



ADDIS ABABA UNIVERSITY
COLLEGE OF DEVELOPMENT STUDIES
CENTER FOR ENVIRONMENT AND SUSTAINABLE
DEVELOPMENT

URBAN DWELLERS' ATTITUDE AND MANAGEMENT
PRACTICE TOWARDS TREE PLANTING IN WOLKITE
TOWN, GURAGHE ZONE, SOUTH NATIONS NATIONALITIES
PEOPLE REGIONAL STATE

BY: ZERIHUN WORKNEH ABATE

FEBRUARY, 2021

ADDIS ABABA, ETHIOPIA

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This is to certify that the research thesis conducted by Mr. Zerihun Workneh, entitled: *“Urban Dwellers’ Attitude and Management Practice towards Tree Planting in Wolkite town, Guraghe Zone, South Nations Nationalities People Regional State”*. Submitted in partial Fulfiment of the requirements for the degree of MA in Environment and sustainable development complies with the regulation of the university and meets the accepted standard with respects to originally and quality.

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DECLARATION

I, the undersigned, declare that this thesis entitled “*Urban Dwellers Attitude and Tree Management Practices towards Tree Planting in Wolkite Town.*” is my original work and has not been presented for a degree in any other university or organization, and that all sources of materials used for the thesis have been duly acknowledged.

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List of Acronyms

CSA Central Statistics Authority

FAO Food and Agriculture Organization of the United Nations

FGD Focus Group Discussion

ha Hectare (s)

HH Household

SNNPR South Nation, Nationalities and People's Regional State

UDCB Urban Development and Construction Bureau

SPSS Statistical Package for the Social Sciences

UN DESA United Nations Department of Economic and Social Affairs

Abstract

Understanding people's attitudes and the current management practices towards tree planting is crucial in advancing the goal of urban greening. This study was conducted to assess the attitudes and management practices of tree planting among Wolkite residents. A mixed methods approach employed to collect and analyze the data that was generated through questionnaires, semi-structured interviews and focus group discussion. A total of 96 households selected through stratified random sampling technique participated in the survey. Furthermore, the research included three interviews for staff members of Wolkite municipality sanitation and beautification department. The data was analyzed quantitatively and qualitatively using descriptive statistics including frequency, percentages and graph. The results indicated that positive attitudes towards tree planting and retaining within respondent's gardens. Some respondents had negative attitudes towards tree planting owing to suspected damage on building and blocking light and fear of allergies. Some 69 (72%) of the total respondents showed willingness to participate in tree planting programs created by the municipality in public spaces. The study also revealed low level of households' satisfaction with respect to municipal's tree planting and management practices. The three most prominent barriers to tree planting in private spaces were limited knowledge about which species are suitable for planting 86 (90%), limited space in people's yards 77 (80%) and lack of water 7 (7%). Therefore, the recommendations, accordingly made in this thesis, include, amongst others, awareness raising, formulation and enforcement of regulatory system and participation of residents towards tree planting and management

Key Words: *attitude, tree management practice, tree planting.*

CHAPTER ONE

1. Introduction

1.1. Background

The world population is projected to grow from 7.7 billion in 2019 to 8.5 billion in 2030, and further to 9.7 billion by 2050. A large and increasing proportion (55 %) of this population resides in urban areas (UN DESA, 2019). In Africa, 57 % of urban dwellers live in smaller cities and towns (UN Habitat, 2016). In urban areas, urban forests are important because they help to solve problems such as urban heating and climate change mitigation by improving air quality and microclimate conditions (Brown et al 2013). According to Shanahan 2014, urban forests also provide social benefits such as the recreational, mental and physical health for people thereby maintaining community health and wellbeing.

Knowledge is a component of attitude, and lack thereof could influence people's attitudes towards urban greenery (Abass et al., 2019). Nanamhla 2020 found in his study lack of knowledge about which species to plant, where to plant trees, and how to plant them as limiting factors to them considering tree planting. This implies a general lack of knowledge about trees and tree planting altogether. Conway (2016) concluded that the lack of knowledge was behind tree removals, either because residents had not understood how large a tree would become or did not know how to properly care for it. This implies that had they had sufficient knowledge on the species suitable for planting, they could have made different choices and would not have to ultimately remove those trees. Similarly, Kirkpatrick et al. (2013) reported that negative attitudes to trees often resulted from limited knowledge about and poor decision-making in relation to trees in cities, stating that major problem is that people (either the residents or municipal councils) do not know the correct trees to plant.

Attitudes have been examined in relation to the willingness of residents to participate with tree planting on private (Kirkpatrick, 2012) and public land (Conway & Bang 2014). Participation in tree planting and urban forest expansion has been appraised as a core necessity in designing and offering urban tree programs that are more likely to be sustainable because they meet local needs

(Donovan and Mills, 2014). The participation of communities and homeowners in both new plantings and the maintenance of existing trees has been proven integral (Jack-Scott et al., 2013) because it can lead to higher ratings of satisfaction with the trees, especially with street trees (Summit and Sommer, 1998), a greater sense of ownership (Padgee et al., 2006), and improved sense of stewardship (Moskell et al., 2016). Above all, urban tree planting initiatives that require the involvement of residents in tree planting and stewardship need to invest in knowledge and insights into people's beliefs, values and attitudes related to tree stewardship and urban forest governance (Heberlein, 2012). These are important to understand peoples' intended and actual participation (or non-participation) in stewardship and the initiatives in general (Moskell and Allred, 2013).

Tree Management is about planning, planting, maintenance, protection and care of trees, forests, green space and related resource for economic, environmental, social and public safety (Jones and Davies, 2017). Trees management includes the development of citizen involvement and support for investments in long-term management of tree planting, protection and care programs.

Trees are increasingly recognized for their importance to the liveability of urban areas. However, many urban environments are challenging for tree establishment and growth (De Lacy and Shackleton, 2014), and those planning and managing woodland, parks, gardens, street and square trees, and other green areas within urban agglomerations operate in highly complex environments, facing multiple and rapidly changing urban demands (Konijnendijk et al., 2006). Trees in urban settings are also affected by the people who plant, own, maintain, pass by, and benefit from them (Vogt et al., 2015), and all these effects can be potential barriers to, or enablers, of successful tree establishment.

Moser and Ekstrom (2010) define barriers as “obstacles that can be overcome with concerted effort, creative management, change of thinking, prioritization, and related shifts in resources, land uses, institutions, etc.” According to Spires et al. (2014), the barriers of tree planting highlighted by households and municipal officials is grouped into biophysical, social and resource barriers. A number of barriers to tree planting in both the private and public spaces were identified by officials and households, including limited space, limited funds, lack of equipment, anticipated and experienced damage to trees, fear of crime, politics, limited knowledge, and

alleged municipal incompetence. Similarly, Biernacka et al (2018) argue that a number of barriers emerged, and the majority of them were related to human agency, and emerged within certain institutional contexts, compared to those that result from urban morphology such as compactness and density of residential areas which limit space for tree planting. Likewise, Nanamhla 2020 points out that biophysical, resource and social barriers to private space tree planting were the most identified by respondents in his study. Gashu et al (2019) who found that structural and capacity barriers, followed by technical problems, were the most important barriers to developing green infrastructure in Bahir Dar and Hawassa, Ethiopia.

This study specifically focused on attitude and tree management practices towards tree planting of Wolkite town residents. Tree planting initiatives in Ethiopia has become the long-term highlight of urban tree planting throughout the country since Ethiopian Millennium. While these initiatives were initially aimed at tree planting in schools and other public institutions, they have become the primary national program for promoting planting in urban areas. In 2019 a new initiative called ‘‘Green Legacy Initiative’’ launched by Ethiopian government to be implemented in all parts of the country including Wolkite town. Wolkite shares some common attitudinal and tree management practices attributes towards tree planting as other developing countries cities and towns. Furthermore barriers for the planting of trees in both private and public spaces, specifically in parks, community gardens, schools and any other institutions are areas of focus of this study.

1.2. Statement of the Problem

Our planet earth is losing its vegetation cover at an alarming rate. Latest studies estimated that millions of hectares of forestlands are converted to other land use types every year (Bastin et al. 2019). Trees make up the major components of the lost vegetation. Loss of vegetation has led to significant loss of ecosystem functions (Gilmour 2012). According to the report by Scholes et al. (2018), Intergovernmental Panel on Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), degradation of land and marine ecosystems undermines the well-being of 3.2 billion people and costs about 10% of annual global gross domestic product in loss of species and ecosystems services.

Considering the severity of land and marine ecosystem degradation, the United Nations General Assembly declared 2021 – 2030 the UN Decade on ecosystem restoration, with the aim of massively scaling up restoration of degraded and destroyed ecosystems as a proven measure to fight the climate crisis and enhance food security, water supply and biodiversity (UNEP, 2019). The project is ambitious and aims to restore 350 million hectares degraded ecosystems by 2030.

Among the predominant measures put forward to stop this planetary bareness, is growing trees to improve the vegetation cover. Bastin et al. (2019) estimate that the area potentially available to plant and grow trees is about 1.7 -1.8 billion ha to significantly absorb greenhouse gases that currently exacerbate global warming. The ecosystem services provided by individual and groups of trees (forests) are critically needed to reinstate our planet's habitability and functionality on a healthy trajectory. Achieving this goal depends on the success of current tree planting initiatives. Minnemeyer et al (2014) estimate that there is close to 1.5 billion ha of degraded land that may be restored through mosaic restoration using tree-based systems (e.g. agroforestry schemes) (Wolff et al 2018).

In the past, millions of dollars have been invested in efforts to restore landscapes through planting trees. However, over the last five decades, there were few success stories of such interventions due to the poor field survival rate of planted seedlings (Negussie et al. 2008). In many cases, the failure rate was so high (Murekezi et al. 2013) that the achieved success from such interventions is lower than the resources invested in it. News articles that announce planting campaigns of millions of seedlings are common, the latest is the 5 billion trees campaign in Ethiopia to re green the country and restore tree-based ecosystem functions and services. Despite all such efforts at national level, in many countries vegetation cover has not improved proportionally to the investment that is reported. This, however, does not mean that all is lost: Zomer et al. (2016) found out that on-farm tree cover across the tropics has increased. This may have been due to individual efforts rather than big investments in tree growing.

Countries' ambitions to restore landscapes, particularly forests, increased after the creation of global mechanisms like the Bonn Challenge which aim at restoring millions of hectares of forested landscapes to further reduce the extent of forest losses around the planet. These aspiring vision and commitment are now reaching even continental levels (van Oosten 2013) e.g. through

the African Forest Landscape Restoration Initiative (AFR100) with the goal of restoring 100 million ha by 2030; in Latin America through the Initiative 20X20 with the vision of restoring 20 million ha by 2020. The largest share of such continental aspirations is meant to be achieved through tree-based restoration schemes.

Wolkite town strategic frameworks (2020) emphasize sustainable development, environmental protection and the creation of quality life and working environments. Tree planting and management play a critical role in achieving these objectives and therefore these valuable environmental assets need to be provided and managed in a manner that will optimize the outcomes of key city strategies. Mohammed, (2011) in his study found that there are implications of deforestation in the study area, since there is land degradation, which is aggravating formations of gullies and soil erosion, loss of productivity, loss of biodiversity, interruption of water flows, and occurrence of climate change.

In sum, restoring ecosystems through tree-based schemes has been going on in many countries with millions of dollars of investments every year. Nonetheless, successes are scanty and untraceable due to poor or no tree management practices. Not much has been done to examine why past efforts have not succeeded as anticipated. Hence, ongoing measures to increase urban tree biomass are taking place as an ad hoc activity rather than a meticulously designed task that needs careful consideration of numerous factors that affect the success rate of tree planting.

Therefore, this research contrasts from past investigations and found the gap in that although trees have been planted yearly in the study area, there is a huge gap that has been left out, as poor or no monitoring and post-planting management activities have been adopted to ensure performance and survival of trees planted. Thus, this research will help in providing much needed information on urban dwellers attitude and management activities which are key factors for the successful survival rate of planting seedlings.

1.3. Research Questions

The research seeks to give answer for the following basic questions:

1. What opinions do have the residents of the study area towards tree planting?
2. What practices of tree management exists in the town for the successful survival rate of planting seedlings?
3. What are the major barriers that undermine tree management in the town?

1.4. Objectives

1.4.1 General Objective

The general objective of the study was to assess urban dwellers attitude and tree management practice towards tree planting in Wolkite Town.

1.4.2. Specific Objectives

The study was guided by the following specific objectives.

1. To assess residents' attitude towards tree planting in the study area.
2. To assess the existing tree management practices in the town.
3. To identify the major barriers that undermines tree planting and its management in the town.

1.5. Significance of the Study

1.5.1. Development Significance of the Study

Since the study practically assessed the attitude and tree management practices of residents of Wolkite town towards tree planting, the findings will be used for decision making in the effort of improving the town's green infrastructure provision and management. The study shall also add new insights to the existing literature by identifying the town's tree planting efforts and management practices. The study findings can be used as an input for any future research undertaking in the area of urban tree planting and management.

1.5.2. Practical Significance of the Study

This study may benefit: the policy makers, the administration of Wolkite town and researchers. The analysis of different countries' experience and the findings of this study together can help

for decision making in the effort of improving the town's green infrastructure provision and management.

