12.9

Different superscript letters indicate significant differences between different residential areas at 0.05 level of confidence.

b) Permission to access, plant and remove trees in public parks

Only 24.8% of the respondents from the Limpopo and Eastern Cape Provinces stated that permission was required to access public parks (Table 7.3). Respondents from informal areas who mentioned that permission was required were significantly more than those from old township areas ($\chi^2 = 75.33$; $df = 1$; $p < 0.001$). In terms of planting of trees in public parks, most respondents (83.9 %) indicated that permission was required. A majority of respondents (85.9 %) also stated that permission was required to remove trees from public parks. These respondents indicated that permission was mostly obtained from the municipality (72.2 %). Some respondents (19.8 %) mentioned that permission was obtained from the owner of the park; others surprisingly indicated that it was obtained from a security guard at the park (6.4 %) while 1.6 % did not know where permission was supposed to be obtained from. Overall, few respondents (13.7 %) from both the Limpopo and Eastern Cape Provinces indicated that payment was required to access public parks.

c) Permission to access, plant and remove trees in public open spaces

On average, only 18.4 % of the respondents indicated that permission was required to access public open spaces (Table 7.3). Close to half (46.1 %) of the respondents stated that they required permission to plant trees in public open spaces and about half (51.1 %) indicated that permission was required to remove these trees. Respondents who stated that permission was required to remove trees in public open spaces gave varying responses as to where the permission was obtained. Most of these respondents frequently mentioned the municipality (46.9 %) as a key source of permission, but others mentioned community leaders (29.6 %), forest rangers (11.4 %), owner of the public open space (7.1 %), and police officers (1.2 %). A few others (3.8 %) indicated that they did not know where permission was obtained from. Respondents from informal residential areas who mentioned that permission was required to remove trees in public open spaces were significantly less than those from old township areas ($\chi^2 = 75.33$; $df = 1$; $p < 0.001$). Similarly, respondents from the RDP and township areas who mentioned that permission was required to remove trees in open spaces also differed significantly ($\chi^2 = 4.85$; $df = 1$; $p = 0.028$). There were more respondents (65.0 %) from the township areas who stated that permission was required to remove trees in public open spaces than those from the RDP (48.9 %) and informal (39.4 %) residential areas.

7.4.3 Local people's knowledge of governance rules and tree planting or greening activities

a) Knowledge and views on governance rules and penalties relating to UTGS

Less than a quarter of respondents (22.4 %) were aware of government rules relating to UTGS. These respondents ($n = 121$) indicated that they gained such information from forest officers (29.8 %), friends and people around the area (23.1 %), the municipality (19.8 %), community meetings (17.4 %), the radio (14.0 %) and television (4.1 %). In terms of knowledge of penalties relating to violations of UTGS rules, respondents indicated that the violators were fined (49.6 %), arrested (21.5 %), warned (10.8 %), or taken to court (2.5 %). Other respondents (10.7 %) indicated that there were no penalties and that nothing was done to the violators.

Respondents gave various reasons that caused people to violate rules relating to the use of UTGS (Figure 7.2). The four most frequently mentioned reasons were: lack of electricity/need for fuelwood (59.5 %); lack of knowledge of the rules (53.7 %); fear that permission would be denied (34.7 %); and to obtain income from the sale of fuelwood (33.8 %).

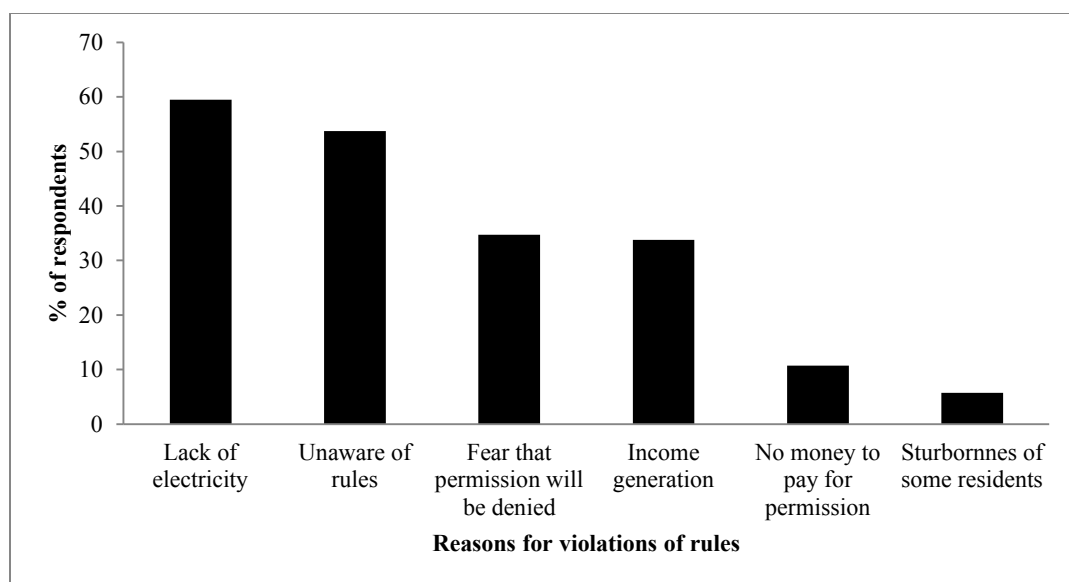


Figure 7.2: Reasons for violating rules relating to UTGS (n=121)

Out of the respondents that knew the rules relating to UTGS, 33.1 % indicated that the rules were complicated, 29.9 % indicated that the rules were fair, 26.8 % stated that rules were too strict and about 10 % indicated that the rules were unfair. Respondents gave different views on how the rules could be improved (Table 7.4). Overall, 37.2 % mentioned that the rules should be communicated to the public, 26.2 % stated that the rules should be clarified whereas others (22.9 %) indicated that that rules should not be too strict.

Table 7.4: Local people's views on how rules could be improved (%)

Views on how rules can be improved	Limpopo (n=68)	Eastern Cape (n=53)	Mean±sd
Rules should not be too strict	25.0	20.8	22.9±2.9
Violators must be punished	4.4	0.0	2.2±3.1
Rules should be clarified	22.1	30.2	26.2 ±5.7
Rules should be communicated to the public	30.9	43.4	37.2±8.8
Rules should not apply to people without electricity	2.9	0.0	1.5±2.0
People should not be made to pay if they violate rules	5.9	5.7	5.8±0.1
More rangers/security to guard UTGS	8.8	0.0	4.4±6.2

b) Knowledge and participation in UTGS activities

Only 27.6 % of respondents from both provinces were aware of tree planting and greening activities in their areas of residence (Table 7.5). Out of these, 58.1 % indicated that tree planting and greening programmes were being conducted in schools, while 23.5 % stated that they were aware of tree planting and greening activities being conducted at their work places. However, few respondents were aware of tree planting and greening projects by the municipality (17.4 %) or by an NGO (12.1 %). There were

significantly more respondents that were aware of tree planting and greening projects in the Limpopo than in the Eastern Cape ($\chi^2 = 5.64$; $df = 1$; $p = 0.017$). Respondents that were aware of tree planting and greening projects in the informal residential areas were significantly less than those from the RDP areas ($\chi^2 = 5.09$; $df = 1$; $p = 0.024$).

Table 7.5: Percentage of respondents that were aware of tree planting and greening projects in their areas of residence

Residential area	Limpopo (n=270)	Eastern Cape (n=270)	Mean±sd
Informal	27.8	11.1	19.5±11.8 ^a
RDP	41.1	25.6	33.4±10.9 ^b
Old township	36.7	23.3	30.0±9.5 ^{ab}
Mean±sd	35.2±6.8 ^a	20.0±7.8 ^b	27.6±10.7

Different superscript letters indicate significant differences in means at 0.05 level of confidence

With regard to Arbor Week, only 33.1 % of the respondents indicated that they were aware of it and on average only 19.4 % of these respondents had participated in Arbor Week campaigns (Table 7.6). Respondents that stated that they had participated in Arbor Week in the informal residential areas were significantly less than those from the RDP ($\chi^2 = 20.41$; $df = 1$; $p < 0.001$) and old township areas ($\chi^2 = 15.69$; $df = 1$; $p < 0.001$).

Table 7.6: Percentage of respondents that participated in Arbor Week campaigns

Settlement type	Limpopo (n=270)	Eastern Cape (n=270)	Mean±sd
Informal	5.6	3.3	4.5±1.6 ^a
RDP	34.4	23.3	28.9±7.8 ^b
Old township	28.9	21.1	25.0±5.5 ^b
All settlement types	22.9±15.3 ^a	15.9±10.9 ^b	19.4±4.9

Different superscript letters indicate significant differences in means at 0.05 level of confidence.

Respondents gave a number of reasons for participating and not participating in Arbor Week campaigns (Figure 7.3 and 7.4, respectively). The most frequently mentioned reasons for participating in Arbor Week campaigns were that trees provided fruits (46.2 %) and shade (37.5 %), protected houses from wind (29.8 %). Others (29.8 %) participated in Arbor Week to gain knowledge about trees. The two most frequently mentioned reasons for not participating in Arbor Week were; not being involved in UTGS activities (34.0 %), and a lack of knowledge of Arbor Week (31.3 %).

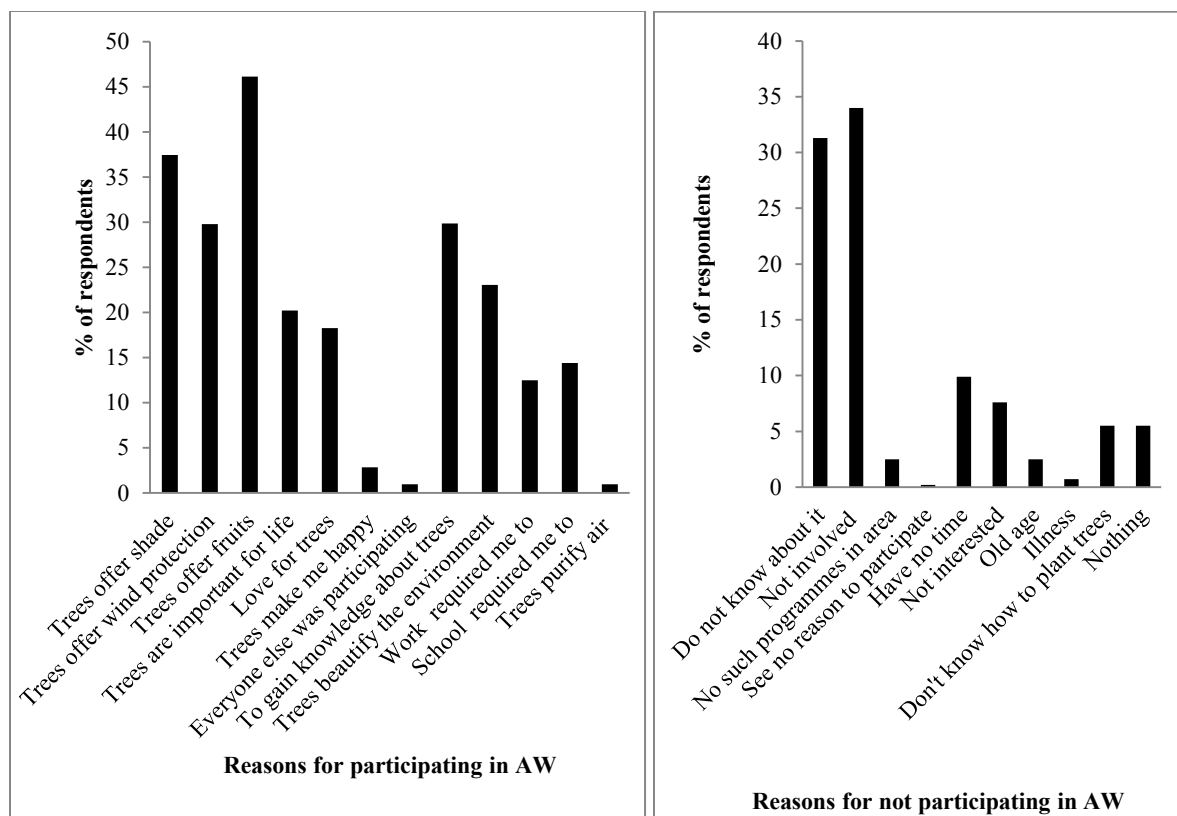


Figure 7.3: Reasons for participating in Arbor Week (n=105)

Figure 7.4: Reasons for not participating in Arbor Week (n=435)

Out of the respondents that knew about tree planting and greening (n = 149), 59.1 % indicated that they gained information about such activities from the radio, 32.2 % from television, 30.2 % from the municipality, 18.1 % from community meetings, 12.1 % from department officials, and 4.0 % from the internet. On the other hand, out of those respondents that did not know about tree planting and greening activities (n = 391), 68.5 % indicated that they did not know where to find the information, 27.4 % pointed out that they did not have the time to search for such information, whereas 4.1 % specified that they were not interested in the subject of UTGS.

7.5 Discussion

7.5.1 Institutions influencing people's ability to plant and use trees on private land

The results of this study generally revealed the influence of tenure security on planting and use of urban trees on private residential plots. Most respondents did not require permission to plant (79.8 %) or remove (75 %) trees on their residential plots because ownership over the land they resided on was well defined. The reverse could be true for some respondents (31.7 %) from the informal residential areas who

indicated that permission was required to plant trees on their residential plots. These respondents possibly realize that they are illegal occupants of the land they reside on, and hence are conscious about making any of their own decisions over the land. The following quote of a respondent from an informal settlement in Bela Bela township is an example of how security of tenure influences decisions relating to urban trees:

“I cannot plant trees or flowers on this land because I can be relocated from here any time by the government. I am on a waiting list for an RDP house, so you should give me some seeds so that I can go and plant there.”

The above cited individual was not only conscious about being an illegal occupant of the land she resided on, but she also believed that she would have full ownership over an RDP house that she was awaiting, hence would plant her trees there. This finding corroborates that of other researchers (Knuth, 2005; Dandy, 2010; Lawrence *et al.*, 2011) who documented that tenure security is an important institutional factor with influence on planting and use of UTGS.

Another finding of this study that could be of particular importance to urban trees is the role of the household head with regard to planting and removal of urban trees on private residential plots. Respondents who indicated that permission was not required stated that the household head determined when to plant or remove a tree within the plot. This finding was also reflected in a study conducted by Parkin *et al.* (2006) in South Africa, where over two thirds of the respondents indicated that the household heads were responsible for planting trees within their home gardens. The powers of the household head are important in promoting tree planting within a homestead, but could also be of particular importance in conserving urban trees on private residential property. In situations where there are no rules regulating the removal of urban trees on private property, or where the rules lack proper enforcement the head of the house could play a significant role in restricting removal of urban trees. This could be particularly important in cities where much of the urban forest resource (e.g. urban trees) resides on private rather than on public property (McPherson, 1998). According to Johnston (2010) trees on private property can form the majority of an urban forest in many towns and cities. After discovering that 90 % of the urban trees were located on private property in Sacramento, McPherson (1998) reported that policies that addressed private property were more likely to have a larger influence on urban forests than those limited to publicly owned land. The results of the current study, however, show that the powers of the household head may be influential in the planting and removal of urban trees existing on private property. Important to note is that security of tenure gives the household head this kind of power over urban trees on their land. Therefore, given the same permission or rights over public land the head of the household could play the same role in promoting tree planting and restricting use of trees on public land.

In examining institutions influencing planting and removal of trees, the current study found a number of factors (constraints) that limit the planting of trees on private residential plots (Figure 7.1). Limited space was the most frequently mentioned constraint to tree planting. This finding substantiates results of an urban study carried out in South Africa by Parkin *et al.* (2006), where most learners (29 %) and parents (20 %) highlighted limited space as a constraint to tree planting around the homestead more frequently than other constraints. The finding was also reflected in other rural studies by Uddin and Hasan (2001) in Bangladesh and Paumgarten *et al.* (2009) in South Africa, but was however the third and second frequently mentioned constraint to tree planting in the two studies, respectively. The variation in findings between the urban and rural studies could be partly due to the reason that rural areas, unlike urban areas are widely spaced with normally bigger areas of land surrounding homesteads. In urban residential areas in South Africa, for example, township and RDP houses have been documented as being on small plot sizes (McConnachie and Shackleton, 2010; Stoffberg *et al.*, 2010) hence there is limited space for tree growing.

The second most frequently mentioned constraint was lack of sufficient water for the trees which was especially mentioned by respondents from informal and newly built RDP areas which had not yet received the piped water service from the government. Poor soil type (11.5 %) and lack of knowledge on how to plant trees (10.2 %) were the third and fourth most frequently mentioned constraints to tree planting by the respondents. These constraints were also reflected in studies by Parkin *et al.* (2006) and Paumgarten *et al.* (2009); though fewer respondents mentioned them as frequently as in this study. About 8.3 % of respondents, mostly from informal residential areas, mentioned that they could not plant trees because they did not own the land they were residing on which again reflects the role of ownership as a decisive factor in tree planting activities (FAO, 1995; Knuth, 2005). Respondents from RDP and old township areas did not mention this factor because of the security of tenure that they have over their residential plots. There were more respondents from the Eastern Cape that mentioned lack of seedlings as a constraint to tree planting activities than from the Limpopo Province. A possible explanation for this difference is that the Limpopo Province, unlike the Eastern Cape is in a treed biome (Mucina and Rutherford, 2006); therefore, it can be assumed that local people in Limpopo can easily access seeds from the abundant tree resources.

7.5.2 Institutions influencing people's ability to access, plant and use trees on public land

Most respondents did not require permission to access both public parks and public open spaces (Table 7.3) which shows that local people are to some extent not restricted to accessing public UTGS. More than 70 % of respondents, however, indicated that permission was required to plant and remove trees on streets

and in public parks (Table 7.3) and that this permission was mostly obtained from the municipalities (72.2 %). The finding suggests that local people recognize that urban trees existing on streets and in parks belong to the local municipalities. Interestingly, about half of the respondents indicated that permission was not required to plant (53.9 %) or remove (48.9 %) trees from public open spaces, whereas the other half indicated that it was required. To some extent, this finding shows a lack of clarity amongst local residents on whether or not they require permission to plant and use trees in public open spaces. The finding also gives an impression that some local people feel they have a right over tree resources in open areas whereas others do not. As stated by Martens (2009), the 'rights allocation processes', which determine who has access to open space land (e.g. commonages) and how many resources they are allowed to extract is non-existent or poorly developed in South Africa. This is unfortunate because where rights are not well defined there is often an unequal distribution of resources and poor residents, especially women, may not be able to benefit from such resources (Anderson and Pienaar, 2003). In addition, scholars have shown that the condition of a forest is better in areas where a system of property rights is well known to the local population than where it is not (Banana and Gombya-Ssembajjwe, 2000). In the case of this study, most respondents recognized municipal rights over public parks, and thus realized that permission was required to plant or remove trees in these areas. However, the lack of understanding of property rights with regard to public open spaces, as will be seen in proceeding paragraphs can potentially lead to over exploitation of the resource.

Respondents, who stated that permission was required to plant or remove trees in public open spaces gave an array of responses as to where the permission was obtained, further suggesting that who the responsible authority is over public open spaces is not adequately defined. According to DLA (2001) and Ingle (2006), public open spaces such as commonages in South Africa are a common pool resource (i.e. a resource used by a group of persons referred to as a resource community (Hussain and Bhattacharya, 2004). In most cases, because they exist within a municipal boundary, public open spaces are supposed to be municipal responsibility (DWAF, 2005; Bezuidenhout, 2008; Sawuti, 2008), yet some local people interviewed in this study could not state the authority responsible for public open spaces. This shows that institutional arrangements that define access to, and control over public open spaces are unclear amongst the local people. This suggests that public open spaces in South Africa, as also noted by (Martens 2009) are being poorly managed.

Other than the municipality, some respondents (29.6 %) especially from the informal residential areas mentioned that permission to plant and remove trees from public open spaces was also obtained from community leaders (e.g., the headmen). This finding is important because it shows that informal institutions (in this case the role of the local headmen in informal areas) influence planting and use of

urban trees. The local headman or community leader in informal areas is chosen as a community representative, but as can be seen from the above finding, the community leader may also exercise authority over illegally obtained land and nearby open spaces. This is because open spaces seem to be either under the common property regime (in which a number of people have rights to the land) or open access regime (where no rights at all are conferred) (Martens 2009), thus capable of encouraging elite capture. Researchers such as Cousins (2000) report that common property regimes in South Africa are not only vulnerable to ecological degradation, but also spontaneous enclosure of resources and elite capture. Other researchers such as Lebert (2004) and Bennett and Barrett (2007) have also shown that without outside control, common property regimes can allow elite capture and privatisation of the commons and the resources therein. It is possible therefore, that the more prominent people (e.g. headmen) in an informal community can privatise and benefit more from open space resources than others. A study by Martens (2009) revealed similar findings where a white farmer married to a chief's daughter (prominent man) was exploiting a commonage resource in defiance of what is required by law, suggesting possible elite capture.