1.6. Limitations of the Study

While the employment of multiple methodologies may serve as the strength of this study, the research process also highlighted the limitations in this regard. This study was large and incorporated multiple data sets which limited my ability as a single researcher to interrogate and deeply analyse individual data sets. The study would have benefited from an in-depth analysis of urban dwellers attitude and tree management practice towards tree planting. The other limitation was lack of organized secondary data as required. Thus more attention was given to primary data specially questionnaire survey, interview and observation data that needs long time and more finance to collect and manage these data.

A detailed assessment of attitude and tree management towards tree planting activity could have enhanced my understanding of the exact objects of those activity systems and the challenges experienced by the subjects in fulfilling those objects. This would have provided me with a more holistic view of the day-to-day functions of the entities mandated to advance urban forestry and urban greening. This also limited the theory related process of this study, and failed to make use of the full potential of the theory.

1.7. Scope of the Study

The thematic area of the study is limited to assessing the attitude and tree management practice of residents towards tree planting. As far as the spatial limit is concerned, the study is limited to the geographical area called "Wolkite town" under the administration of Guraghe zone of the SNNPR government. The target population included Wolkite town Menaharia Kebele HHs, Wolkite Municipality Urban and Beautification Department officials. Moreover, non-governmental organizations also participated during Focus Group Discussion.

CHAPTER TWO

2. RELATED LITERATURE REVIEW

2.1. Introduction

This section presents the review of literatures related to urban tree planting and its management. It is organized into sub-topics that include definitions of terms and concepts, urban dwellers' attitude towards tree planting and its management, different countries' experiences on the issue and barriers towards urban tree planting and management. And finally, this section concludes the whole literature review in conceptual framework of urban tree planting and its management.

2.2. Conceptual and Theoretical Framework

2.2.1. The Urban Forest Concept

The urban forestry concept is not a straight-forward and simple one to explore and define (Konijnendijk et al., 2006), as it requires initial insights into 'urban' and 'forestry' as independent terms and subsequently bring these together subtly as to not lose their meaning. Reputably, the combination of these two words came about in 1965 at the University of Toronto in response to a request for a name or title to a graduate student's study of the success and failures of municipal tree planting projects in a borough of metropolitan Toronto (Jorgensen, 1986). No consensus exists on the precise meaning of the terms 'urban forests' and 'urban forestry' (Randrup et al., 2005), although the most quoted definitions of urban forestry reflect high expectations for the field, encompassing an inclusive perspective of the urban forest as representing various types of green spaces, long term planning, provision of multiple benefits, dialogue between various disciplines and creation of partnerships among stakeholders (Randrup et al., 2005). More normative descriptions of urban forestry have evolved over the years, and they have all stressed its socially-inclusive nature, i.e. the need for urban forestry to involve local residents in policy, planning and management (Konijnendijk van den Bosch, 2016).

Strom (2000) define the urban forest as "the land in and around areas of intensive human influence, ranging from small communities to dense urban centres, which is occupied or potentially occupied by trees and associated natural resources, and includes public and private

property and street, transportation and utility corridors”. Consequently, urban forestry can be described as the “art, science and technology of managing trees and forest resources in and around urban community ecosystems for the ecological, physiological, sociological, economic and aesthetic benefits that trees provide society” (Miller, 1997). This description strongly suggests that the concept of urban forestry mainly relates to the establishment, promotion, maintenance and management of trees in urban and peri-urban landscapes (Shackleton, 2006). Therefore, the urban forest is not simply street trees and parks, but an ecosystem that includes soil, water, animals, utilities, buildings, transportation systems, people, and vegetation (Strom, 2000). Vegetation includes all plants, woody and herbaceous, regardless of where they are growing (Moll et al., 1995). Urban forestry is a specialist branch of forestry, and is different from the traditional forestry practice in that most forests are considered and managed as a commodity to provide timber resources and other woody biomass products, while in urban forestry however, forests are valued for their aesthetic and environmental qualities; to be “harvested” only when they die or become hazardous (Gerhold, 2007).

The urban forestry term grew “out of a lively counterculture (what Erik Jorgensen recalls as then “happening scene” at the University of Toronto during the sixties), a traumatic environmental disaster (the decimation of urban elm trees by Dutch elm disease), and the intellectual ferment created by media guru Marshall McLuhan” (Dean, 2009), and was then formalized in 1965 by Erik Jorgensen in Toronto, Canada (Randrup et al., 2005). However, the urban forestry practice had long been evident through the care of green spaces, creation of gardens, plantations and planting trees around places of worship as well as buildings as some of the earliest cities such as Egypt, former Persia, Greece, China, and Rome expanded (Grey and Deneke, 1978). Urban tree planting is an old practice historically mentioned in places like Britain in the 1600s–1900s regarding “walks and avenues” (Johnston, 2015), and tree planting in other European cities was traced from boulevard and allée planting in private gardens and, subsequently, in avenues and then public gardens, squares and promenades (Lawrence, 1988). Today, trees in urban areas, which are the focus of this research, are a major component of the urban forest, and tree planting and maintenance are the most dominant practices of urban forestry. Trees can be found anywhere, space permitting, within the urban landscape, including on the street (Strom, 2007) and within domestic gardens (Kaoma and Shackleton, 2014a, 2014b).

Tree Management is about planning, planting, maintenance, protection and care of trees, forests, green space and related resource for economic, environmental, social and public safety (Jones and Davies, 2017; Bettinger et al., 2016; Wolf and Robbins, 2015; Rafiuddin, 2011). Trees management includes the development of citizen involvement and support for investments in long-term management of tree planting, protection and care programs.

2.2.2. Theoretical Framework

In a number of studies, households' tree planting behaviour has been investigated and analysed under different theoretical frameworks. On one hand, employing neo-classical theory, Amacher et al. (2004) examined households' investment in tree planting behaviour for different purposes. Further, Cooke et al. (2008) applied neo-classical theory to discuss households' tree planting behaviour, based simultaneously on utility and profit maximization factors. Furthermore, Bluffstone et al. (2008) investigated households' tree planting behaviour using utility maximization theory, identifying different factors influencing tree planting behaviour. It has, however, been reported by Josh and Arano (2009) that the utility in question can only be observed through a set of determinants. Thus, households' decisions to plant trees are assumed to represent their utility maximization behaviour (Louhichi et al., 2013). On the other hand, Mahapatra and Mitchell (2001) have used a number of theories to examine the factors that influence households' tree planting behaviour, which include the theory of economic constraints.

The theories reviewed have been developed for the purpose of analysing the behaviour of households in rural settings, in an effort to invest in tree planting in the long term. In a more specific study, Besley (1995) has analysed investment incentives and property rights linkages using theoretical models. According to Shively (2000), the utility maximization model has been used to investigate households' tree planting behaviour in situations such as those in which expected returns and changes in the price of trees are important determinants for tree planting patterns. Other works that have dealt with the factors for households' tree planting behaviour include the work of Simmons et al. (2002). This work has analysed the factors and market incentives that influence people's tree planting behavior.

In the study areas, households primarily employ family labour in tree planting, without using hired labour. Thus, the market wage rate of primarily family labour depends on the shadow wage

of returns from the tree planted products. Therefore, the use of shadow wages makes households non-separable, which implies that the decision to plant trees does not depend on production alone, but also on factors that affect consumption decisions. For example, some of these factors include perceptions about tree planting, the right to transfer tree products for trade or domestic use, and policy tools designed to match household utility (Amacher et al., 2004; Mekonnen and Damte, 2011). According to de Janvry and Sadoulet (2006), when a household's decisions regarding production are affected by its decisions regarding consumption, a household is said to be non-separable.

Therefore, the theoretical framework used in this study is based on the studies by Bluffstone et al. (2008) which are directly related to the current study, for they also analysed households' tree planting behaviour.

2.3. Empirical Literature Review

2.3.1. Urban Dwellers Attitude and Management Practices

Urban greening refers to organized or semi-organized efforts to introduce, conserve, or maintain outdoor vegetation in urban areas, including a range of policies, incentives, and initiatives to vegetate the urban landscape (Eisenman et al., 2019).

The urban forest is best approached under the 'ecosystem services' fostering the cooperation between public and private stakeholders within the socio-economic framework (Niemelä 2014) and human-ecology research is currently trying to understand how urban green spaces can be managed, recovered and used. This interaction with nature addresses the issues of how green spaces are affected by socio-demographic factors (Niemelä 2014) and how the socioeconomic status of residents influences their attitudes towards the urban forest (Kirkpatrick, Davison & Daniels 2012). As this thesis assesses attitudinal differences when assessing the socio-economic variables of residents, it is important to examine in the literature how socio-economic factors influence people's attitudes and management practices towards urban tree planting.

Studies analyzing attitudes under the influence of socio-economic variables of a community have been done when evaluating tree abundance and the spatial distribution of trees (Shanahan et al. 2014), garden types and differentiation between exotic and native species (van Heezik et al

2013), landscape preferences (Swanwick 2009), survival and growth of trees (Jack-Scott et al. 2013) and the access to green areas and environmental justice (Shanahan et al. 2014). For example, Kirkpatrick, Davison and Daniels (2012) found that tree size distribution and abundance are correlated with residents' income, education and gender, but not with age or ownership status. In the same way, Jack-Scott et al. (2013) found that existing canopy cover and the relative neighborhood percentage of homeownership had little relationship to tree survival or growth.

Positive or negative attitudes towards tree planting in relation to socio-economic conditions are also studied in the light of values and concerns (Jones, Davis and Bradford 2013) influenced by demographics, culture, ownership and type of house (Pickett & Cadenasso, 2007), age (Todorova et al. 2004), gender, education and income (Kirkpatrick, Davison & Daniels 2012). For example, Lohr et al. (2004) highlighted a tendency to a negative attitude toward urban tree planting by those with low levels of education and socio-economic status, as well as a lower number of gardens (Kirkpatrick, Daniels, & Zagorski, 2007), a reduced tree cover (Kirkpatrick, Daniels and Davison 2011) and reduced plant diversity (Van Heezik et al 2013). This is the opposite of more affluent suburbs where there is more space allotted to parks and green spaces (Boone et al., 2009).

In addition, attitudes have been examined in relation to the willingness of residents to participate with tree planting on private (Kirkpatrick, Davison & Daniels 2012) and public land (Conway & Bang 2014). Age, high income and higher education levels were related to the level of participation in tree planting programs (Conway & Bang 2014). Younger full time workers with high incomes were also found to be more willing to take part in public tree planting in some regions (Zhang et al. 2007) as well as to contribute financially to tree conservation (Pouta 2003).

Besides the willingness to participate, the willingness to support council tree planting programs has also been studied (Conway & Bang 2014). For example, Jones (2013) found that women were more supportive of these programs within their municipality, valued the importance of the urban forest and collaborated more with the protection of trees than men. Lohr et al. (2004) identified more support for tree programs coming from residents with high income, white, middle-aged women and with a university education, and Conway and Bang (2014) in Canada

examined the willingness of residents to support council urban forest policies in residential areas. These last-mentioned authors evaluated the socio-economic characteristics of residents in view of the level of policy support and found positive correlations with attitudes toward the relationship of the age of the house, the condition of the urban forest in residents' backyards, and their level of education and age. However, the increase in tree numbers and policy support was not found by these authors to be related to income, ethnicity and home ownership.

While there have been major advances in the development of urban forest research and applicability across North America and Europe (Konijnendijk et al. 2006), Australia has only begun to initiate a range of research in urban forestry from a socio-economic perspective in the last decades (Niemelä 2014). More studies are required to understand attitudes under varying socio-economic conditions and to directly address urban sustainability both translated into barriers and opportunities for tree planting.

Therefore, based on the previous empirical works in this study it is expected socioeconomic factors to affect the household's attitude, tree management towards tree planting decision either positively or negatively.

2.3.2. Urban Tree Planting Experiences of Different Countries

South Africa's landscape of urban tree planting is characterized by a governance network that includes public, private, and civic society actors, as is the case in other contemporary tree planting and urban forestry initiatives elsewhere (Konijnendijk van den Bosch, 2014). In this network, the national Department of Environment, Forestry and Fisheries is the custodian of forestry and therefore at the forefront of designing urban greening plans and facilitating greening programs with the support of cognate sector departments. Local municipalities are responsible for implementing these plans by planting and maintaining urban trees in public spaces (Gwedla and Shackleton, 2015). The government entity as custodians of forestry and by extension urban forestry, and implementers of urban greening policies, plans and strategies is typical of other countries across the globe. In Canada, local governments, or municipal governments, are the principal agents of urban forest management, and provincial governments vary in their roles in urban forests within their respective jurisdictions (Duinker et al., 2014).

The recent Urban Forest Governance Framework (UFGF) in Niger is more decentralized, with new and overlapping jurisdictions such as the Ministry of Environment, Urban Health, and Sustainable Development in the Office of Green Spaces, the Ministry of Urbanism and Housing and the Office of the Environment at city-level. Together, these departments and organizations engage with green spaces and urban trees in cities, either in their development, maintenance or destruction (Hungerford and Moussa, 2017). Zimbabwe's urban forestry governance network is more complex than that of South Africa. However, at the forefront of this network are the Forestry Commission (in the Ministry of Forestry) and the Environmental Management Agency (EMA, 2019). Municipalities are then also responsible for urban greening and the maintenance of urban trees in public spaces. Therefore, like in many other countries, the mandate for urban tree planting in Ethiopia, particularly in the public space, falls to the national and regional governments and implementation on municipalities.