Public open spaces may be the only UTGS resource available for poor urban dwellers to obtain multiple tangible and intangible benefits. Yet, as shown in this study as well as others (Martens, 2009; Davenport, 2011), this component of the urban environment happens to be the most neglected in terms of management, and is also vulnerable to a number of factors including rapid urbanization, housing development, elite capture and over exploitation. As indicated by Davenport (2011), whether or not open spaces such as commonages will be available as a safety net for poorer households, is dependent on how municipalities manage the resource and how they recognize and permit access to the resource. There is a need therefore for an intervention in the overall governance and management of public open spaces. A land tenure system that allows for equitable access and proper enforcement of rules regulating use is urgently called for. Researchers such as Martens (2009) have recommended adaptive co-management (between users, government departments, and other stakeholders) as an appropriate regime for public open spaces such as municipal commonages in South Africa; however, whether or not this would reveal better results requires further research.

7.5.3 Local people's knowledge of governance rules and tree planting or greening activities

a) Knowledge and views on governance rules and penalties relating to UTGS

The results showed that only 22.4 % of the local people were aware of the rules relating to planting and use of UTGS. According to Ostrom (1990) working rules "are common knowledge and are monitored and enforced. Common knowledge implies that every participant knows the rules, and knows that others

know the rules, and knows that they also know that the participant knows the rules" (Ostrom, 1990). The lack of knowledge of the rules by most local people suggests that the national, provincial and municipal laws with an influence on regulating use of UTGS (Chapter four and Chapter five) are not being implemented on the ground. The results also show that while some local people realize that permission is required to plant and remove trees in streets, public parks and public open spaces, this is not as a result of them knowing the rules, but because they realize that they have no ownership over these areas. It is well established that where there are no rules regulating use of a resource, or where the rules are not adequately enforced, the resource becomes one of open access rather than secure tenure (Ostrom, 1990; Banana and Gombya-Sembajjwe, 2000; Dietz *et al.*, 2003). The effects of an open access regime have been well documented, and researchers have often stressed the importance of rule formulation and enforcement in the management of common pool resources such as open spaces in the case of this study (Ostrom, 1990; Dietz *et al.*, 2003). It is important therefore, that municipalities aid and support the formulation and enforcement of rules regulating use of UTGS, with special attention to public open spaces as they happen to be the most vulnerable to over exploitation.

Unfortunately, the respondents (22.4 %) who claimed that they knew the rules relating to UTGS gave various responses in terms of the penalties involved for violation of the rules. In fact, some (10.7 %) stated that there were no penalties involved and that violators were not punished. This finding substantiates those in Chapter six, where some department officials indicated that the NFA of 1998 was weak with regard to punishing violations related to the removal of trees. In addition, respondents who knew the rules and penalties most frequently stated that the rules were complicated (33.1 %), and suggested that the rules be communicated to local people (37.2 %). These findings show that there is a lack of knowledge and understanding of the rules relating to UTGS amongst the local people. Some respondents indicated that others within their communities obtained trees illegally for various reasons including: lack of electricity (need for fuelwood); lack of knowledge of the rules; fear that permission will not be granted, and for income generation from the sale of fuelwood. Davenport (2008) and Martens (2009) also revealed that local people were illegally obtaining natural resources, e.g., rare plants and medicinal plants in municipal commonages of the Eastern Cape Province. These findings additionally call for proper regulation of the use of trees especially in public open spaces. If not well regulated, trees and other natural resources in these areas will diminish and will not be available for the poor in the future.

b) Knowledge and participation in UTGS activities

Although most municipalities (see Chapter five) indicated that the public was involved in UTGS activities, 72.4 % of the local people surveyed in this study were not aware of UTGS activities in their

areas of residence. This finding implies that UTGS activities are unevenly distributed within communities, or that there is little or no involvement of local people as was claimed by some local municipalities (see Chapter five). The results showed that respondents from RDP areas (33.4 %) were significantly more aware of UTGS activities than those from informal settlement areas (19.5 %). This is probably because RDP areas, being newly developed housing units in the country could be the main focus for UTGS activities by both government and NGOs (DWAF, 2005). Respondents from the informal areas on the other hand are yet to receive recognition by government (Mohammed, 2009), and be placed on the agenda for UTGS activities (DWAF, 2005).

Surprisingly, most respondents (66.9 %) in this study were also unaware of Arbor Week, and relatively few (19.4 %) had ever participated in Arbor Week campaigns. As indicated earlier (Chapter four), this could be because Arbor Week Campaigns in the country mainly focus on schools, (Guthrie and Shackleton, 2006), and most of the learners may not necessarily be relaying this information to their parents (Parkin *et al.*, 2006). This line of reasoning is also supported by the finding that respondents who did not participate in Arbor Week frequently stated that they were not involved in such activities (34.1 %) or that they did not know about Arbor Week (31.2 %). Researchers stress that local people's participation in UTGS activities is important, both in terms of encouraging ownership and also raising awareness of the importance of UTGS (Van Herzele *et al.*, 2005; Lawrence *et al.*, 2011). For example, a study in the Philippines revealed that eighty thousand residents of Puerto Princessa City were made aware of the benefits of UTGS through their involvement in a massive reforestation project in their city (Palijon, 2002). In China, because of public urban-land ownership, the low citizen participation in the management system of a public amenity led to apathy and caused vandalism of amenity vegetation (Jim, 2000). Therefore, in order to increase public support and reduce problems such as vandalism of UTGS there is a need for municipalities and other key actors involved in UTGS activities to not only focus on schools, but to extend UTGS activities to other communities (Parkin *et al.*, 2006; Guthrie and Shackleton, 2006).

It was exciting that the respondents (19.4 %) who took part in Arbor Week appreciated the benefits of trees in providing fruit, shade, wind protection, as well as learning opportunities on trees. Similar results were reflected in a study by Guthrie and Shackleton (2006) in South Africa where most urban and rural schools declared that participation in Arbor Week or rather tree planting, yielded benefits such as shade, fruit, oxygen and provision of an educational platform. A complementary study to this one, by Chinyimba (2012) also found that most local residents in Bela Bela and Tzaneen towns of South Africa were interested in UTGS and most also appreciated the social, cultural and environmental benefits of them.

More than half of the respondents (59.1 %) in the current study who had information on tree planting and greening activities mostly obtained this information from the radio; thus, this medium could be one of the most effective ways of communicating tree planting and greening activities to the general public. However, for the communities that have no electricity, (e.g., informal and some RDP areas) information sharing through community meetings would be more appropriate. Dissemination of information to communities is paramount in urban forestry. A study by Grado *et al.* (2006) indicated that urban and community forestry outreach had helped communities in Mississippi be more familiar with recreational, wildlife, soil, and air quality benefits of urban and community forestry. It is essential therefore that information on UTGS is widely communicated to the general public, as this will result in increased appreciation of them amongst local people.

7.6 Conclusions

Land ownership was the main institutional factor that influenced planting and use of urban trees on private land and in public lands such as streets and public parks. Planting and removal of trees on private residential plots was mostly determined by the head of the household. In informal areas, the local headmen or community leaders also influenced planting and use of trees within the informal areas and in nearby open spaces. Municipalities were recognized as the responsible authority for trees on streets and in public parks. The findings of the study have, however, shown that public open spaces within municipalities are not properly managed and that local people are not clear about who is responsible for these areas. Open spaces appeared to be under an open access regime which may potentially lead to over-exploitation of the tree resources in these areas. Most local people did not know the governance rules relating to use of trees a majority of them were also unaware and uninvolved in UTGS activities. Thus, there is a need for more involvement of local people in UTGS activities. Public open spaces also need to be better managed for the benefit of all community members and future generations.

Chapter Eight

Synthesis, conclusion and recommendations

8.1 Introduction

Urban trees and green spaces have the capacity to improve the environment and lives of many urban residents in South Africa. Studies from the developed countries show that UTGS provide social, recreational and psychological benefits (Hunter, 2001; Pedlowski *et al.*, 2002; Tyrväinen *et al.*, 2005). In developing countries, researchers stress the importance of UTGS in providing basic needs for the poor urban population (Horst, 2006; Fuwape and Onyekwelu, 2011). Studies specific to South Africa show that urban residents obtain fruit, fuelwood, and medicines from UTGS (Davenport, 2008; Martens 2009; Kaoma, 2012), while at the same time appreciating the social and cultural benefits of UTGS (Chinyimba, 2012). However, without good governance and management, UTGS are unlikely to provide optimal and continued benefits to the urban poor and future generations. While forest governance has received recognition in the last couple of decades, it has received less attention in the urban context globally (Lawrence *et al.*, 2011, Lawrence and Dandy, 2012). Scholars, however, stress the need for urban forestry governance and management because it differs from the governance of forests in rural areas (Knuth, 2005; Lawrence *et al.*, 2011). For example, there are differences in policy and legal conditions for promoting forest and tree cover in urban and rural environments (Knuth, 2005). Constraints on the use of and access to tree resources in urban areas also differ from those of rural areas. Lastly, the complex nature of the urban environment in comparison to the rural environment requires the involvement of a much wider range of stakeholders with state and non-state organizations operating at multiple scales (Lawrence *et al.*, 2011). Despite the above sentiments, the governance and management of trees and green spaces in urban and peri-urban areas is still inadequately studied or mentioned in existing literature worldwide (FAO, 1995; Knuth, 2005; Lawrence *et al.*, 2011). Therefore, findings of this study give valuable insights on the governance and management of UTGS in a developing world context.

The researcher proposed that the governance and management of trees and green spaces in urban and peri-urban areas is important because it can influence the benefits that UTGS offer to local people and the environment. In Chapter one, the daunting problem of loss of UTGS was highlighted, and the governance and management aspects that could potentially lead to this loss were shown. The researcher then hypothesized that poor governance and management of UTGS in South Africa is leading to a loss of UTGS, which consequently limits the potential benefits of UTGS to local people and the environment.

This chapter synthesizes and provides a summary of the major conclusions the above hypothesis and key questions which were posed as follows:

1. Are there any governance institutions influencing UTGS at national and provincial level of government, and are these being implemented to promote urban forestry?
2. Are the concepts of planned, integrated, and systematic management being implemented in the management of UTGS in the selected municipalities?
3. Who are the key players (actors) involved in urban forestry in the country, what roles do they play in its deliverance, and how do they perceive its benefits?
4. What governance institutions influence local people's ability to plant trees, and to access and use UTGS?

8.2 Are there any governance institutions influencing UTGS at national and provincial level of government, and are these being implemented to promote urban forestry?

The study revealed that governance institutions (including policies, legislations and programmes) with an influence on UTGS, exists at both national and provincial levels of government in the Limpopo and Eastern Cape provinces. However, these institutions were not being implemented to promote urban forestry in the country. Figure 8.1 below highlights this finding.

In agreement with Shackleton (2006), this study observed that tree planting, greening activities in the country were unguided, and the efforts of the key actors lacked collaboration. The National Greening Strategy was developed to guide tree planting and greening activities in the country (DAFF, 2011a). However, due to the lack of political support, this strategy was not being implemented at local government level. In addition, most of the key actors identified in this study were not carrying out their roles with respect to the strategy.

There were various tree planting and greening initiatives at national level, and in the selected provinces. However, due to shortcomings within the responsible departments (DAFF, LEDET and DEDEA), monitoring of trees that were planted and distributed was seldom done, and no records were kept to show how many of these trees actually survived. Trees that were distributed to municipalities for example, often did not survive (Kuruner-Chitepo, 2011) because most municipalities lacked human, financial and technical capacity to maintain them (Shackleton 2006). From these findings, it can be concluded that tree planting and greening efforts are currently ineffective in promoting urban forestry in the country (see Figure 8.1). While it is clear that there are numerous urban greening programmes in South Africa, it is

also obvious that they get little attention on the political agenda regardless of their importance and contribution to society (Shackleton, 2006).

It was evident from the review that UTGS or urban forestry was generally not adequately covered in existing policies and legislation at national level and provincial levels of government in the Limpopo and Eastern Cape. These findings were in line with Kuchelmeister (1998) and Konijnendijk (2003) who reported that urban and peri-urban forestry was rarely integrated in national and local level policies in developing countries. The findings of the study, however, dispute the notion that UTGS in South Africa could be protected under existing forestry, planning and environmental legislation as suggested by other researchers (Knuth, 2005; Lawrence *et al.*, 2011). This is because the pieces of legislation that had indirect or partial provisions for UTGS in this study (i.e. NFA, 1998; NHRA, 1999; NEMBA, 2004) were not being implemented to promote urban forestry.

Firstly, there were no inventory records to show the numbers of trees that were indigenous, threatened, protected, or of cultural or historic importance in municipal areas. Secondly, most urban residents interviewed in this study did not know about these legislations, which according to Ostrom (1990), makes them non-working rules. The finding concurs with the popular saying in South Africa that it is a country with good laws, but implementation of these is often poor. Poor implementation was seen to be due to a lack of human and financial resources to implement policies relating to UTGS (e.g. NFAP of 1997) or to monitor compliance to legislation with provisions for UTGS (e.g. NFA, 1998). However, a lack of understanding of key actors' respective responsibilities was also noted as a factor influencing the implementation of policies and legislations relating to UTGS (Figure 8.1). For example, some municipal officials felt that regulating the use of urban trees was not their responsibility but that of government departments (DAFF and DEAT), whereas the government departments indicated otherwise. This deficiency is likely to result in the loss of UTGS (especially public open spaces) through human exploitation. As reported by FAO (1995) and Akerlund *et al.* (2006), the lack of clarity regarding responsibilities amongst key actors is one of the institutional factors that inhibit the full potential of urban forestry in developing countries.

Urban trees and green spaces were not explicitly recognized in any of the planning and development policies and legislations reviewed. Yet, even when considered as part of the overall environment, the importance of UTGS in planning and development in South Africa still remains at the same level. Several policies, plans and legislations that were reviewed recognized the importance of promoting sustainable development and integrating environmental issues in development activities. However, situations on the ground as depicted in this study suggest that even the environment itself is not adequately protected and

integrated in development planning. These findings are in line with McConnachie and Shackleton (2010) and Schäffler and Swilling, (2012) who report that development issues in South Africa are silent or weak on the environmental and natural resource dimensions. At local government level, this was seen to be a factor of low political support and lack of knowledge and appreciation of UTGS benefits (Figure 8.1). Environmental issues are lowly prioritised in most municipalities; and thus receive less attention in municipal development planning. At national and provincial levels of government, the lack of resources (human and financial) to monitor compliance with Environmental Impact Assessment (EIA) regulations was noted as a factor that limits protection of the environment and its components during development.

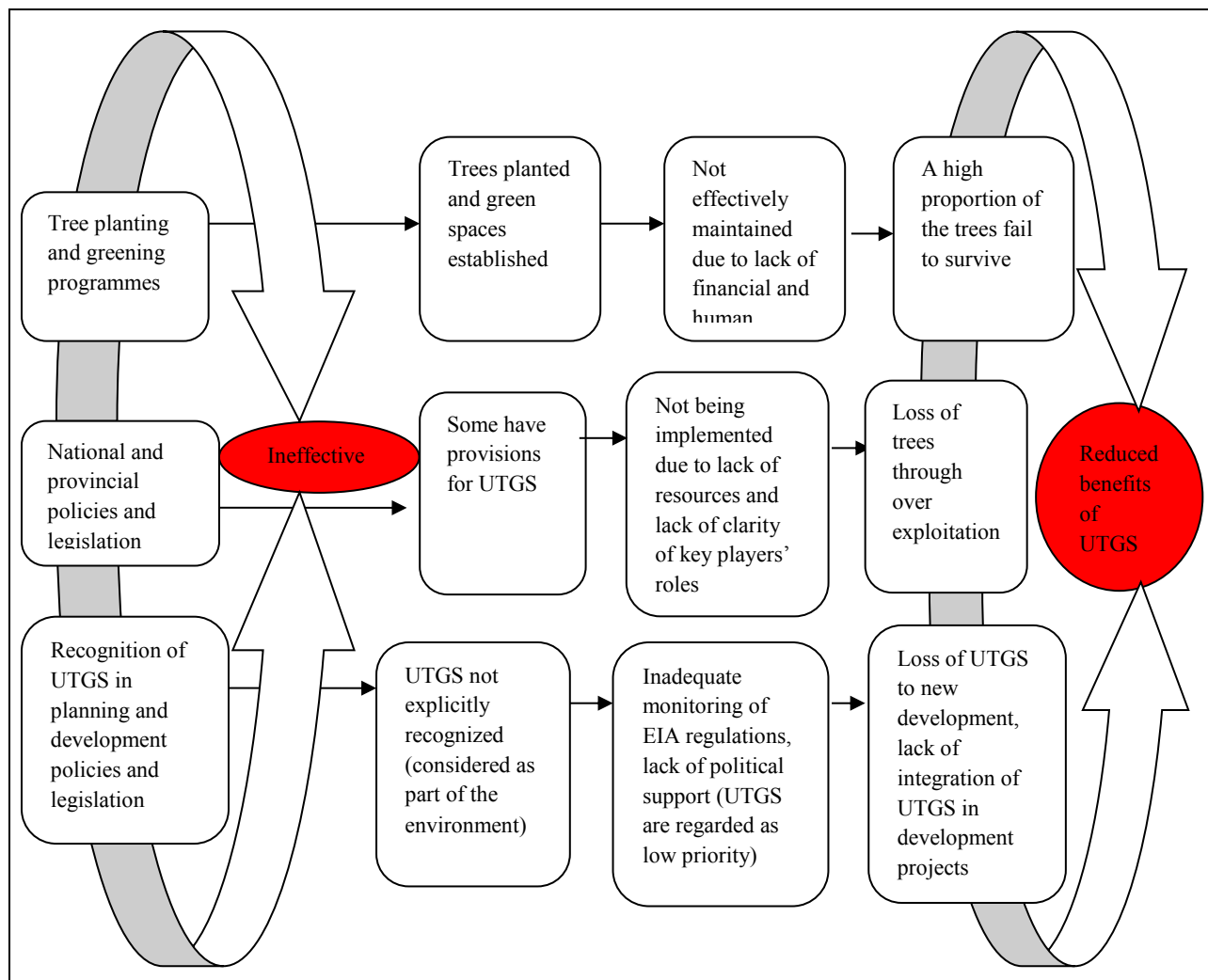


Figure 8.1: The influence of national and provincial governance institutions on UTGS

8.3 Are the concepts of planned, integrated, and systematic management being implemented in the management of UTGS in the selected municipalities?

The study revealed that both local and metropolitan municipalities are far from adopting planned and systematic management of UTGS. Although most municipalities claimed that they involved the public (75 %) and other key actors (60.6 %) in UTGS activities, the lack of public consultation on the management of UTGS, as reflected in this study, suggests that an integrated approach to their management is limited.

Almost all the municipalities that were surveyed in this study had no tree inventories or any information on the extent of tree cover in their municipal areas. These results support Shackleton (2010) who reported that many municipalities in South Africa did not know the extent or quality of public green spaces under their jurisdiction nor the number, density, distribution and variety of street trees within the urban limits. In general, not more than 36 % of the municipalities had urban tree policies, bylaws or procedures that protected trees during development. In addition, less than 25 % of the municipalities conducted systematic planting and maintenance of trees. Findings from the developed world however, show that some municipalities in Europe have accurate tree inventory records or can at least give an estimate of urban tree cover within their municipal boundaries (Saretok, 2006; Gerhardt, 2011). Studies from the former also show that most municipalities manage their UTGS resources in a systematic manner, with some having computerised management systems for street and park trees. These findings were not replicated in the developing world context of this study. The differences could be due to the reason that the developed world has more resources to aid planned, systematic and integrated management of UTGS. Some countries in the developed world also allocate more resources to UTGS because they have different priorities and they also value the benefits from UTGS more than countries in the developing world.

In this study, limited financial and human resources in most municipalities were the major drawbacks to adopting planned, integrated and systematic management of UTGS. Municipalities with big populations had better management of UTGS than the smaller municipalities. This finding also came out of several studies conducted in the US, Europe and Canada, which showed that larger municipalities had developed better urban forestry programmes than smaller ones (Kennedy and Idziak, 2000, Conway and Urbani, 2007; Gerhardt, 2010). One possible reason for this is that bigger municipalities have more resources (more revenue obtained from more people paying tax, therefore bigger budgets) for tree related activities. Smaller municipalities on the other hand have little or no funds for UTGS activities. The results obtained from this study therefore support the idea that municipal involvement in tree related activities is limited

by available resources, with smaller municipalities having less resources available for the management of UTGS (Kenney and Idziak, 2000; Conway and Urbani, 2007).

Irrespective of the size of the municipality, respondents in this study were either unsatisfied (47.8 %) or very unsatisfied (21.7 %) with the budget for tree related activities. In essence, the budget constraint is a major challenge to UTGS management in most municipalities because it influences employment of a person(s) responsible for UTGS, purchase of maintenance equipment and tree planting materials (Figure 8.2). The majority of respondents indicated that environmental issues (including UTGS) generally received smaller budgets because politicians regarded them to be of low priority compared to other services such as housing, water and electricity. This is quite unfortunate because as much as attention to basic services such as housing, water and electricity is important, these are not sufficient for healthy living conditions of local people.