A typical urban greening and tree planting initiative in South Africa is characterized by various actors and stakeholders such as government sector departments, NGOs, parastatals, community members, public institutions, and corporate businesses who all make varying and valuable contributions. According to Chishaleshale et al. (2015), the successful management of urban trees and green spaces requires the involvement of other stakeholders who also have an interest or play a role in urban trees and green spaces management, both within and outside the local authority. Non-profit organizations have become nature's services amenity providers, and are key actors in urban and community forestry initiatives (Carmichael and McDonough, 2018), as the fiscal ability to provide infrastructure, including parks and the new green infrastructure, has shrunk in many cities as a result of the decline of revenues (Pincetl, 2003; Svendsen and Campbell, 2008). They play varied roles, from the design and implementation of these initiatives (Battaglia et al., 2014), and here this was evidenced by the presence of NGOs committed to implementing tree planting initiatives in various communities. NGOs have taken on prominent roles in delivering environmental services in cities through operationalizing environmental campaigns like tree planting (Foo, 2018).

Despite the presence of these NGOs, they unfortunately do not have a wide reach across the country, and capacity within the NGOs themselves is one of the contributing factors. In a country of just over 58 million people, 66 % of whom live in urban areas, the expectation would be that

there would be significantly more NGOs that are actively involved in urban forestry and urban greening. Therefore, regardless of the work done by these key role players and considering their limitations, green spaces and biophysical infrastructure should be given a greater collective priority by green space managers, urban planners and citizens alike (Gulsrud et al., 2013).

Ethiopia has many lessons to learn from others' history of tree planting experiences. According to Samuel (2020) Ethiopia is working on planting five billion trees this year, part of an ambitious plan to plant 20 billion seedlings by 2024 to help build a green climate resistant economy. The initiative, started by Prime Minister Abiy Ahmed, follows the Green Legacy Challenge project that claimed to plant a record 353 million seedlings on a single day, and a total of 4 billion last year.

But it comes as Ethiopia faces a ballooning budget deficit and growing government expenditure with dwindling foreign investment in the wake of the corona virus pandemic. "The new initiative seems appealing from the outset and it is a good opportunity to raise forest coverage of the country, but the cost to plant and take a care of the trees should be taken into consideration when the government attempts to make such a plan a reality," (Adefris, 2020).

Up to 84% of the seedlings planted last year have survived and that more than 20 million people were mobilized throughout the country for the effort, according to the prime minister. The initiative has been getting support from nations including Norway, Sweden and the United Nations Development Program (UNDP) as a way to help Ethiopia embrace a green agenda and help create sustainable local jobs. The call to plant more trees is part of Ethiopia's national "Green Legacy" initiative, which according to the prime minister's office, aims to tackle deforestation and the effects of climate change by educating Ethiopians on the environment, and planting different "eco-friendly seedlings". Perhaps more than other countries, severe droughts, food shortages, and flash floods responsible for mass displacements of people have made the effects of climate change especially felt in the East African country.

But one challenge of planting trees across Ethiopia is that it might have the opposite of a beneficial effect, and could even threaten some of the country's ecosystems. Scientists have worried that for the initiative to work, trees planted in the country's different ecological

environments need to be tailor-made for their location. If the right trees are not planted in the environments for which they are a fit, the “Green Legacy” might be doing more harm than good. Ethiopia’s ability to execute such an ambitious plan also continues to be questioned and last year the government blamed time constraints for the absence of independent observers, including the Guinness Book of World Record, to certify the high figure. Over 90% of the country’s estimated 110 million population obtain energy from biomass, but unsustainable harvest from natural forests resulted in the widening of the gap between supply and demand of forest. Between 2007 and 2015, according to the Ethiopian Commission of Environment Forest and Climate Change, the nation imported 3.06 million meter cube of various industrial wood products, approximately worth \$182.5 million.

2.3.3. Urban Residents’ Participation in Tree Planting Campaigns

Tree planting initiatives can operate and be implemented at varying spatial scales, such as at the scale of the neighborhood, at city-scale, and at national scale.

2.3.3.1. Neighborhood and city-scale urban tree planting

Tree planting initiatives implemented at the neighborhood and city-scale are usually small and are typical of single cities in selected sites where municipalities or organizations embark on tree planting initiatives for a particular community over a relatively small area of land (Yao et al., 2019), although they may be multiple small areas within a single municipality. An example of such initiatives is one championed by Canopy, a non-profit organization based in Palo Alto, California, whose mission is to “grow urban tree canopy in Mid-Peninsula communities for the benefit of all” (Canopy, 2019) and “to bring the life-giving benefits of trees to the schools, neighborhoods, and public spaces of the San Francisco Mid-Peninsula” (Roman et al., 2015). This initiative was created in 1996 as a spin-off from Palo Alto’s Tree Task Force, and became an independent non-profit in 2002 (Roman et al., 2015), and they “prioritize tree planting, stewardship, education and advocacy in communities where people do not have a thriving urban forest due to limited resources, competing priorities, and historical development and urbanization patterns” (Canopy, 2019).

Their strategies include 1) to *engage* by planting trees in partnership with residents, volunteers, school communities, municipalities, and grassroots partners, 2) to *educate* by creating life-long environmental stewards through exploration and education about trees and tree care, 3) using *stewardship* as a rigorous approach to tree care and maintenance by always engaging the community towards high rates of tree survival and longevity, and 4) to *advocate* by upholding and promoting policies and funding that protect trees and promote a healthy urban forest (Canopy, 2019). In 2018, the organization planted 323 trees and 784 landscape plants across 12 community sites, and tended 844 young trees in the ‘working class’ municipality of East Palo Alto (Canopy, 2019).

The Massachusetts Greening the Gateway Cities Program, which was initiated in 2014 by the state of Massachusetts (Breger et al., 2019) is an example of a city-scale urban tree planting initiative. It is a state-managed urban tree planting initiative that runs urban tree planting programs in 26 municipalities (Breger et al., 2019). Furthermore, the program targets parts of cities that have low tree canopy, old housing stock, high wind speeds, and a large renter population, with an environmental justice lens of ensuring benefits to the neighbourhoods most in need (Breger et al., 2019). The goal of the program is to reduce household heating and cooling energy use by increasing tree canopy cover by 5 %-10 % in selected urban residential areas (Breger et al., 2019). While the program is managed by the Massachusetts Department of Conservation and Recreation, it is implemented with the cooperation of local program partners, such as municipal agencies and local NGOs (Breger et al., 2019). The program is funded and managed by state-level staffs who simultaneously conduct tree acquisition, siting, planting, and maintenance at the municipal level (Breger et al., 2019).

2.3.3.2. National-scale urban tree planting

National-scale urban tree planting projects and initiatives extend across multiple cities over a long period of time (Yao et al., 2019) and can include a diffuse set of often loosely related tree planting events hosted by various organizations with huge variation in scale and partnerships. As such, they may have varying institutional arrangements and governance structures with flexible collaborations between stakeholders and diffused power, which is typical of Arnouts et al. (2012)’s open co-governance arrangement. National-scale projects and initiatives are typically based on pre-existing forest resources, but there has been a surge of progressive urban and peri-

urban afforestation programs over the last century globally. An example of a national-scale urban tree planting project would be the Million Trees Initiative (MTI) which has extended over various cities globally.

The MTI, initiated in 2007, is a partnership between city governments and non-profit organisations, although residents, property owners, business and community organisations are often invited to be involved in the planting and care of urban trees (Pincetl, 2010). Furthermore, the MTI encompassed a series of initiatives across various large cities across the United States and other countries, including Los Angeles, New York City, Shanghai, Denver, London, and Ontario, where each had their own governance and partnership arrangements. For example, the success of the NYC MTI, which is by far the only one which managed to plant the millionth tree, can be attributed to the financial investment provided by both the city and a very well-funded non-profit organization. The Million Trees Los Angeles, one of the mayoral tree planting initiatives embedded within municipal climate protection plans (McPherson and Kendall, 2014), was launched in September 2006, and pledged to plant one million urban trees over a few years, which had translated to ~400 000 trees planted by 2013 (McPherson, 2014). The initiative is administered by the Department of Public Works and led by employees of the Million Trees LA Foundation which is a non-profit organization, with a number of corporate sponsors through donations and grants (McPherson, 2014). Million Trees Los Angeles (MTLA) relies heavily on its internal city departments and non-profit partners, including Fuego Tech Rangers, Hollywood/ Los Angeles Beautification Team, Korea town Youth & Community Center, Los Angeles Conservation Corps (LACC), North East Trees, and Tree People, to deliver the program to neighborhood residents (McPherson, 2014; Pincetl, 2010). In the initiative, street and yard tree planting projects occur in residential areas when trees are adopted by locals who agree to maintain those planted on their property or along the street, and tree adoption requests are parcelled out by MTLA staff to the non-profit responsible for activities in the area (McPherson and Kendall, 2014).

The Arbor Day initiatives also fall within the national-scale urban tree planting initiatives, and are an example of the diffuse set of often loosely related tree planting initiatives that are popular across the globe (Parkin et al., 2006). Tree planting done under the banner of Arbor

Day/Week/Month are not necessarily centrally coordinated and they take place on varying dates, by country and the best planting weather. For example, celebrations in the U.S. take place in April, while July is the official Arbor Day month in Australia (Jones, 2010a). Arbor Day celebrations date back to 1872 in the USA, when a Nebraskan newspaper editor, J. Sterling Morton, persuaded authorities that planting trees would play an important role in greening and enriching what was then known as the ‘great American desert’ (Eisenman, 2015), a message which resonated with the broader Nebraskan community. This day is largely associated with tree planting in schools and public institutions, and characterized by educational activities.

Several countries in southern Africa, including Lesotho, Malawi, Namibia, South Africa, and Zimbabwe, also have annual tree planting days, or weeks (Guthri and Shackleton, 2006). Zimbabwe has a national policy that requires every household to plant a tree on the designated day, each year (Campbell et al., 2002). Niger has a National Tree Day that is celebrated annually on 03 August (Hungerford and Moussa, 2017). Arbor Day was celebrated for the first time in South Africa in 1983 (Parkin et al., 2006). Each year an indigenous tree is nominated, the first of which was South Africa’s national tree, the yellowwood (*Podocarpus* species), and in 1996 two species were nominated, and the celebration of Arbor Day extended to an Arbor Week, from 1 to 7 September (Parkin et al., 2006). This was also recently extended to a month, and the month-long campaign is managed by the national Department of Environment, Forestry and Fisheries. Its aim is to “promote a better understanding of trees, especially indigenous trees, highlight the important role trees play in sustainable development, the livelihoods of people and their environment, encourage communities to participate in various greening activities within their own surroundings, and to raise awareness of South Africa’s urban greening initiatives” (Parkin et al., 2006).

2.3.3.3. Ethiopia’s Experience

Ethiopia recognizes the key role forestry plays in setting the country on a sustainable and green development path. The current 15.5 per cent forest cover is inadequate to provide an economic and ecological support system in this mountainous and climatically precarious country. While protecting the existing 17.35 million hectares of forest, Ethiopia also intends to undertake large-scale afforestation and reforestation to increase total forest cover to 30 per cent by 2030.

Afforestation and reforestation are also key to alleviating the pressure on natural forests (MoFECC, 2017).

To achieve this long-term target, Ethiopia committed to restore degraded lands across different parts of the country and pledged to the Bonn Challenge and AFR100 to restore 15million ha of degraded land by 2030. The progress is encouraging with involvement of high-ranking government officials including the Prime Minister and other ministers. This commitment is included in the country's 5 Years National Development Plan, Climate Resilient Green Economy Strategy (CRGE), Nationally Determined Contribution (NDC), National Forest Sector Development Program (NFSDP), and others. Some of these commitments from CRGE strategy document include: Increase forest cover to 20% by 2020 focusing on the improvement of existing natural forests and large-scale afforestation and reforestations activities; Increase forestry's contribution to GDP to 8% by 2020; and Achieve 130 Mt CO₂e reduction by 2030 to achieve 50% carbon sequestration and emissions reductions goals by reducing deforestation and forest degradation.

In Ethiopian context tree planting initiatives was implemented at varying spatial scales, such as at the scale of the neighbourhood, at city-scale, and at national scale. The practice of tree planting in both private and government spaces is not new phenomenon to most urban centers in Ethiopia. But, there is almost no documented information with regard to the status and values of private urban spaces in Ethiopia, and yet they have not received due attention from development practitioners.

According to the field survey conducted by the Ministry of Urban Development and Construction in 36 selected urban centers in the country, which was conducted between September and October 2014, different types of private gardens were observed in the urban centers. They are generally found at varying management levels. The infrastructural facilities (*hardcapes*) and vegetated landscapes (*softcapes*) of most private gardens encountered are not properly established and are not up-to standard (MUDCo, 2015).

The plant species observed in most private gardens include both native and exotic plants purposely planted for shade, ornamental and food (fruit) values. Observation from sample

private/home gardens in the selected urban areas reveals that the practice of cultivating fruit trees, vegetables, agricultural crops, shade trees and ornamental plants is widely practiced (MUDCo, 2015).

Nevertheless, in most cases, the trees and shrubs planted in private gardens are found to interfere with buildings and utility lines. And, due to the limited landholdings, most plant species are closer to each other; there is no appropriate spacing and also lack timely follow-ups and tending operations. The practice of maintaining diverse multipurpose plant species is, however, encouraging and might need some management issues to utilize to the best of its potential. Therefore, development of standards and guiding manuals of this type would help a lot in realizing their sustainable management (MUDCo, 2015).