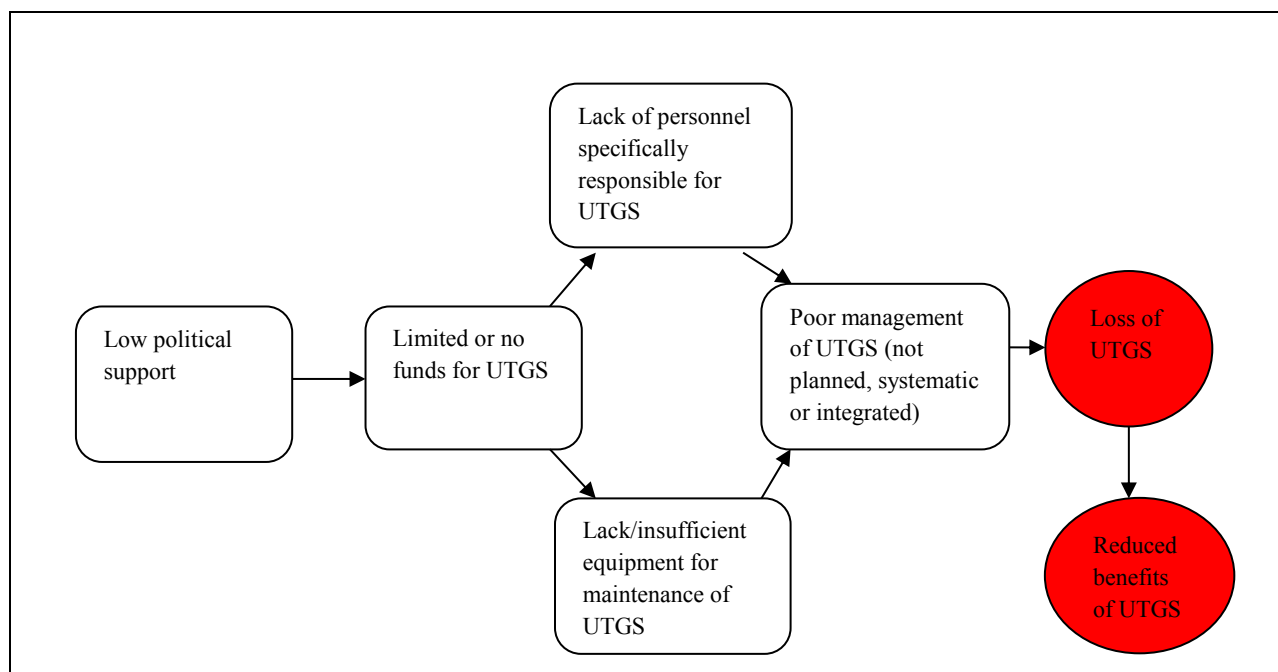


Figure 8.2: The influence of current management approaches on UTGS

A few significant differences in the management of UTGS were noted between municipalities in the Limpopo and Eastern Cape Provinces. However, these differences could not lead to accepting the hypothesis that there was better management of UTGS in municipalities of a non-treed biome (Eastern Cape), than those in a treed biome (Limpopo). For example, there were more municipalities with greening strategies in the Limpopo (55.6 %) than in the Eastern Cape (40.0 %), with subsequently more people and key actors involved in tree related activities in the former. On the other hand, there were more municipalities (30.0 %) with municipal bylaws in the Eastern Cape, than in the Limpopo Province (11.1

%), suggesting that there could be more effort in trying to control the removal of UTGS in the Eastern Cape. There is an indication from literature that municipalities in treed areas (with abundant green resources) are more likely to be reluctant in terms of adopting urban forestry programmes and policies than those that are not as treed (Gerhardt, 2010). In this study, the differences in the management of UTGS between municipalities in the Limpopo and Eastern Cape were narrow, and could not lead to such a conclusion. Municipalities in the Limpopo and Eastern Cape were facing more or less similar constraints in the management of UTGS. These findings to some extent support Kuruneru-Chitepo (2011) who concluded that management actions (e.g. budgets allocated to UTGS) influenced the size, health and diversity of street trees more than the macro-environmental context.

8.4 Who are the key players (actors) involved in urban forestry in the country, what roles do they play in its deliverance, and how do they perceive the benefits associated with it?

The study found different key actors involved in UTGS activities at different levels of government. These included: national and provincial government departments; local government municipalities; NGOs, and the private sector. As indicated earlier, most of the key actors were not meeting their urban greening mandates as stipulated in the National Urban Greening Strategy. This could be because key actors in urban forestry did not know or understand what their respective roles were. It is also possible that the National Urban Greening Strategy was developed by DAFF with limited or no input from other key actors; hence, key actors conduct tree planting and greening activities independent of each other. No one monitors what the other is doing, thus there is concentrated effort in planting trees and providing tree seedlings by almost all the key actors. This leaves the largely incapacitated municipalities responsible for the overall management and governance of UTGS. These findings are in line with Shackleton (2006) who reported that the planning and management of UTGS in South Africa was mostly left in the hands of local municipalities who generally lacked funds and expertise. It can be concluded therefore, that municipalities are not receiving the support that they need for the management of UTGS from other key actors. Table 8.3 synthesizes the overall findings on how key actors currently influence UTGS.

There were more key actors involved in UTGS activities in the Limpopo than in the Eastern Cape. Consistent with other researchers (Palijon, 2002; Konijnendijk, 2004), this was seen to be a factor of a single political leader's involvement in tree planting and greening activities. The involvement of the Premier of the Province in the Limpopo Greening Strategy increased the participation of other key actors in greening activities. The findings support the idea that involving political leaders in tree planting and greening activities can lead to increased awareness and appreciation of the benefits of UTGS by the general public. Sadly, most political leaders especially at local government regard environmental issues

including UTGS as a low priority. Thus, there is a need for raising awareness of the benefits of UTGS amongst political leaders. Unless political leaders appreciate the benefits of UTGS to both the local people and the environment, they will not carry this message forth to the general public.

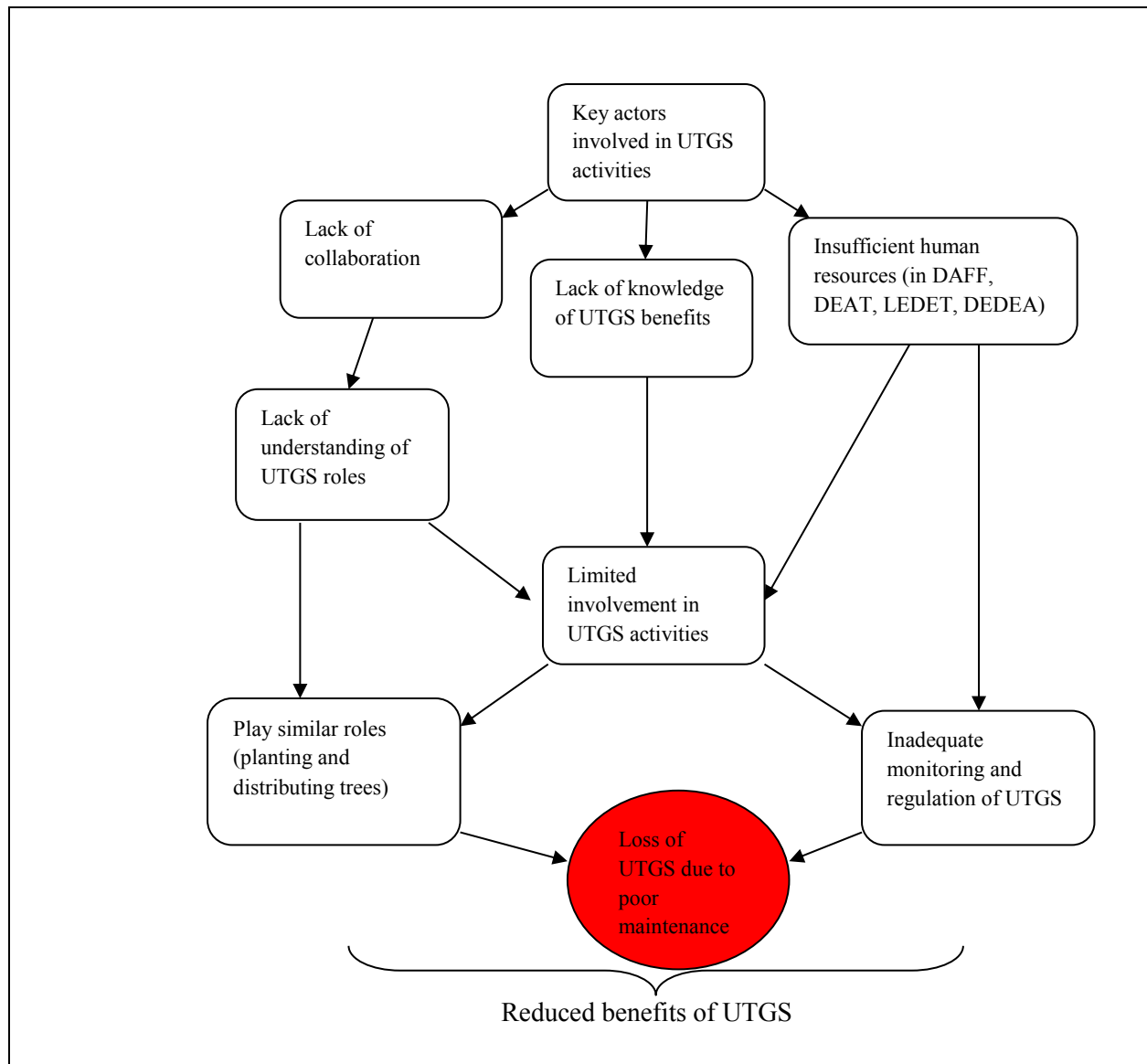


Figure 8.3: Key actors' influence on UTGS

Over 50 % of key actors were less knowledgeable of the benefits of UTGS. This finding concurs with the hypothesis that UTGS benefits are underestimated and not fully understood by the key actors involved in UTGS activities in the country. With the exception of food provision (tangible benefit), the key actors generally appreciated the intangible regulating services of UTGS. Although most researchers in the developing world report that UTGS provide wood for fuel and building materials to the urban poor communities (Openshaw, 2010; Murwendo, 2011; Fuwape and Onyekwelu, 2011), these benefits were

perceived as less important by most key actors interviewed in this study. This finding could explain why there is less attention paid to regulating the use of UTGS. Most key actors do not realize that local people in South Africa obtain and use wood from UTGS for fuel, building and construction (Kaoma, 2012). There is, therefore, an urgent need to formulate and implement rules that will regulate the use of UTGS in order to secure the future of these resources.

Similar to the findings of other researchers ((Tyrväinen, 2001; Lohr *et al.*, 2004; Young, 2010), the shade benefit of UTGS was highly appreciated by the key actors surveyed in the study. Most inspiring, however, was that a majority of respondents (65.6 %) were aware of and also highly appreciated the benefits of UTGS in climate change mitigation. This finding could explain why there is an increased effort in the planting of trees across the country, which unfortunately are not managed well enough to serve the intended purpose. There is a need for key actors involved in tree planting and tree distribution activities to get more involved in tree maintenance, so as to ensure that the trees survive and consequently play a role in sequestering carbon emissions. Other researchers in South Africa stress the need for government bodies, NGOs, and the private sector to become more actively involved in greening initiatives by providing ‘soft’ (e.g. information, training and advice) and ‘hard’ (e.g. tree maintenance equipment) support to UTGS (Guthrie and Shackleton, 2006; Parkin *et al.*, 2006).

8.5 What governance institutions influence local people’s ability to plant trees, and to access and use UTGS?

The findings of the study highlighted the importance of land ownership and its influence on planting and use of urban trees. This finding supports scholars such as Knuth (2005) and Lawrence *et al.* (2011) who recognized land ownership as an institutional factor that was likely to influence planting, access to and use of UTGS. Local people were more willing to plant and use trees on the land which they owned. These results substantiate findings by Treiman and Gartner (2005) which revealed that people who owned their own home were more likely to plant trees on their homestead than those who did not. Secondary to ownership, the study found other institutions with an influence on the planting and use of trees. For example, at household level, the head of the house influenced the planting and use of trees. In informal areas, the local headmen or community leaders influenced planting and use of trees within the informal areas and in the nearby open spaces.

Limited space was the most frequently mentioned reason for not planting trees on residential plots. This finding also came out of an urban study conducted by Parkin *et al.* (2006) in the Eastern Cape, South Africa. This finding is important as it shows how housing development plans can influence planting and consequently use of urban trees on private residential plots. Due to limited space, local people, especially

in RDP areas, were less inclined to plant trees on their residential plots (RDP residential areas in the country only have about 3.5 m² of public green space per capita (McConnachie and Shackleton, 2006). This finding shows that planners and developers need to consider and integrate green spaces in their housing development plans, or the negative effects of insufficient green space will become evident in the future (Louv, 2006).

The findings of the study revealed that public open spaces were more or less under an open access regime, with close to half of the respondents indicating that no permission was required to plant or remove trees in these areas. These findings suggest that public open spaces within the surveyed municipalities were not being managed effectively. This finding is in line with Martens (2009) who indicated that public open spaces (commonages) in three municipalities of the Eastern Cape, South Africa, were being poorly managed. A majority of the local people surveyed in this study were not clear about the responsible authority for these areas and most (77.6 %) were also unaware of governance rules relating to the use of trees in these areas. This finding supports those presented in Chapters four and five which showed that the laws influencing UTGS were not being implemented to promote UTGS. To avoid human exploitation, improved management of public open spaces is needed (Martens, 2009).

Finally, most local people (especially from informal areas) were unaware and uninvolved in UTGS activities as claims and counter claims were made by some municipal and department officials. These findings suggest that there is a lack of integrated management of UTGS. To encourage ownership and increase public support, there is a need for more involvement of local people in UTGS (Lawrence *et al.*, 2011).

8.6 Conclusions

It is increasingly acknowledged that UTGS can offer ecological, social, economic and psychological benefits. This study has shown that the current governance and management approaches to UTGS are not adequate in promoting the benefits of UTGS to local people and the environment. Urban forestry lacks full recognition at national and provincial levels of government. There was no policy or legislation specific to urban forestry in the country. In addition, the governance institutions with an influence on UTGS were not being implemented to promote urban forestry. The lack of full recognition of urban forestry at higher levels of government (national and provincial), has resulted in low political support and poor management of UTGS at local government level. Due to low political support from local government leaders, UTGS receive little or no funds at all for their management. Lack of budgets and insufficient funds limit local municipalities' ability to adopt planned and systematic management of UTGS. Urban trees and green spaces are not being managed effectively because of the reasons stated

above. Unfortunately, most of the key actors involved in UTGS activities are not coordinated and most only plant and donate trees with limited or no support for the management of these trees. This leaves the resource constrained municipalities with the overall responsibility of managing UTGS. If no action is taken, overexploitation and loss of UTGS will prevail. This will consequently result in reduced benefits of UTGS to local people and the environment. As illustrated in Chapter one, UTGS can play a major role in improving the quality of urban life. Thus, to meet government's aim "to improve the quality of life in urban areas, and to provide for better living conditions for previously disadvantaged people" as stated in the Constitution of South Africa (1996) and NEMA (1998), UTGS need to be institutionalized at national, provincial and local levels of government. Urban trees and green spaces also need to be integrated in urban planning and development at all three levels of government.

8.7 Recommendations

From the findings above, the following recommendations are made to improve UTGS governance and management in South Africa:

The formulation of a national urban forest policy or guidelines that recognize planned management of UTGS by central government would be useful to guide and encourage local municipalities to formulate and implement UTGS management plans and strategies. The policy can, for example, state targets that all municipalities need to achieve in their management of UTGS. This would certainly provide local municipal politicians with an incentive to act on urban forest issues on behalf of central government and the community (Saretok, 2006). Central government could also offer incentives and cost-share solutions to those municipalities that wish to develop UTGS management plans. Such a move by central government would show how committed the government is in achieving national environmental and greening objectives.

There is a need to integrate green space planning in national and provincial urban development plans. The lack of recognition of UTGS in higher level planning development stems from little or no recognition of UTGS in municipal Integrated Development Plans (IDPs). Government bodies such as DEAT, LEDET and DEDEA who are responsible for issuing development licenses should ensure that UTGS are sufficiently incorporated in development plans.

The successful management of any urban forest resource requires that the extent of the resource is known (Gerhardt, 2010; Lawrence *et al.*, 2011); thus, it is essential to conduct tree inventories in municipal areas. Since municipalities are financially constrained, external funds for conducting tree inventories can be sourced from other key actors, e.g. national and provincial government departments that are mandated to

protect trees and the natural environment. The Department of Agriculture, Forestry and Fisheries for example, can assist local municipalities to assess indigenous trees within their municipal boundaries. Government departments such as DEAT, LEDET and DEDEA can assist local municipalities in determining the location and numbers of tree species that are threatened and endangered. The South African Heritage Resources Authority and the Department of Arts and Culture can assist municipalities in identifying trees that are of cultural and historic importance. Involving local communities in the tree inventory assessment would be key for the purpose of raising awareness and promoting a sense of ownership.

Following the tree inventory assessment, responsibilities for urban trees and green spaces between local municipalities and government departments would have to be clarified. This is especially pertinent in the management of trees and green spaces existing on the periphery of towns but within municipal boundaries. Most local municipalities felt that they were only responsible for trees on streets and in parks. There is, however, a lack of clarity on who is responsible for managing and regulating use of trees in public open spaces.

There is a need to increase awareness of UTGS benefits amongst political leaders especially at local government level. Government departments such as DEAT and DAFF can organise workshops on the environment and UTGS activities, targeting municipal mayors and councillors. Only when political leaders understand the tangible and intangible benefits of UTGS, will they support increased funds for UTGS management and integration of UTGS in municipal development plans.

Municipalities have to allocate adequate budgets for the management of UTGS. Adoption of planned and systematic management of UTGS in local municipalities of the country will only be possible when sufficient budgets are allocated for tree maintenance work to be conducted on a regular and systematic basis. Regular and systematic management of UTGS is important in identifying trees that could be a threat to property and human life. Other disservices of trees, such as increasing crime levels (O'Brien, 2005; Chinyimba, 2012) can also be avoided when UTGS are regularly maintained. For example, regular pruning of trees will open tree canopies, thus making the treed area safer for local people to visit.

Due to insufficient funds within municipalities, persons responsible for UTGS management need to be inventive in securing funding and other forms of assistance for UTGS. For example, other key actors within municipal areas that could assist in meeting UTGS objectives have to be approached. Municipalities thereafter, have to establish permanent support structures for UTGS. For example, some private sector organizations can be requested to donate funds for UTGS annually as part of their corporate

social responsibility. Others can be requested to adopt and manage green spaces such as parks on behalf of the municipality.

Guided by central government, municipalities need develop UTGS management policies, plans or strategies with well-defined long-term objectives. Developing and adopting a UTGS management plan or policy shows how committed a local municipality is to managing UTGS. This can assist in facilitating budget decisions and resource allocations (Saretok, 2006). It can also assist in obtaining external funds for UTGS (Booth, 2005). For example, one municipality in the Limpopo Province prepared and used a UTGS management proposal to obtain funds for developing and managing municipal parks for a period of five years.

In developing UTGS management policies, plans or strategies, municipalities have to ensure the involvement of other stakeholders. This is essential to improving the quality of decision-making and awareness-raising of UTGS activities (Lawrence *et al.*, 2011). There also happens to be a degree of positive correlation between the level of stakeholder participation and the outcomes of urban greening (Baycant-Levent and Nijkamp, 2009).

To increase public support, municipalities are required to involve the general public in UTGS activities. Community participation in tree planting and maintenance activities builds local people's sense of ownership over the trees (Moskell *et al.*, 2010; Lawrence *et al.*, 2011) and thus reduces the chances of vandalism of UTGS.

To secure the future of UTGS, and to ensure that local people benefit equally from these resources, use of UTGS should be effectively regulated. There is a need for municipalities to formulate and implement bylaws that will regulate use of UTGS, especially in public open spaces. These bylaws need to be adequately communicated to the public through the radio and community meetings. Local government public participation (Indabas) can also be used to communicate such laws to local people. However, the formulation of bylaws alone is not enough. Municipalities need to establish adequate monitoring and enforcement mechanisms and involve. Involving local users of the UTGS resources in monitoring compliance with UTGS bylaws can be a useful tool.

Finally, key actors outside the governance realm have to become more involved in the management aspects of UTGS. For example, some actors can offer mechanical support in form of equipment for the management of UTGS, whilst others (e.g. private nurseries) can offer technical advice. Non-Governmental Organizations should assist in raising awareness of the importance of UTGS amongst urban residents.

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Greater Letaba Local Municipality. <http://bgis.sanbi.org/municipalities/show-muni-summaries.asp?muni=LIM332>

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Sundays River Valley Local Municipality. <http://bgis.sanbi.org/municipalities/show-muni-summaries.asp?muni=EC106>

Appendices

Appendix 1: Reviewed documents (South Africa)

Development Facilitation Act DFA, 1995

Eastern Cape Environmental Conservation Act, 2004

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Eastern Cape Heritage Resources Act, 2003

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Eastern Cape Provincial Parks Act, 2003

Eastern Cape Provincial Spatial Development, 2010

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Limpopo Province and Eastern Cape Greenest Municipality Competition Programme, 2011

Limpopo Province and Eastern Cape Schools State of the Environment Report Competition Programme, 2011

Employment Growth and Development Plan, 2009-2014

Limpopo Environmental Management Act, 2004

Municipal Demarcation Act, 1998

Municipal Systems Act, 2000

National Arbor Week Programme, 2011

National Environmental Biodiversity Act, 2004

National Environmental Management Act, 1998

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National Forest Act, 1998

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National Greening Strategy, 2005

National Heritage Resources Act, 1999

National Urban Development Framework, 2009

National Urban Renewal Programme, 2001

Transvaal Nature Conservation Ordinance, 1983

Urban Development Framework, 1997

Urban Development Strategy, 1996

White Paper on Housing Policy and Strategy for South Africa, 1994

White paper on Reconstruction and Development Programme, 1994

White Paper on Spatial Planning and Land Use Management, 2001

White Paper on Sustainable Forestry, 1996

Appendix 2: Municipal questionnaire

Consent form

My name is Mwale Chishaleshale. I am postgraduate student at Rhodes University pursuing a Master of Science Degree in Environmental Science. The South African-Netherlands Programme on Alternatives in development and Rhodes University are partners on a research project “The contribution of trees to local livelihoods in urban settings”. The research has been divided into three different research subjects which are being conducted by three masters students. My research is on the governance and management of urban trees and green spaces in selected municipalities of South Africa. The aim of the research is to get an understanding on how the current governance and management approaches to urban trees and green spaces influence their contributions to local people and the environment. The study also seeks to establish the key actors involved in urban forestry, their roles and their perceptions of urban forestry associated benefits. Thus, this research involves interviewing all key actors influencing urban trees and green spaces, including municipal managers, urban planners, forest officers, landscapers, Non-Governmental Organisations (NGOs) and Community Based Organisations (CBOs).