In general, some of the best practices, and the existing challenges and opportunities observed during the extensive field surveys are addressed shortly as follows:

According to the field survey conducted by the Ministry of Urban Development and Construction (MUDCo, 2015) from sample private gardens in the different urban centers of the country reveals that the practice of cultivating fruit trees, vegetables, agricultural crops, shade trees and ornamental plants is widely practiced at private/home garden levels within the urban centers. These practices have connotations with the livelihood of the urban dwellers, vise-a-vise subsistence values and cash income to the farming communities. The practice of maintaining diverse multipurpose plant species (e.g. fruit trees, ornamental plants, field crops, vegetables, medicinal plants, shade trees and live fences) is encouraging and, upon promoting proper management activities, tree planting can be utilized to their best potential and continue contributing to the tackle against poverty. Even if it is limited, it has also been observed that, in some urban areas, good tree management practices were observed. Some of these management practices include, watering, inter-cultivation, weeding, tending operations, and establishment of private nursery sites and fencing.

According to the field surveys undertaken in different urban areas of the country (MUDCo, 2015), the following are identified as the major challenges and opportunities for most of the private urban gardens. The challenges include lack of awareness and attention to tree

management practices from both the government and public side; technical deficiencies and management gaps: technical shortfalls with regard to design, species selection, tending operations, interference of trees/shrubs with infrastructures, spacing among plants, weeding, waste management, fertilization and other related management issues; lack of material inputs and logistic facilities; increasing population densities, and hence limited access to land. The opportunities include emerging willingness and initiatives on tree planting practices (attention is being given from the government; potentials of fund raising from global funding organizations working on urban green infrastructure; availability of enough labor; availability of diverse plant species that can adapt the different agro-ecologies that can easily be integrated with other development sectors; conducive agro-climatic conditions, etc.

2.3.4. Barriers to tree planting

2.3.4.1. Biophysical barriers and enablers

The biophysical barriers to tree establishment and preservation can be ecological and physical, and can include climate, urban infrastructure design and development, soil type, and water (Kronenberg, 2015). These barriers are applicable to both public and private spaces. The climate of an area can either be conducive for, or not, tree growth. This means species that can thrive in particular climates need to be selected for planting. However, a lack of variety in tree species reduces the resilience of urban tree populations against recurring outbreaks of pests and diseases, and the threat of future diseases (Bassuk et al., 2009), and are unlikely to meet the varied cultural and aesthetic needs of urban residents. Therefore, a variety in suitable species would be recommended.

Many problems associated with urban vegetation are attributed to the soil environment (Hawver and Bassuk, 2007). This is because soils are dramatically altered by human activities in urban environments such as compaction, reduced moisture, and pollution (Bullock and Gregory, 2009). These alterations distinguish urban soils from those in other systems (Zhang et al., 2012). Soil quality degradation can be a potential barrier to the successful establishment of trees in urban areas. Soil quality refers to “the capacity of soil to function, within ecosystem and land use boundaries, to sustain productivity, maintain environmental quality, and promote plant and

animal health” (Doran, 2002), and the basis for improving sustainable land use management (McGrath and Zhang, 2003).

Urban compactness, an example of an infrastructural design barrier limiting space is also a barrier to urban greening (Jim, 2000). According to Venn and Niemela (2004), an adequate area of green space is an important requisite for the development of a good green space system, hence smaller gardens in cities are less likely to harbour trees (Tratalos et al., 2007).

2.3.4.2. Social barriers and enablers

Social barriers can be converted to enablers when they can be controlled. Social barriers and enablers are vast and can include cognitive, normative, and institutional (Jones and Boyd, 2011). Cognitive barriers to, and enablers of, tree planting may relate to people’s attitudes and understanding of the importance of having trees and their preferences, are often manifested at household and neighborhood scale. They are influenced by people’s behaviour. The barriers here may arise when people would rather not have trees planted for reasons such as fear that trees conceal criminal activity (Lyytimäki and Sipilä, 2009), while enablers could be associated with them choosing particular types of trees planted in a less dense and difficult to maintain manner to limit criminal activity (Donovan and Prestemon, 2012). Urban residents in areas of high criminal activity usually do not want trees planted in front of their properties as they fear that criminals will be able to hide in the trees (Pincetl, 2010). Indeed, urban tree cover has an impact on perceived safety among urban residents (Mouratidis, 2019), from fear of crime (Sreetheran and Konijnendijk van Den Bosch, 2014), to perceived reduction of crime (Gilstad-Hayden et al., 2015). The perceived reduction may result in perceived safety among residents, which Mouratidis (2019) describes as an individual’s level of comfort and perception of risk within the environment and as such is an important factor in human well-being. Burley (2018) opines that certain green infrastructure initiatives may be successful in reducing crime and creating safer environments for underserved communities. This suggests that the fear of crime has to do with other factors, such as community interactions and social cohesion that may contribute to less violence in communities (Burley, 2018) than just the trees being hiding havens for criminals.

Residents may also resist tree planting because they do not like trees and would not want the added burden of having to fix infrastructure that may be damaged by tree roots (Pincetl, 2010).

Conway (2016) reported that property concerns, focusing on either perceived risks such as trees falling on houses or actual damage caused by the tree to drains or sidewalks, among other things, was one of the reasons residents from Mississauga, Ontario, Canada removed trees in their properties. Kirkpatrick et al. (2012) had reported similar sentiments, stating that residents from six eastern Australian cities opted to remove different types of trees because of disease or advanced age, root damage to foundations, paths or pipes, because limbs or whole tree had fallen or because there was likelihood of such a fall. Inner city African Americans in the United States may also resist the planting of trees outside their houses because they are concerned about tree maintenance and damage to their property (Perkins, 2011). There is an underlying assumption made by many practitioners and researchers that residents desire trees (Kitchen, 2013) because “trees are intrinsically good for the city (...and thus centering trees in the construction of a city's self-image)” (Braverman, 2008), and that a sparse urban forest indicates a lack of resources needed to produce high canopy cover or a lack of knowledge regarding the benefits of trees (Heynen et al., 2006). Yet, not all urban residents want trees in their yard or neighbourhood (Kirkpatrick et al., 2012). This can be seen in the behaviour projected towards trees in some communities, such as the vandalism of newly planted trees.

Normative barriers to, and enablers of, tree planting may relate to ways in which ‘norms’ influence how people respond (Jones and Boyd, 2011) to having or not having trees. For instance, the reality of poverty in low-cost housing areas can influence residents’ attitudes on whether municipalities should spend money on tree planting rather than prioritize other services. Additionally, the ‘norm’ of not having trees planted in low-cost housing areas could influence residents’ perspectives on both the importance of having trees and the benefits they provide (Nassauer et al., 2009). Alternatively, some residents may not be open to new tree planting of a species they are not used to and would much rather have the trees that are already planted elsewhere around their town, whether they are alien or indigenous.

Other barriers to and enablers of tree planting are institutional (Kronenberg, 2015). These are also directly linked to resource barriers and enablers as institutions have resources and decide on how they should be allocated. Institutional barriers include government failures which are characterized by financial constraints (Gwedla and Shackleton, 2015), political power of development interests (Gwedla and Shackleton, 2015), a lack of public support for green issues,

as reflected in the decision-makers' attitudes (Zabel, 2007), and failure to see urban trees as part of a broader urban regeneration agenda (Simson, 2008).

A paramount institutional barrier to tree establishment in South Africa is the lack of policies directly championing the planting of trees in low-cost housing areas (Chishaleshale et al., 2015). The few that exist were designed over a decade ago by the then national Department of Water Affairs and Forestry (Shackleton et al., 2014).

2.3.4.3. Resource barriers and enablers

Resource barriers are another group of barriers that when improved or augmented, can lead to enablers. They refer to entities such as knowledge, technology, finances and human resources (Spires et al., 2014) which, when limited, hinder urban tree establishment, while enablers refer to the entities whose availability promotes the establishment of trees. Resource barriers and enablers are closely related to institutional barriers and enablers because many of them are a result of failure, or success, by institutions to provide or allocate such resources to tree planting, and occur at municipal or regional and household scales. Various studies (e.g. Biernacka and Kronenberg, 2018) demonstrate that the most common resource barrier to, and enabler of, tree planting and success of tree planting initiatives is the lack (or availability) of finances. For example, one-third of urban park managers in the UK have had budget cuts over 20 % over a period of two years, and 90 % of them still face further funding cuts (Hoyle et al., 2017). In the same light, Young (2011) concluded that adequate, secure long-term financing and political support, were major barriers to the success of urban tree initiatives in selected American cities. According to Zhang and Zheng (2012), financial support is one of the most effective ways to promote urban forestry programs. The availability of finances also greatly augments other resource barriers such as technology and equipment provision, and employment of skilled personnel and human resources.

Limited skills and knowledge is also a barrier to tree planting. This is mostly exhibited in the lack of people with the knowledge and training to plant and maintain trees, as experienced by many municipalities in South Africa (Chishaleshale et al., 2015). This can be observed through the professions of the officials responsible for urban greening. Gwedla and Shackleton (2015) interviewed 24 municipal parks officials in relation to urban forestry in their towns. These

managers had different expertise, from horticulturalists, waste managers, social workers, environmental managers and foresters (Gwedla and Shackleton, 2015). Despite the different expertise and training, all these managers were the ones responsible for the town greening initiatives. Limited skills and knowledge can also mean that urban foresters are not innovative in their techniques of tree planting, which may compromise the survival of planted trees (Yang and McBride, 2003). Innovation is crucial in urban forestry as it may contribute to the reducing the cost of tree planting, specifically when cost-saving techniques are employed.

Ethiopia is one of the poorest nations on the African continent and it is a developing country. Developing nations share some common tree planting barriers, including biophysical barriers, social barriers and resource barriers to mention a few. Section 2.5 further details the most common tree planting barriers in developing countries while Chapter Four in this research provides an analysis of specific tree planting barriers that the study area faces.

2.4. Conceptual Framework

Through reviewing literature analytical framework was developed and it is explained below:-

Tree planting means the transplanting of a seedling or sapling tree to a permanent position whereas tree management is about planning, planting, maintenance, protection and care of trees, forests, green space and related resource for economic, environmental, social and public safety. Trees management includes the development of citizen involvement and support for investments in long-term management of tree planting, protection and care programs. Figure 1 summarizes issues considered in this section concerning attitude, tree planting and management as well as barriers towards tree planting. In the light of the objectives of this study, the issues in the following figure are included and discussed in the literature review part of the study. The concepts in the figure are discussed below. Urbanization can cause loss of trees which may be reasons for urban dwellers for tree planting and management; tree planting and management includes such issues as: attitude, management practice and barriers. The attitude towards tree planting and management may be positive or negative.

The identification of attitudes and views, on both private and public land, will then lead to the identification of barriers towards tree planting that, when translated into opportunities, will

contribute to the city's sustainability, as the integration of both private and public stakeholders' perspectives is crucial for the effective management of the urban forest. This integrated management has a positive influence on the cities' greening process starting to embrace an eco-social perspective of the urban forest.

Figure 1: Conceptual Framework for Tree Planting and its Management



CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Description of the Study Area

3.1.1. Historical Background of tree planting in the Town

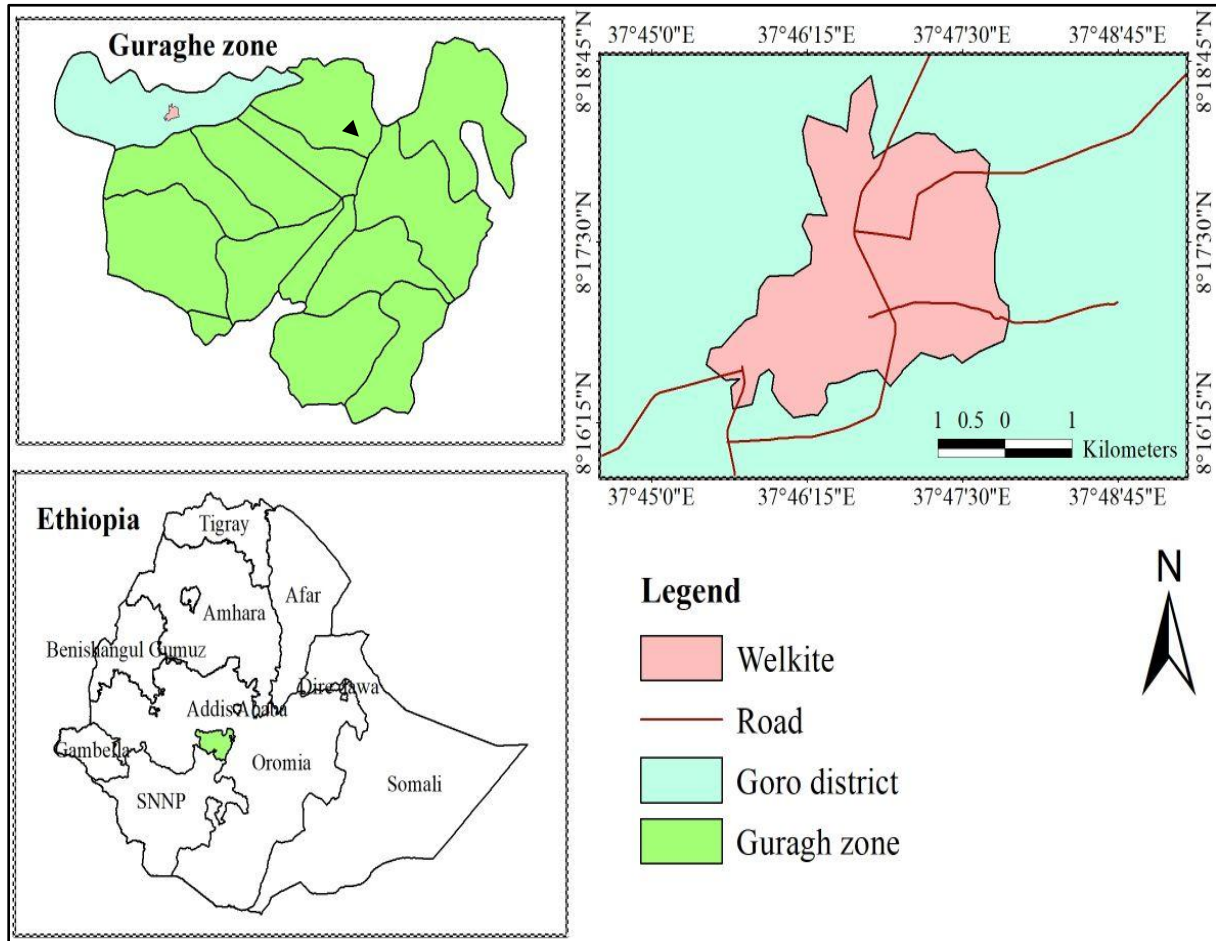
Abajifar is said to have coined the name "Wolkite" to the town. He used to travel from Jima to Addis Ababa and during his long journey he used to get rest and even spent nights at what is today Wolkite particularly at the named "Gemel Warka". He considered that site as a half way between Addis Ababa and Jima and accordingly he named it "Wolkite", in Afaan Oromo that means "equal". This is the most acceptable discourse among the elders as far as the name of the town is concerned (Armaye, 2006).

The establishment of settlements at the present site of Wolkite town, the land was densely covered by acacia and palm trees and inside the forest wild animals like lion, buffalo cheetah etc. sheltered. Although there is no clear information about the exact time tree seedling planting began in the town, tree planting is believed to be started at the emergence of the town (SNNPR UDCB, 2010).

3.1.2. Location

The town is about 158 kms from Addis Ababa to the South-West direction. Its geographical location is approximately between $07^{\circ} 10'$ - $08^{\circ} 16'$ north latitude and $37^{\circ}45'$ - $37^{\circ}50'$ East longitudes. The town is bounded by six Kebeles. Accordingly, it is bounded in the north and northwest by Fikadu, in the northeast by Zebimola, in the South west by Koremiya, in the south by Gasore na Karach, in the southwest by Kola Kebada as well as in the west by Rimuga na Reka Boka Kebeles. The total area of the town is 1,132 ha (SNNPR UDCB, 2010).

Figure 2: Location of the Study area: Ethiopia regions, Guraghe Zone, Goro District and Welkite town (study area)



3.1.3. Climate and vegetation

The annual maximum, mean and minimum temperatures of the town are about 28⁰C, 24⁰C and 12⁰C respectively. The mean annual rainfall is about 1,524.4 mm, and the highest rainfall concentration occurs from June to September (SNNPR UDCB, 2010).

In Wolkite *Junipers* and *acacia* species are the dominant trees found in the town and its hinterland. Individuals and communities are engaged in planting *Gravelia Robusta*, *Azedarach indica*, *Eucalyptus* and *fruit trees* etc for construction, energy and economical purposes.

3.1.4. Infrastructure and Basis Service

3.1.4.1. Education

There are educational facilities at all levels in the town. In the town there is one government university and in terms of spatial distribution, two governments owned secondary school are located one in Addis sub-city and one in Gubre area. In addition in these two localities there are 14 elementary schools out of which 7 of them are privately owned elementary schools. So in terms of educational services, Addis sub city and Gubre area are in a better position as compared to the other localities in the town. Currently, there are 11 kindergartens in the Town; of which some are not formal (i.e. the services is being rendered in rented residential houses).

3.1.4.2. Roads and Transportation Service

Wolkite has access road that links the town with Addis Ababa, Jima, Woliso, Hossana and Butajira town. The area has transport infrastructure such as paved roads and gravel (unpaved) roads of 130 and 386 km, respectively, which connect rural areas and the district's city.

3.1.5. Population

Concerning population size and trend information obtained from Statistical abstract report produced by the CSA shows that in 2003 population of the town was 24,120 and grew by 5.05% per year and reached 27,775 in 2006. The 2007 Population and Housing Census report indicated that the population of the town is 28,856. Of this, 15,068 are male and 13,788 female. The high growth rate implies high need of basic urban services including urban green infrastructure provision and management. In 2015, the total population of the town was estimated at 55,100 (CSA, 2015). The age composition of the town's population is as follows: 36.6% for age groups with below 15, 57% for with between 15 and 55, and 3.4% for with above 55 years (Ibid). This implies that the bigger proportion is to the active workforce, i.e., able to plant and manage trees in both private and public spaces.

3.2. Research Design

The study used descriptive research design to describe the state of affairs during the study period. A cross sectional survey design was also used in this study. The study design was chosen because it is well suited to the goal of describing variables and their distribution patterns and it

allows data to be collected at a single point in time. Therefore the design is economic in nature; and it is suitable in situations where time is limited (Hulley et al., 2013).

3.3. Research Approach

According to Creswell (2014, p. 1), research approaches are plans for conducting research that cover everything from general worldviews to specific data collecting, analysis, and interpretation methodologies. Therefore, to accomplish the aim of the research and to find the expected results from the research question. This is done in order to collect reliable data and to prevent limitations. There are three types of research approaches: qualitative, quantitative, and a mix of both. Qualitative approach uses language instead of numbers; quantitative is more numeric rather than language-based; and the mixed method lies in between and the triangulation of the two former approaches. This research study used a mixed method approach because of the nature of my research problem statement, my experience, and the audience of the research. Above all, I chose this approach because it gives me a better overall picture of the study than either the qualitative or quantitative approaches alone. Furthermore, I believe that collecting both qualitative and quantitative data boosts me and my audience's confidence in the research findings.

3.4. Data Sources

Both primary and secondary data were collected from different sources. Secondary data was collected from various documents such as: reports, statistical abstracts, journal articles, thesis and dissertations among others. In addition, primary data were collected through interviews with officials from Wolkite Municipality, questionnaires were distributed and filled by the sampled households, field observation and focus group discussion.

3.5. Target Population

The target population for this study was drawn from the people who live in Menaharia Kebele of Wolkite town. Based on CSA, 2015 data the total population of Wolkite are about 55,100. The target population for this study was 96 respondents drawn from 2000 HHs selected through stratified random sampling technique from Menaharia kebele. Furthermore, Wolkite

Municipality Urban Sanitation and Beautification Department Heads were the target group of the study since they are responsible for tree planting practices in the town.

3.6. Sampling Technique

It was difficult to include the entire population or households of the study area due to time and budget constraints. Therefore, the researcher selected Menaharia Kebele purposefully and took representative samples from that Kebele to get representative households. Probability sampling technique i.e Stratified random sampling technique was applied to select residents' sample. It is the process of selecting randomly samples from different strata: i.e. Male and Female categories of the population used in the study. Stratified random sampling and its advantages is that it contributes much to the representativeness of the sample and it is easy to apply. Non probability sampling techniques i.e. purposive sampling was applied to select one kebele (Menaharia Kebele) from the six kebeles of the town. Furthermore, non probability sampling techniques was applied to select and was used to get information from the key informants. i.e. from municipality of the town. Wolkite town is purposely selected being it was the working area of the investigator.

3.6.1. Sample Size Determination

The size of the sample was determined through scientific standard procedures and techniques relevant to the study. Relevance in terms of representativeness was given priority in the process of deciding for the size.

The sample size generally depends on different factors such as the type of the research design employed, the amount of accuracy needed, and the desired level of confidence in the results and the characteristics of the population of interest. Considering these factors the sample size for residents in this study was determined using Kothri's (2004) technique of determination:

$$n = \frac{Z^2 pq}{d^2}$$

Where; p is proportion of success

q is 1-p

n is the size of sample

d is the acceptable error

z is standard variant for the given confidence level

Since there was no estimate on how the population is being distributed on the variables of the interest, the proportion p is taken as 50% as recommended by Fisher. The researcher required 95% confidence level and 10% significance level in that it has believed by the researcher that 95% confidence level has been achieved due to the maximum effort put in spite of the time constraint. The z- value for 95% is 1.96 (taken from the statistical table).

Then, $n = \frac{Z^2 pq}{d^2}$ implies

d^2

$$n = \frac{Z^2 p(1-p)}{d^2}$$

d^2

$n = \frac{1.96^2 * 0.5[1-0.5]}{[0.1]^2} = 96$ is the satisfactory sample size.

Therefore, through the described technique, from total of 2000(896 male headed households and 1104 female headed households) targeted population (households) of Menaharia kebele (Wolkite Municipality Development Plan, 2018), 96 households were taken as sampling units from residential land use in the town. The sample size of each male and female stratum was determined by applying proportionate stratified sampling. Household from Menaharia Kebele in Wolkite town were taken by using purposive sampling technique.

3.7. Data Collection Methods

Based on the research problem and objectives, both primary and secondary data sources were used. Multiple data collection strategy is more advantageous than single data collection strategy in research work. As Teshome (1998) stated, there are strengths and weakness to any single data collection strategy and using more than one data collection approach give opportunity to the researcher to combine the strengths and correct some of the deficiencies of any one source of

data. More specifically, the selected methods to collect the necessary data were questionnaire, focus group discussion, interview, personal observation and secondary sources.

3.7.1. Questionnaire

In order to achieve the stated objectives, the items of the questionnaire are developed using simple and clear words that were appropriate and helped respondents to respond to the questions with understanding. During the development of this questionnaire, the researcher used the related theoretical background reviewed for the purpose of the study. The construction of this questionnaire items is more strengthened using the professional comments given by colleagues and my advisor. The questionnaire was prepared in English and translated to Amharic, which is the language spoken by most people in the study area.

3.7.2. Focus Group Discussion

In addition to survey questionnaires, focus group discussion was also conducted to substantiate the responses acquired using questionnaires. The group discussion was conducted with people such as representative of kebele development committee, local institutions, governmental and non-governmental organization who involved in tree planting practices either in private or public spaces within the study area. One focus group discussion was conducted in the study area. Total number of individuals involved in the group discussion was eight.

3.7.3. Interview

To get the necessary information, in-depth interviews were given more attention. The interview was conducted with key-informants who are from Wolkite Municipality, Urban Sanitation and Beautification Department. The key-informants were selected due to their knowledge and experience about tree planting and its management within the study area. Notes were sufficiently and carefully taken from the interviewees who were considered knowledgeable and rich to provide explanations on tree planting and management in the town.

3.7.4. Observation

The researcher's personal observation and experience of the study area helped him to understand households' tree planting and management efforts and crosschecked data gathered through household survey, discussion and key informant interviews. Furthermore recreational areas, HHs

tree planting activities and rights of way were observed to assess the Municipality's efforts in tree planting and management in public land. In this case, information on the current condition of tree planting and management in the town was obtained.

Figure 3: Tree planting practices on private land and roadside



3.7.5. Secondary data source

Various publications of the CSA such as the 2003 and 2007 population and housing census statistical and analytical reports at country have contributed to the study substantially by providing information regarding the study. Literatures related to tree planting and its

management issues from internet websites, unpublished and published materials in the library of Addis Ababa University and other institutions were also intensively reviewed.

3.8. Administration and Procedures of Data Collection

The researcher made a prior contact with the kebele administrator of Menaharia Kebele for data collection permission. Taking into account of the sample size and the time schedule as well as the nature and content of questionnaires, the researcher recruited a total of four local enumerators from Menaharia Kebele of the town. The data collectors were selected on the basis of their personal characteristics, educational level (all preparatory complete) and knowledge of the town (i.e. native to the area and speakers of local language Amharic). Before the data collectors start the actual field survey, the researcher arranged orientation program on how to proceed with data collection. Then the enumerators started their work. In addition, during the survey the researcher accompanied field assistance in order to coordinate as well as to crosscheck their works. In order to maintain the quality of data collected, meetings were held with the enumerators after the end of each survey data to discuss any problem they faced. The researcher also cross checked the completed questionnaires with some of the respondents. A total of 96 questionnaires were completed.

3.9. Ethical Considerations

One aspect of the research process which must get greatest recognition is its ethical considerations concerning research subjects and general conduct. As of these social research needs a vivid account for informed consent, beneficence, respect for people and anonymity. Therefore, the investigator has shown university identity card and a letter of clearance so that the legality was assured which would enables the investigator to obtain factual data as well as increase the confidence of the respondents since the purpose of the study is clear. Without the permission of the concerned body the investigator did not performed any activity including taking videos and photographs. In addition to that research participants or their family's personal identities will not be publicized to the public or not transferred to other parties other than the researcher itself.