The research will help fill in the gap on urban forestry governance and management, and will contribute to an understanding of the larger issues surrounding the role of urban forestry policy in the country. Research findings will be made available to the public through published articles and written policy briefs, but this information will not be linked to any individual. If you agree to participate in this study, your anonymity will be protected, and even after you agree to participate, you can withdraw at any time you wish. We believe that there are no risks involved in this study.

With that brief background, I am requesting for an interview with you and/or any other persons influencing urban trees and green spaces in your municipality or organisation.

Would you be willing to participate in this study? If so, please initial and sign or follow the link below to participate in the study.

<http://ruconnected.ru.ac.za/mod/questionnaire/view.php?id=96689>

The study has been explained to me. I have read and understand the consent form. All my questions have been answered and I agree to participate.

Signature of respondent _____

Date _____

Start time: _____

Section A: General information about the municipality and the respondent

Name of Respondent: _____

Sex: Male ☐ Female ☐

Position/ Official designation: _____

Years on the job: _____

Town name: _____

Municipality name: _____

Professional background:

1. Landscape Architecture

2. Landscaping

3. Horticulture

4. Nature Conservation

5. Urban Planning

6. Forestry

6. Arboriculture/Tree Care

Other _____

Section B: Resources for urban trees and green spaces

Q1 Personnel responsible for UTGS

- a) Please state the total number of staff employed on tree-related work in your municipality _____
- b) Do you have personnel specifically responsibility for UTGS? Yes ☐ No ☐
- c) Who is the individual with principal responsibility for urban tree management and care? (Tick all that apply.)

	Tick (✓)
Public Works Director	
Street Superintendent	
Parks Director	
City/Community Forester or Arborist	
City Administrator / Manager	
City Planner	
Community Development Coordinator	
City / Village Clerk	
Elected Public Official (please give title)	
Other: specify _____	

d) What portion of his/her job is devoted to working with trees? (Please check appropriate answer.)

> 50% ☐ Between 25% and 50% ☐ Between 5% and 25% ☐ < 5% ☐

e) What is the level of training for the municipal employee with principal responsibility for urban tree management? (Please check all that apply.)

	Tick (√)
College degree in forestry, horticulture, biology, park management or related field	
Two-year technical degree	
Certified Arborist	
Certified Tree Worker	
Training through commercial tree service	
Attendance at tree care workshops	
No structured training in tree care	
Other: specify _____	

Q2 Budget for urban tree related work

f) Does your municipality have a budget for tree related work? Yes ☐ No ☐

Please state your annual budget for tree related work _____

a) Please rate your satisfaction with that budget?

1. Very satisfied	2. Satisfied	3. Neutral	4. Unsatisfied	5. Very unsatisfied
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Section C: Planned management of urban trees and green spaces

Q3 Information on number of urban trees and extent of tree cover

a) Do you have an estimate of the extent of tree cover in your municipality?

Yes ☐ No ☐

b) If yes, please give estimate _____

c) Do you have an urban tree inventory record?

Yes ☐ No ☐

If yes, is it kept updated? If so, how often? _____

d) Has your municipality conducted an inventory of any of the following? Check all that apply.

Trees in public open spaces/commonages Yes ☐ No ☐

Park trees	Yes ☐	No ☐
Street trees	Yes ☐	No ☐
Trees on private land	Yes ☐	No ☐
Significant or Historic Trees	Yes ☐	No ☐

*Please attach your updated tree inventory records.

Q4 UTGS management plan and/or tree planting and greening strategies

e) Does your municipality have a UTGS management plan?

Yes ☐ No ☐

If no, please state why not _____

f) Does your municipality have any tree planting or greening strategy?

If yes, please state these _____

If no, please state why not _____

g) Do the municipal urban tree programmes include planting of trees in public open spaces/commonages? Yes ☐ No ☐

If no, please state why not:

h) Do they include planting of trees in open public parks? Yes ☐ No ☐

If no, please state why not _____

i) Do they including planting new or replacing existing street trees? Yes ☐ No ☐

If no, please state why not _____

Q5 Institutions/rules influencing planting and removal of trees in public open spaces/commonages

a) Is there a set of regulations or bylaws regarding the planting of trees in public open spaces of your municipality by urban dwellers? Yes ☐ No ☐

b) If yes, please state what these are and when they were enacted?

1. _____ When _____

2. _____ When _____

If no, please state why not _____

c) Is there a set of regulations or bylaws regarding the **use/removal** of trees public open spaces of your municipality by urban dwellers? Yes ☐ No ☐

d) If yes, please state what these are and when they were established?

1. _____ When _____

2. _____ When _____

If no, please state why not _____

- e) Have the regulations been modified or changed over the years? Yes ☐ No ☐

If no, please state why not _____

Q6 Institutions/rules influencing planting and removal of street trees

- a) Is there a set of regulations or bylaws regarding the planting of street trees by local people in your municipality? Yes ☐ No ☐

- b) If yes, please state what these are and when they were enacted?

1. _____ When _____

2. _____ When _____

If no, please state why not _____

- f) Is there a set of regulations regarding the **use/removal** of street trees by adjacent property owners and/or urban dwellers in your municipality? Yes ☐ No ☐

- g) If yes, please state what these are and when they were established?

1. _____ When _____

2. _____ When _____

If no, please state why not _____

- h) Have they been modified or changed over the years? Yes ☐ No ☐

Q7 Institutions/rules influencing planting and removal of trees in public parks

- a) Is there a set of regulations regarding the planting of trees by local people in public parks in your municipality? Yes ☐ No ☐

- b) If yes, please state what these are and when they were established?

1. _____ When _____

2. _____ When _____

If no, please state why not _____

- c) Are there any regulations regarding the removal of trees in parks by adjacent property owners and/or local people in the municipality? Yes ☐ No ☐

- d) If yes, please state these and when they were established

1. _____ When _____

2. _____ When _____

Q8 Institutions influencing planting and removal of trees on private property

- a) Are there any regulations regarding the planting or removal of trees on private property?

Yes ☐ No ☐

b) If so, what are they and when were they established?

1. _____ When _____

2. _____ When _____

If no, please state why not _____

c) Have they been modified or changed over the years? Yes ☐ No ☐

d) Does your municipality have performance zoning standards or otherwise regulate the amount or type of vegetation on existing or new private property? Yes ☐ No ☐

Q9 Recognition of UTGS in urban planning and urban developments

a) Are urban trees and green spaces incorporated in municipal urban planning?

Yes ☐ No ☐

b) If yes, please indicate where urban trees and green spaces are mentioned in the urban planning policies or bylaws

c) Are there any procedures protecting trees and vegetation during urban developments (e.g. construction)?

d) Does your municipality have an ordinance that protects trees during new construction?

Yes ☐ No ☐ Don't know ☐

e) If yes, please state _____

If no, please state why not _____

f) Does your municipality have an ordinance that requires trees to be planted after new residential construction? Yes ☐ No ☐ Don't know ☐

g) If yes, please state _____

h) Does your municipality have an ordinance that requires trees to be planted after new commercial construction? Yes ☐ No ☐ Don't know ☐

i) If yes, please state _____

Q10 Communication and Enforcement of rules

a) Please state how the rules and regulations regarding urban forests/trees are communicated to the public? _____

b) What is the level of enforcement and penalties associated with the regulations?

c) Is punishment the same for first and second violators of law?

Yes ☐ No ☐

d) What department is responsible for law enforcement? _____

e) Have there been any recorded cases of violators in the past 12 months?

Yes ☐ No ☐

Please state the usual cases of violations

f) Is there provision for the rules and regulations regarding urban trees to be reviewed?

Yes ☐ No ☐

If yes, please give the number of years, specified between each revision _____

g) What is your view of the current rules influencing urban forestry?

Okay ☐ Fair ☐ Complicated ☐ Corrupt ☐ Other: specify _____

h) How do you think they can be improved?

Section D: Systematic management of urban trees and green spaces

Q11 Systematic tree planting, maintenance and inspections

a) Do you have a tree planting schedule to guide tree planting activities Yes ☐ No ☐

If no, please state why not _____

b) How often do you plant trees in:

Public open spaces _____

Public parks _____

Streets _____

c) How is the species of trees chosen? _____

d) Do you have a tree maintenance schedule or strategy to guide tree maintenance work?

Yes ☐ No ☐

If no, please state why not _____

e) Please how tree maintenance work is conducted? _____

f) Does your municipality have an inspection schedule for trees in:

Public open spaces Yes ☐ No ☐ How often is inspection done _____

Public parks Yes ☐ No ☐ How often is inspection done _____
 Streets Yes ☐ No ☐ How often is inspection done _____
 If no, please state why not _____

Section E: Support and integrated management of urban trees and green spaces

Q12 Involvement of other key actors in UTGS management

- a) Do you get any outside support in running your UTGS related programmes/activities
 Yes ☐ No ☐
 If yes, please state the kind of support received _____
 From who? _____
- b) Does your municipality consult or work with other organisations in regards to UTGS management? Yes ☐ No ☐
- c) If yes, please state who is consulted.
1. Other municipalities
 2. Government agencies
 3. Voluntary organisations
 4. General public
 5. Businesses
 6. Community groups
 7. Other _____
- d) If no, please state why not _____
- e) If yes, please state your kind of involvement with other organisation _____

- f) Does your municipality support other organisations engaged in tree planting and greening activities? Yes ☐ No ☐
 If yes, please state organisation and kind of support given
1. _____ Support _____
 2. _____ Support _____

Q13 Involvement of local people in UTGS management

- a) Does your municipality consult local urban residents in regards to UTGS management? Yes ☐
 No ☐
 If no, please state why not _____

Are local residents engaged in municipal-led urban tree planting and management activities? Yes

☐ No ☐

If yes, please state the kind of activities local people are involved in _____

Q14 Municipal participation in Arbor Week

a) Does your municipality participate in National Arbor every year?