3.10. Data Analysis

The data was analyzed quantitatively and qualitatively using descriptive statistics including frequency, percentages and graph. Data collected through the open-ended items, responses of interviewees, personal observation and group discussion were considered during data analysis. The researcher entered the data into the computer using the Statistical Package for Social Scientists (SPSS) software version 20 to produce different tables, frequency and percentages which were used to illustrate the various aspects of the study. In general, the processes of analysis included coding questionnaire responses, data tabulation and statistical computation. The method of data analysis and presentation of findings followed an approach of describing qualitative and quantitative data. Moreover, different tables, graphs, and maps are used to illustrate the various aspects of the study.

CHAPTER FOUR

4. DATA PRESENTATION AND ANALYSIS

4.1. Introduction

The findings of the study is presented and discussed in this chapter. Based on the research objectives, the chapter is organized into four main sub-sections. The first sub-section deals with the background information of HH. The second sub-section deals with urban dwellers' attitude towards tree planting on private land. The third sub-section deals with urban dwellers' attitude towards tree planting on public land. The fourth sub-section deals with the existing practices of tree planting activities and its management in the town. The fifth sub-section deals with the major barriers in the process of management practices in the town. Finally the sixth sub-section deals with barriers by the HHs to plant trees around their property.

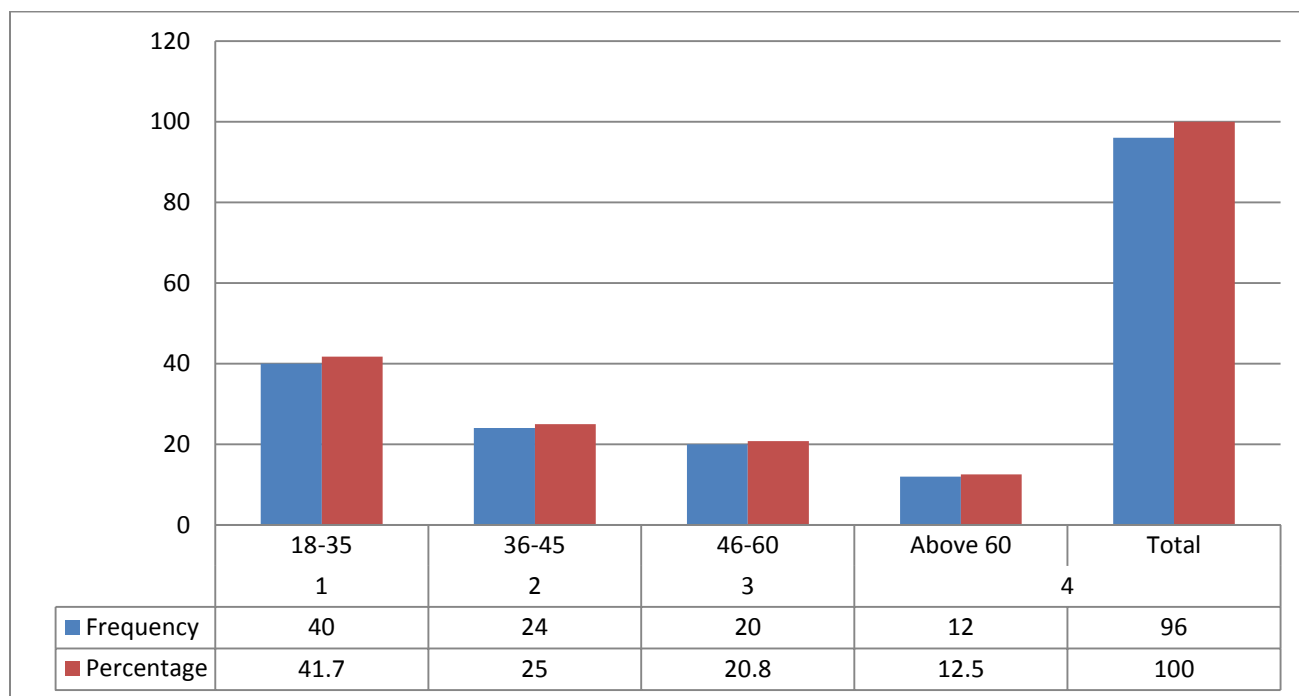
4.2. Characteristics of the respondents

The sample survey was conducted at household level in Wolkite town, which has 6 kebeles with about 6012 households. Of which one Kebele, namely, Menaharia participated in the study purposely with about 96 respondents out of 2000 HHs.

4.2.1. Age and Sex structure of the respondents

The age distribution of the respondents indicated that 40(41.7%) were aged 18-35 years, 24(25%) were aged 36-45 years, 20(20.8%) were aged 46-60 years, and 12(12.5%) were aged above 60 years. Among the 96 respondents, 43(44.8%) were males and 53(55.2%) were females.

Figure 4: Distribution of the HHs according to their Age



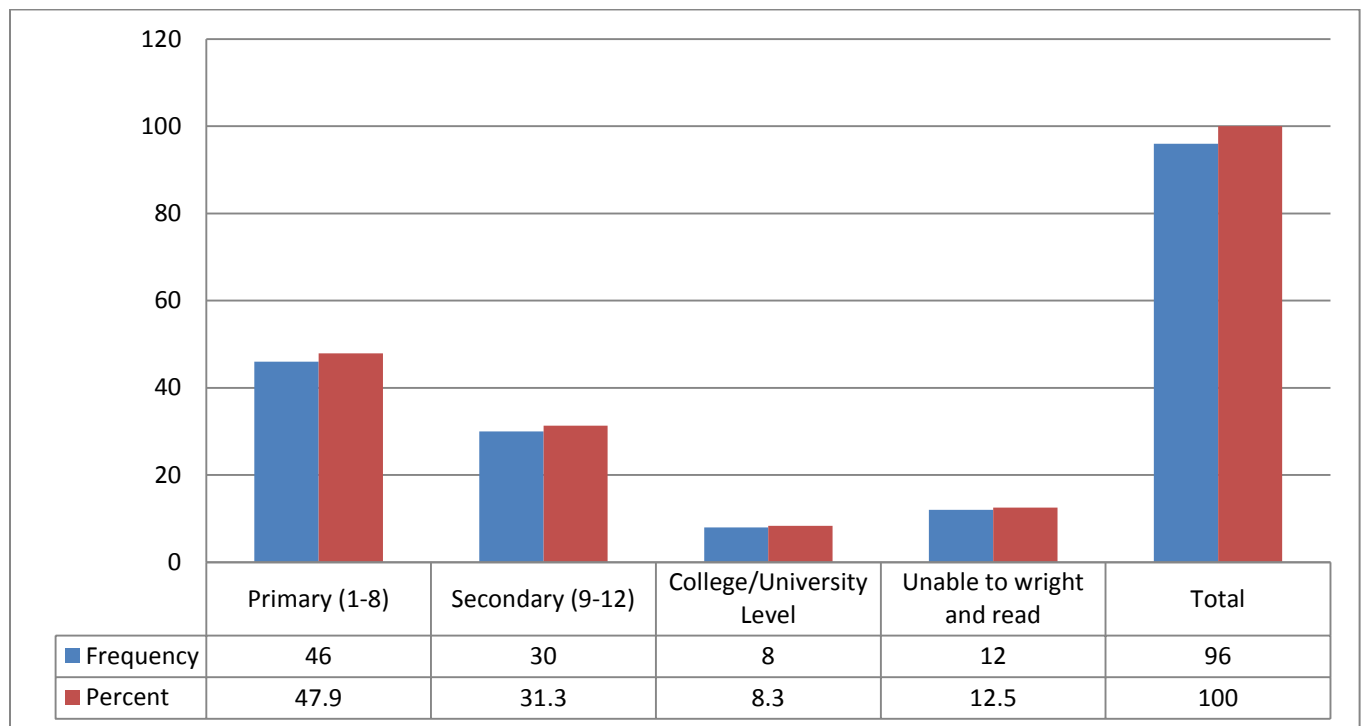
Source: Field survey data April, 2020

From Figure 4 one could easily conclude that the majority of the respondents were aged 18 – 45 years, the age groups with high capacity to plant and manage tree seedlings in the study area.

4.2.2. Level of Education of sample HHs

The distribution of the level of education of respondent is presented in Figure 5 below. The highest number of the respondents 46(47.9%) were primary, followed by 30(31.3%) were secondary level, while 12(12.5%) were unable to write and read and the rest 8 (8.3%) have attained university training.

Figure 5: Level of Education of Sample HHs



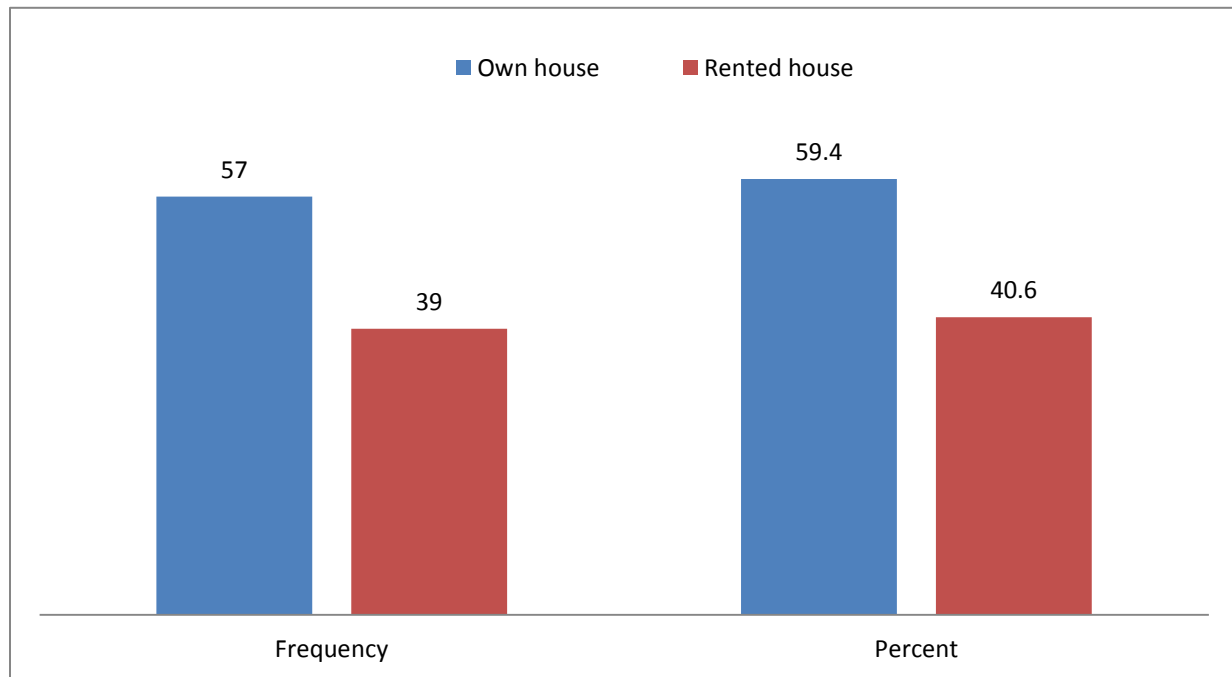
Source: Field survey data April, 2020

If there is a possibility of raising awareness and mobilizing the community on tree planting and its management on both private and public land, the people can easily understand and communicate with their respective neighbours and relatives.

4.2.3. Housing Tenure of the respondents

Respondents were asked about their housing tenure. 57(59.4%) of the respondents were living in their own house and the rest 39(40.6%) were living in rented house.

Figure 6: Housing Tenure of the Respondents



It could be argued that the housing tenure of the respondents is one of the factors for people to decide planting trees. A question was raised for the respondents ‘Have you planted trees in your garden?’ Among 57 of the respondents who have their own house all of them 56 (98.2%) responded ‘Yes’ whereas among 39 of the respondents who don’t have their own house 39 all of them responded ‘No’.

Table 1: Housing tenure of the respondents with tree planting experience

Housing Tenure	Have you planted any trees in your garden?		Total
	Yes	No	
Own house	56	1	57
Rented house	0	39	39
Total	56	40	96

Source: Field survey data April, 2020

The results revealed that there was a significant strong positive correlation between house of tenure and decision to plant trees ($r = 0.979$, $p = 0.01$) (Table 2). This indicates that planting of

trees was found to be influenced by security of tenure. These results are consistent with Treiman and Gartner’s (2005) findings that people who owned their own home were more likely to plant trees on their homestead than those who did not own their own homes. The researcher’s findings are also consistent with the fact that ownership of land on which planting takes place is an important factor that affects or does not affect the decision to plant trees (FAO 1995). Insecure or unclear land ownership discourages local people to engage in tree planting activities.

Table 2: Spearman’s correlation results of the association between Housing Tenure and Decision to Plant Trees

Spearman’s Correlation		R results
Housing Tenure	Pearson Correlation	0.979**
Vs	Sig. (2-tailed)	0.000
Decision to plant trees	N	96

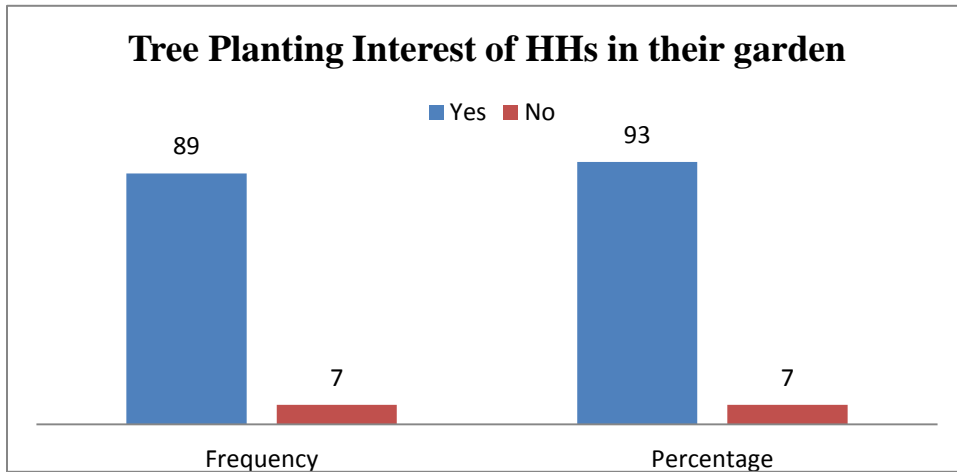
** . Correlation is significant at the 0.01 level (2-tailed).