If yes, what kind of activities does your municipality conduct during Arbor Week _____

If no, please state why not _____

Section F: Municipal challenges to UTGS management

Q15 Challenges to UTGS Management

a) Please state the challenges to UTGS management in your municipality:

b) What in your opinion, can help overcome these challenges _____

Section G: Knowledge, appreciation and practice of urban forestry

Q16 Knowledge of urban forestry benefits

a) Please state the benefits that UTGS offer to local livelihoods and the environment (tick all that apply).

Benefits of UTGS	Tick (✓)
Tangible benefits	
Food	
Fuelwood	
Medicines	
Building materials	
Intangible benefits	
<i>Regulating services</i>	
Habitat for biodiversity	
Wind barrier	
Air purification/oxygen	

Water retention	
Sound barrier	
<i>Cultural services</i>	
Beautification	
Social interactions	
Part of culture	
Recreation	
Relieving stress	
Increasing property value	
Other: specify _____	

Q17 Appreciation of UTGS benefits

How would you rate the importance of the following UTGS benefits?

Benefits of urban forests and trees	Very important	Moderately important	Neutral	Slightly important	Not important
Tangible benefits					
Food					
Fuelwood					
Medicines					
Building materials					
Intangible benefits					
<i>Regulating services</i>					
Cooling effect/shade					
Climate change mitigation					
Soil protection					
Habitat for biodiversity					
Wind barrier					
Air purification/oxygen					
Water retention					
Sound barrier					
<i>Cultural services</i>					
Beautification					
Social interactions					
Part of culture					
Recreation					
Relieving stress					
Increasing property value					

Q18 Perceived roles and practise of urban forestry

- Please state what your role as a municipality is in urban forestry planning and/or UTGS management. _____
- Please state what your role as an individual is in urban forestry planning for and/or management of UTGS _____

Start time: _____ End time: _____

Appendix 3: Key actor's questionnaire

Date: _____

Start time: _____

Section A: General information

Municipal Area _____

Name of Respondent _____

Sex Male ☐ Female ☐

Organisation _____

Position/ Official designation _____

Years on the job _____

Please indicate your main professional background _____

How long has your organisation been in existence?

Less than 5 yrs ☐ 5-10 yrs=2 ☐ more than 10 yrs ☐

Section B: Knowledge, appreciation and practice of urban forestry

Q1 Knowledge of urban forestry benefits

- b) Please state the benefits that UTGS offer to local livelihoods and the environment (tick all that apply).

Benefits of UTGS	Tick (✓)
Tangible benefits	
Food	
Fuelwood	
Medicines	
Building materials	
Intangible benefits	
<i>Regulating services</i>	
Habitat for biodiversity	
Wind barrier	
Air purification/oxygen	
Water retention	
Sound barrier	
<i>Cultural services</i>	

Beautification	
Social interactions	
Part of culture	
Recreation	
Relieving stress	
Increasing property value	
Other: specify _____	

Q2 Appreciation of UTGS benefits

How would you rate the importance of the following UTGS benefits?

Benefits of urban forests and trees	Very important	Moderately important	Neutral	Slightly important	Not important
Tangible benefits					
Food					
Fuelwood					
Medicines					
Building materials					
Intangible benefits					
<i>Regulating services</i>					
Cooling effect/shade					
Climate change mitigation					
Soil protection					
Habitat for biodiversity					
Wind barrier					
Air purification/oxygen					
Water retention					
Sound barrier					
<i>Cultural services</i>					
Beautification					
Social interactions					
Part of culture					
Recreation					
Relieving stress					
Increasing property value					

Q3 Perceived roles and practise of urban forestry

- c) Please state what your role is in urban forestry planning and/or UTGS management: _____
- d) What urban forestry programmes or urban tree related activities is your organisation currently involved in? _____
- e) Please state what your role as an individual is in urban forestry planning for and/or management of UTGS _____

Q4 Support and integrated management of urban forestry

- a) Do you get any support in running your urban forest/tree related programmes/activities?

Yes ☐ No ☐

If yes, state kind of support received _____

From _____

- g) Does your organisation support others (e.g. municipalities) engaged in tree planting and greening activities? Yes ☐ No ☐

If yes, please state organisation and kind of support given

3. _____ Support _____

4. _____ Support _____

5. _____ Support _____

- b) Are you involved in municipal-led urban forest/tree programmes? Yes ☐ No ☐

If yes, please indicate programme _____

If no, please state why not _____

- c) Which organisations/departments do you work with in running your urban tree related programmes? _____

- d) Are local residents engaged in your organisation's tree related activities? Yes ☐ No ☐

If yes, what programmes are they engaged in _____

If no, please state why not _____

Section C: Challenges influencing performance of roles relating to UTGS

Q5 Challenges to UTGS Management

- c) Please state the challenges that affect your organisations involvement in urban forestry activities _____

What in your opinion can help overcome these challenges _____

Section D: Knowledge of governance rules and penalties relating to UTGS

Q8 Knowledge of governance rules and their enforcement

a) Are you aware of any rules or regulations influencing planting of trees on:

- | | | | |
|-------------------|------------------------------|-----------------------------|-------------------------------------|
| i) Own property | Yes ☐ | No ☐ | Don't know ☐ |
| ii) Open spaces | Yes ☐ | No ☐ | Don't know ☐ |
| iii) Public parks | Yes ☐ | No ☐ | Don't know ☐ |
| iv) Street trees | Yes ☐ | No ☐ | Don't know ☐ |

If yes, please state them: _____

b) Are you aware of any rules influencing use/removal of urban trees/tree products on:

- | | | | |
|------------------------|------------------------------|-----------------------------|-------------------------------------|
| i) Own property | Yes ☐ | No ☐ | Don't know ☐ |
| ii) Public woodlots | Yes ☐ | No ☐ | Don't know ☐ |
| iii) Open spaces/parks | Yes ☐ | No ☐ | Don't know ☐ |
| iv) Street trees | Yes ☐ | No ☐ | Don't know ☐ |

If yes, please state them: _____

a) Are you involved in the formulation of rules/laws regulating planting and use of urban trees/forests? Yes ☐ No ☐

b) Do you know the penalties/sanctions involved if one violates governance rules/laws regarding urban forests? Yes ☐ No ☐

If yes, please state them _____

c) Do local residents violate the rules regarding use of urban forests and trees?

Yes ☐ No ☐ Don't know ☐

d) What is your view about governance rules regarding removal/use of urban trees by local residents?

Okay ☐ Fair ☐ Complicated ☐ Corrupt ☐ Other: specify _____

e) How should the rules be improved? _____

End time: _____

Appendix 4: Household questionnaire

Date _____

Start time: _____

Section A: Institutions influencing planting and removal of trees on private residential plots

Q1 Institutions influencing planting and removal of trees within the household

- a) Do you require any permission to plant or cut trees within your household?

Yes ☐ No ☐

If yes, please state what kind of permission is required, and what procedures if any should be followed: _____

- b) Who determines when to plant or cut a tree within the household?

Household head Yes ☐ Anyone within the household No ☐ Other: specify

- c) What prevents you from planting trees within your household plot?

Section B: Institutions influencing access to, planting and removal of urban trees on public land

Q2 Institutions influencing peoples' access to treed areas

- a) Do you require any permission to go to (access) these areas?

i) Public open spaces Yes ☐ No ☐

ii) Public parks Yes ☐ No ☐

If yes, please state what kind of permission is required to access these areas, and what procedures if any should be followed: _____

Q3 Institutions influencing planting of trees in public urban areas

- a) Do you require any permission to plant trees in:

v) Public open spaces Yes ☐ No ☐

vi) Public parks Yes ☐ No ☐

vii) Street trees Yes ☐ No ☐

Q4 Institutions influencing the use/removal of trees from public urban areas

b) Do you require any permission to use and/or harvest urban forest/tree products from:

- | | | |
|-----------------------|------------------------------|-----------------------------|
| i) Public open spaces | Yes ☐ | No ☐ |
| ii) Public parks | Yes ☐ | No ☐ |
| iii) Street trees | Yes ☐ | No ☐ |

If yes, please state what kind of permission is required to access these areas, and what procedures if any should be followed: _____

c) Do you have to pay for the permission to access or use trees in:

- | | | |
|-----------------------|------------------------------|-----------------------------|
| i) Public open spaces | Yes ☐ | No ☐ |
| ii) Public parks | Yes ☐ | No ☐ |
| iii) Street trees | Yes ☐ | No ☐ |

d) What is your view of the procedures in place for getting permit to use or harvest products from the above?

Okay ☐ Fair ☐ Complicated ☐ Corrupt ☐ Other: specify _____

Section C: Knowledge of government rules and penalties relating to UTGS

Q5 Knowledge of governance rules and their enforcement

a) Do you know of any governance rules or laws regarding the planting of trees on public or private property? Yes ☐ No ☐

If yes, please state these: : _____

b) Do you know of any governance rules or laws regarding the removal of trees on public or private property?

- | | | |
|----------------------|--|-------------------------------------|
| i) Public property | Yes ☐ No ☐ | Don't know ☐ |
| ii) Private property | Yes ☐ No ☐ | Don't know ☐ |

If yes, please state these _____

- _____
- _____
- b) What are the penalties if one violates these laws? _____
- _____
- c) Do local residents violate the rules regarding use of urban forests and trees?
Yes ☐ No ☐ Don't know ☐
- e) What are the sanctions/penalties if one violates the above rules? _____
- _____
- d) What is your view of governance rules regarding removal/use of urban residents trees by local residents?
Okay ☐ Fair ☐ Complicated ☐ Corrupt ☐ Other: specify _____
- e) How should the rules be improved, or what can be done?

Section D: Knowledge and participation in UTGS activities

Q6 Knowledge of forest resource and its uses

- a) Are you aware of any information on extent of urban trees and green spaces, how they should be used, and who should use them? Yes ☐ No ☐
- b) If yes, please state where you accessed this information _____
- c) What is the primary factor preventing you from gaining information about trees and tree care (please choose one)?

	Tick (✓)
Not interested in the subject	
Do not have the time	
Do not know where to find the information	
Other: specify _____	

Q7 Knowledge and participation in urban forestry programmes

- a) Are you aware of any tree planting or greening project within your municipality?
If yes, please state the programme and who runs it _____

b) Are you involved (do you take part) in these programmes?

Yes ☐ No ☐ Don't know ☐

If no, please state why not _____

Q8 Knowledge and participation in Arbor Week

a) Have you ever heard of Arbor Week Yes ☐ No ☐

Do you take part in Arbor Week celebrations? Yes ☐ No ☐

If yes, please state your reasons for participating _____

If no, please state why not _____ End time: _____