4.3. Urban Dwellers’ Attitude towards Tree Planting on Private Land

4.3.1. Tree planting interest of HHs in their garden

Respondents were asked about their interest in planting trees in their garden. 89 (93%) said they were interested in planting trees, while 7 (7%) said they were not. During the focus group discussion conducted at the study area the participants agreed that the city administration actions cause community members to lose confidence in the tree planting efforts because they speculate that the government is only planting trees for as a way to gain attention for political purposes. The participants of the FDG agreed that they are very interested to plant fruit trees and shade trees during rainy season but there is lack of seedlings from the municipality.

Figure 7: Tree Planting Interest of HHs in their garden

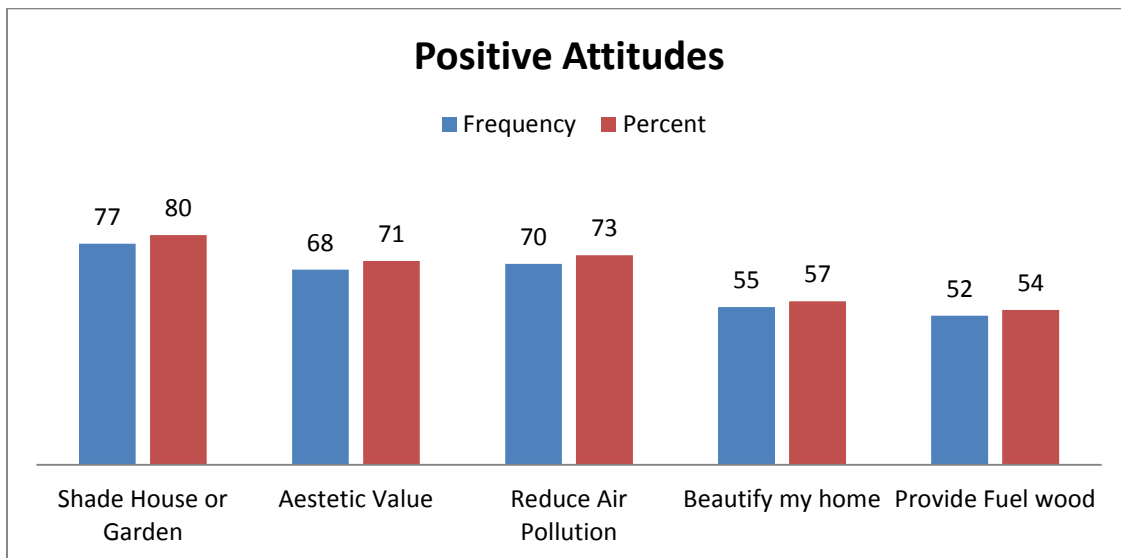


Source: Field survey data April, 2020

4.3.2. Reasons of Planting and Retaining Trees within Respondent’s Garden

The respondents were asked about reasons of planting and retaining trees within their property. Figure 8 indicated that 77 (80%) of the respondents mentioned ‘shade house or garden, 70 (73%) said ‘reduce air pollution’, 68 (71%) of the respondents mentioned ‘aesthetic values’. The study finds that the most popular reasons for planting and retaining trees within private land were related to the functional, environmental and aesthetic character of trees.

Figure 8: Why would you plant a tree in a garden? [Multiple Response is Possible]



Source: Field survey data April, 2020

As far as functional values are concerned, planting trees because they provide shade and privacy are the most popular reasons for the respondents. This outcome is consistent with Olive, Rusch and Ayers (2013) in that residents value trees because of a personal benefit, such as shade and property values, both functional aspects of trees (Kirkpatrick, Davison & Daniels 2012). Likewise, Summit and McPherson (1998) emphasize the functional (shade) and the aesthetic (beauty) as a priority for residents' tree planting.

After the functional values towards trees, residents rate the environmental value as the second most popular value of trees within private land, because of reducing air pollution. In fact, environmental benefits are reported by the literature as popular responses by residents (Daniels & Kirkpatrick 2011).

Municipal officers were also queried about the benefits and values of trees on public land. Officers give relevance to the environmental value of trees followed by the visual/aesthetic value coinciding with Ely (2011) findings.

However, the aesthetic value is still relevant in public tree planting. Both residents and municipal officers highlight the aesthetic value of trees in the town. Likewise, interviews with the municipality officers demonstrate that the environmental perspective is resonating within the minds of municipal officers, especially with the need to reach tree planting targets. In fact, trees are most wanted by most of municipal officers interviewed as per their awareness about tree benefits.

In addition, municipal officers commented that the town plants a tree in green areas for beautification, shade and environmental tendency. From observation, people in the study area plant and retain trees in their garden mainly for aesthetic, shading and beautification purposes. Residents' attitudes towards the environmental value of trees are worthy of study as approaching strategies by councils can be more effective if they embrace community preferences.

Correspondingly, during the focus group discussion, participants mentioned the cultural importance of trees as a reason, said that trees play a huge role in our culture and religion, especially we celebrate the birth of St. Mary under the tree such as Ficus Vasta Tree species every year on May 9.

Figure 9: Tree Planted on Private Land



During the focus group discussion, participants said that they have experience of planting trees for consumptive benefits such as fruits, fuel wood and medicines. A study done by Lohr *et al.* (2004) in the United States produced similar results.

One of the most widely understood positive attributes of trees was their ability to provide shade. Wolkite has a hot climate during summer months. These high temperatures can cause discomfort for residents, especially those whose homes are not air-conditioned, a point confirmed during focus group discussion by the participants that during the summer time Wolkite is hotter than winter time, you'll notice people sitting under trees. Some trees, particularly large shade ones, would be quite useful. This feeling was widespread among focus group discussion participants. It was especially important to those who did not have access to shaded outdoor areas in Menaharia Kebele. One woman stated that Shade tree is very important as it cools the surrounding; otherwise it's like sitting on top of oven another woman remarked in our village there are so many large trees that keep us cool when it gets to be summer. A recent university graduate commented that he was aware of the urban heat effect, and that he knew tree shade would help reduce it by lowering temperatures.

Residents also valued the aesthetic value of trees. A woman living in Menaharia Kebele during focus group discussion said,

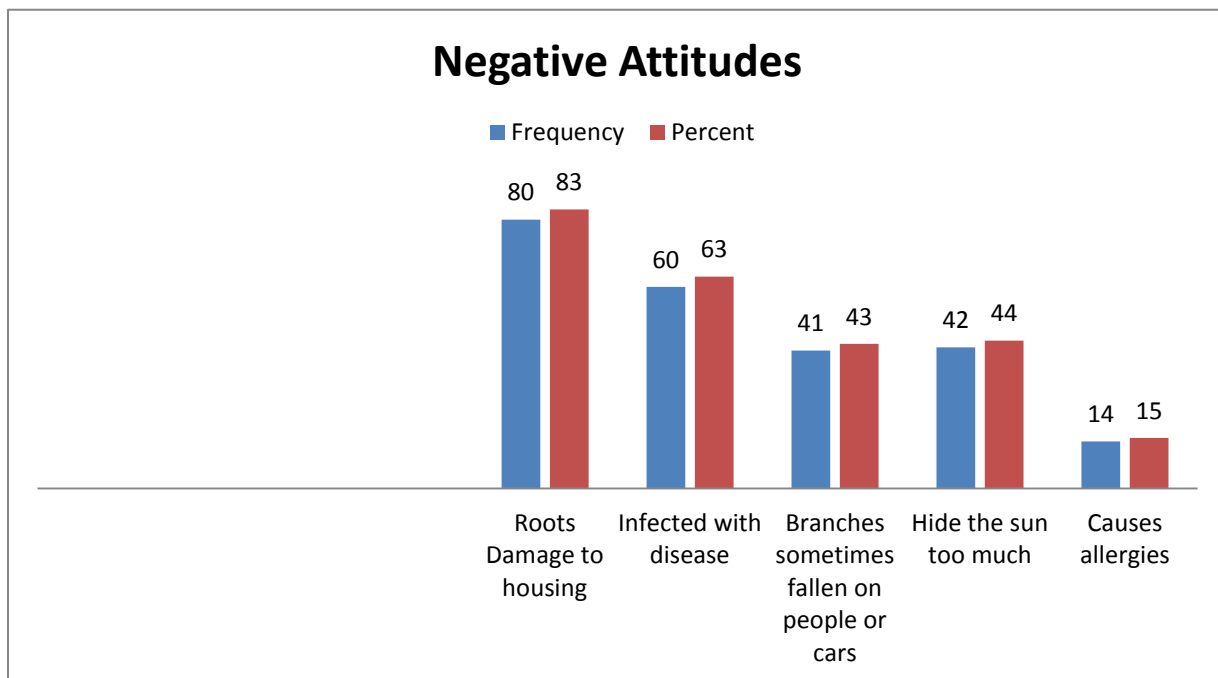
“This village just looks better, people here plant tree seedlings and it looks nicer than some of the other villages around here.” Another woman added, “Beautification is important in this area. The residents need to plant more tree seedlings which beautify the village.”

4.3.3. Reasons of Removing/Cutting trees

Study respondents were asked about the reasons of tree removing/cutting trees. About 80 (83%) respondents said that ‘Roots damage to housing’, 60 (63%) said ‘infected with disease’ and 42 (44%) said ‘Hide the sun too much’ and 14 (15%) said ‘causes allergies’

Kirkpatrick et al. (2012) had reported similar sentiments, stating that residents from six eastern Australian cities opted to remove different types of trees because of disease or advanced age, root damage to foundations, paths or pipes, because branches or whole tree had fallen or because there was likelihood of such a fall.

Figure 10: Respondents Reasoning for Removing a Tree from a Garden [Multiple Response is Possible]



Source: Field survey data April, 2020

In fact, the majority of respondents on private land in Menaharia kebele of Wolkite town replied that they removed a tree because of roots damaging to housing, and when trees are diseased or old.

During focus group discussion property damage from trees was one of the points of discussion. When initially asked how he felt about tree planting in his garden, a man responded:

“I’m not interested in deep rooted trees like Eucalyptus tree species!” throughout his time as a homeowner in Menaharia Kebele he has had numerous problems with tree roots breaking his water pipes. A woman added she maintained that the trees inside her yard caused damage to electrical wires, and that she had experienced several power outages. Hence trees were removed due to property damage.”

Participants of the FDG said that trees cause structural damage to buildings. Trees like Eucalyptus tree species near the house can also cause damage to the base of the house and as a result the walls might crack as the roots go deeper into the ground. Likewise, during interview one municipal officer said that the municipality removed trees that damage infrastructures such as roads, electric poles and electric wires; diseased trees such as Cupressus lustanica tree species infected with ephids and scales diseases in public land.

About 80 (83%) respondents of Wolkite town residents said that trees cause damage to their houses. Urban trees have been reported to cause structural damage to buildings, especially at the base of buildings due to their roots, and also through the falling of the entire tree or branches (Jari *et al.*, 2008). The roots of trees frequently cause roads and pavements to crack up and occasionally water pipelines in the case of street trees (Biddle, 1987). Trees around the yard can also cause damage to the base of the house and as a result the walls might crack as the roots go deeper into the ground.

During the focus group discussion, one participant mentioned the reason of cutting trees in his garden, said that he removed Eucalyptus tree species because the roots of the tree damaged the structure of my house; another man said I removed tree because it blocked the sun light from entering into my house early in the morning.

About 42 (44%) respondents of Wolkite town residents said that trees hide the sun too much. Trees have been reported to decrease visibility and they are also held responsible for blocking signs, storefronts, and window displays from both pedestrian and automobile traffic (Zhang *et al.*, 2007). Urban trees are also blamed for blocking sunlight and views.

During the focus group discussion, one participant mentioned the reason of cutting trees in her garden, said that she removed *Schinus molle* tree species because the allergic caused by this tree aggravated my respiratory illness asthma.

Health issues regarding trees producing allergies and attracting pests and undesirable wildlife are also reported (Shaw 2014) as well as trees causing respiratory illnesses such as asthma (Roy, Byrne & Pickering 2012). Also certain animal species utilizing trees may be vectors of diseases (e.g. avian influenza, rabies) (Jari *et al.*, 2008). Reducing this perceived risk within the study area will increase tree survival on private land.

Positive attitudes can be taken as opportunities to increase tree planting within private land in the town. Special emphasis on the aesthetic value for the residents is ideal with small trees to avoid blocking views and focusing on the safety image of trees regarding infrastructure damage and related to health issues.

Davison and Daniels (2012) commented that large trees such as *eucalypts* are associated with infrastructure damage by residents observing a small version of it, the *eucalyptus caesia*, being widespread across municipalities. Conway and Bang (2014) also propose that councils help with pruning and maintenance of mature trees within properties thereby helping to decrease the hazardous image of trees to residents. These authors suggest accounting with the selection of species to create an adaptable urban forest.

On the other hand, education campaigns are also important as an opportunity for tree planting especially because the education variable is the most influencing factor in residents' attitudes. Information can be addressed to the maintenance of healthy trees and adequate planting practices with prior evaluation of the household's space and soil conditions, as well as education on the selection of tree species taking into account individual attitudes towards trees. Education campaigns can be also focused on increasing that 'feeling of connectedness with nature' but

further research is needed to evaluate at what point residents are willing to change their land stewardship.

4.4. Urban Dwellers' Attitudes towards Tree Planting on Public Land

4.4.1. Residents' Willingness to Participate in Tree Planting Campaigns

Respondents were asked about their willingness to participate in tree planting campaigns created by the municipality. Out of the total respondents about 69 (72%) of the respondents said that they are willing to be involved in tree planting campaigns created by the municipality while the rest 27 (28%) said they are not willing to participate in tree planting campaigns created by the municipality in public spaces.

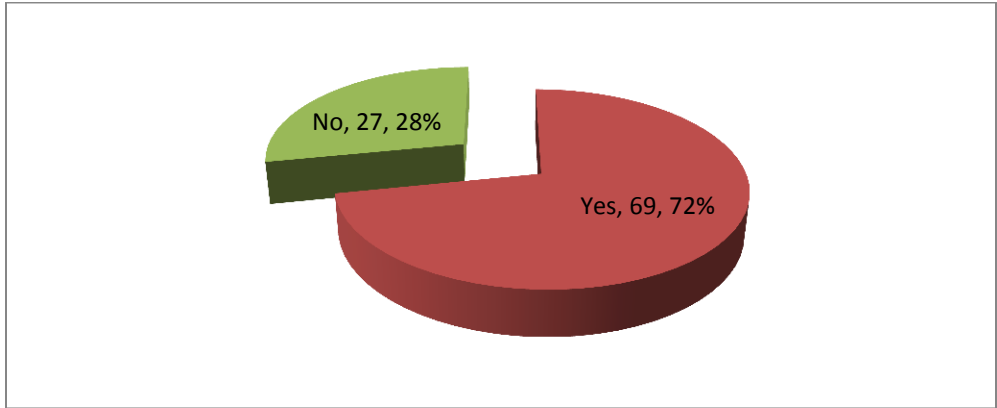
According to officials of the municipality during tree planting campaigns, the municipality gets tree seedlings from Abeshge Woreda Nursery site which they then donate to governmental and nongovernmental organizations and some local residents free of charge. Specifying this, an official from the municipality said:

“In the town, we have got a tree-planting program in the first week of July every year. In the past, we have held activities around tree-planting week, where people dig hole for tree planting before plantation conducted and often tree seedlings planted, and we are typically a part of it. Residents of the town do come to these events.”

The other municipality official said:

“The municipality uses local radio, specifically F.M Wolkite, to publicize a tree seedling planting program for town inhabitants to participate in. The municipality welcomes and encourages the willingness of the community to get involved in the development and maintenance of public green spaces and their private yards”

Figure 11: Willingness to Participate in Tree Planting Campaigns



Ethiopia’s national “Green Legacy” initiative has become the primary national program for promoting planting trees in both urban and rural areas. During this time, resources will be allocated for the planting of trees in both private and public spaces, specifically in parks, community gardens, schools and any other institutions that may be interested. An official from the municipality said before we even consider embarking on a tree-planting campaign, we will make sure that appropriate tree seedlings are ready; plantation site is ready and the communities are oriented to be willing to participate in plantation campaigns.

During these events, urban residents are encouraged to participate in tree planting and to learn more about trees. It is also the period where homeowners receive trees as donations from the municipality to plant in their private spaces.

Figure 12: Tree Planting Campaign in the Study Area

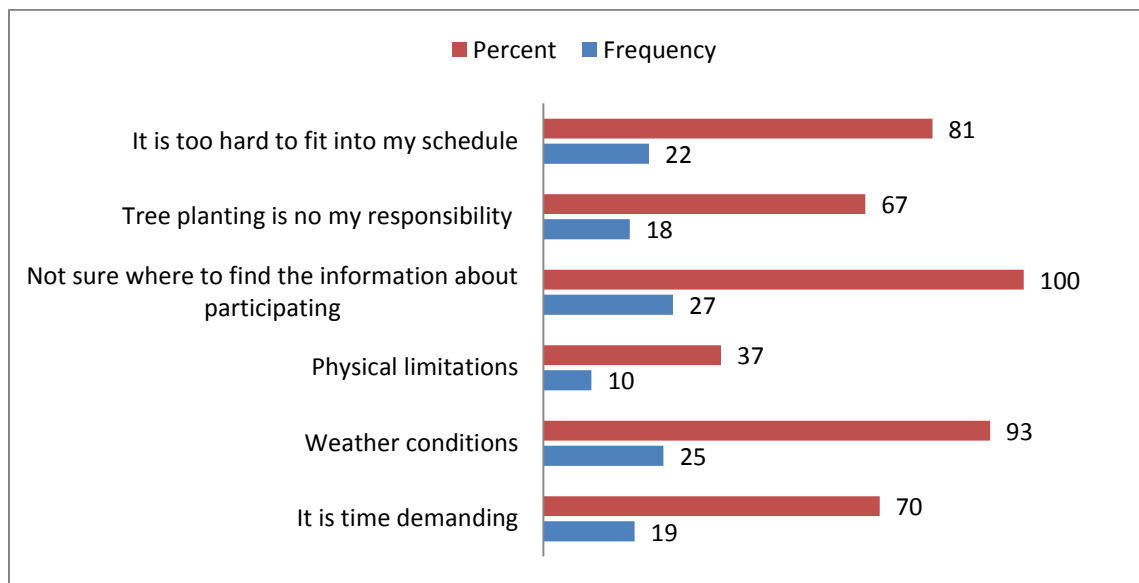


4.4.2. Unwillingness to Participate in Community Programs

27 respondents who were not willing to participate in tree planting campaign asked to give their reasons. The respondents gave multiple responses for this specific question. Figure 12 indicated that out of 27 respondents about 27 (100%) of the respondents said ‘not sure where to find the information about participating’, 25(93%) said ‘weather conditions’ and 22 (81%) ‘It is too hard to fit into my schedule’, 19 (70%) ‘it is time demanding’, 18 (67%) ‘I think it is the municipalities’ responsibility only’ and 10 (10.4%) said ‘physical limitation’ as a reason for not willing to be involved in tree planting campaigns.

Figure 13: Reasons not to participate in Council Tree Planting Programs

(N=27) [Multiple Response is Possible]



Source: Field survey data April, 2020

Lack of information and incompatible schedule was the most important reason given by the respondents for not planting trees. In their conceptual model on reasons not to volunteer, Brady et al. (1995) classified that people do not volunteer either because they cannot, they do not want to, or nobody has asked them to. The reasons pertaining to unwillingness to participate in tree planting are largely conglomerated within people being unable to participate because they do not have time or they have jobs, and not wanting to because they would not work without pay. The

results of this study are consistent with those reported by Sundeen et al. (2007) where people frequently attribute their unwillingness to volunteer to a lack free time (43%), lack of interest (27 %), and health problems (14 %).

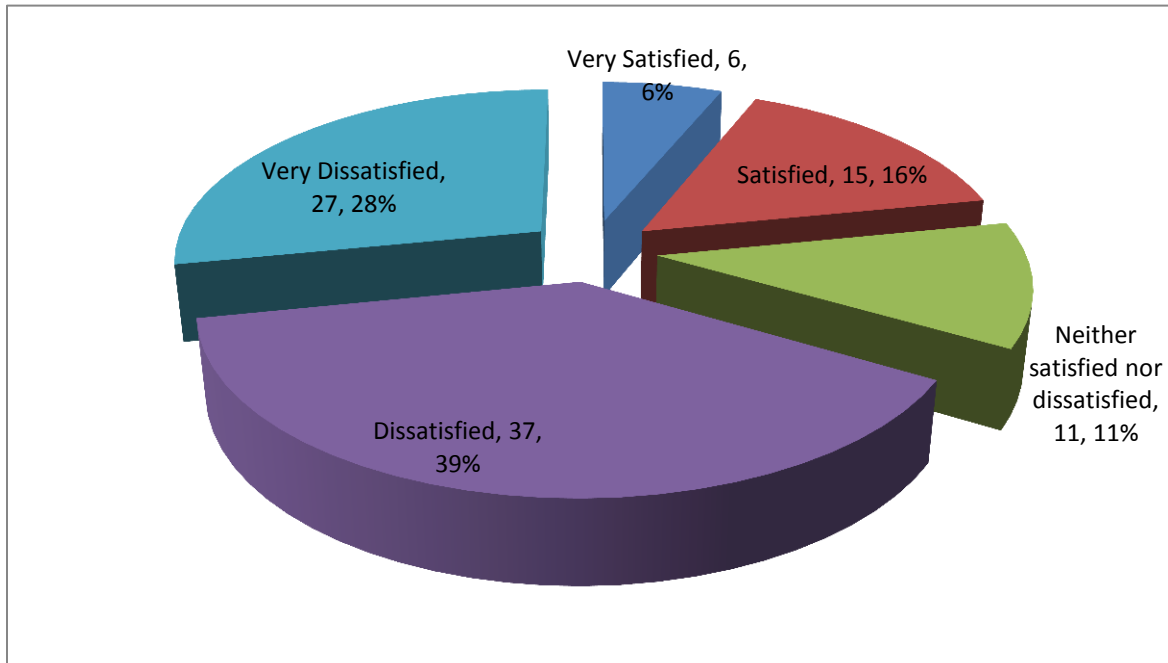
According to the Points of Light Foundation (2000), barriers to volunteering among residents of eight low-income communities in Washington D.C., USA include “lack of time and/or financial resources. Jobs can also limit time available for other pursuits (Wilson, 2012) such as participating in tree planting or other volunteer initiatives because some people spend most of their time at work and can barely do anything else after work. This is perhaps less pertinent in my study because of the high unemployment rates in the town.

Although this may not have been a popular reason for residents’ unwillingness to participate in tree planting in this study, other studies have acknowledged that residents living in leased properties may be less inclined to want to participate in volunteer activities (Dury et al., 2015), or specifically tree planting programs, because they are less attached to their neighbourhoods than homeowners (Rotolo et al., 2010).

4.4.3. Satisfaction Level of the Respondents with the Municipality’s Tree Planting

Residents were asked about their level of satisfaction with their municipality’s tree planting practices along Wolkite town asphalt main road. Respondents reported their level of satisfaction on a 5-point scale and provided their comments. Level of satisfaction is illustrated in Figure 13. The figure indicated that 37 (39%) of the respondents were Dissatisfied, 27 (28%) were very dissatisfied whereas 6 (6%) were very satisfied, 15 (16%) were satisfied and 11 (11%) were neither satisfied nor dissatisfied by tree planting along the town asphalt main road.

Figure 14: Level of Satisfaction with respect to Municipal’s Tree Planting along Wolkite town Asphalt Main Road



Source: Field survey data April, 2020

Figure 14 indicated that majority of the respondents were not satisfied by municipal’s tree planting along the town asphalt main road. During data collection it was observed that trees planted along the town’s asphalt main road lacks tree management practices such as pruning and they are too old.

In this regard, a respondent from Wolkite Municipality summarized the stance of their municipality regarding roadside tree planting, stating that:

“Municipalities have universally adopted the role of implementers of urban forestry, including in Ethiopia too. However, Wolkite municipality, as key enablers of tree planting and management along roadsides, are battling and not fulfilling this mandate because we have limited capacity and resources.”

Figure 15: Street Trees of Wolkite Town



4.5. Tree Planting and Management Practices

4.5.1. Number of Trees Planted by the Respondents' Yard in 2019/2020 Budget Year

The result in Table 3 indicated that 40 (42%) of the respondents planted none, 36 (38%) planted 1-5 seedlings, 15 (16%) planted 6-10, 4 (4%) planted 11-15 seedlings, 1 (1%) planted 16-20 seedlings and none of them planted above 20 seedling. Information obtained from the municipality by interview and from the residents through focus group discussion indicated that the municipality provides different species of tree seedlings to the residents of the town free of charge. This created opportunity for the residents to plant tree seedlings in their home garden.

Table 3: Number of Trees Planted by the Respondents in 2019/2020 Financial Year

Number of tree planted/year/HH	Frequency	Percent
0	40	42
1-5	36	38
6-10	15	16
11-15	4	4
16-20	1	1
Above 20	0	0
Total	96	100

Source: Field survey data April, 2020

An official from the municipality who had explicitly said that their municipality engaged in distribution of tree seedlings to the residents during the 2019/2020 financial year. He stated that:

“The municipality distributed tree seedlings for the residents free of charge in 2019/2020 budget year. 200 Callistemon Citrinus, 2247 Fruit trees (avocado, mango, papaya), 12000 Gravelia, 8150 Cordia africana, 5150 Acacia species, 4000 Croton macrostachyus were distributed to the residents of the town to plant into their private garden”.

Figure 16: Tree Planting Efforts by HHs

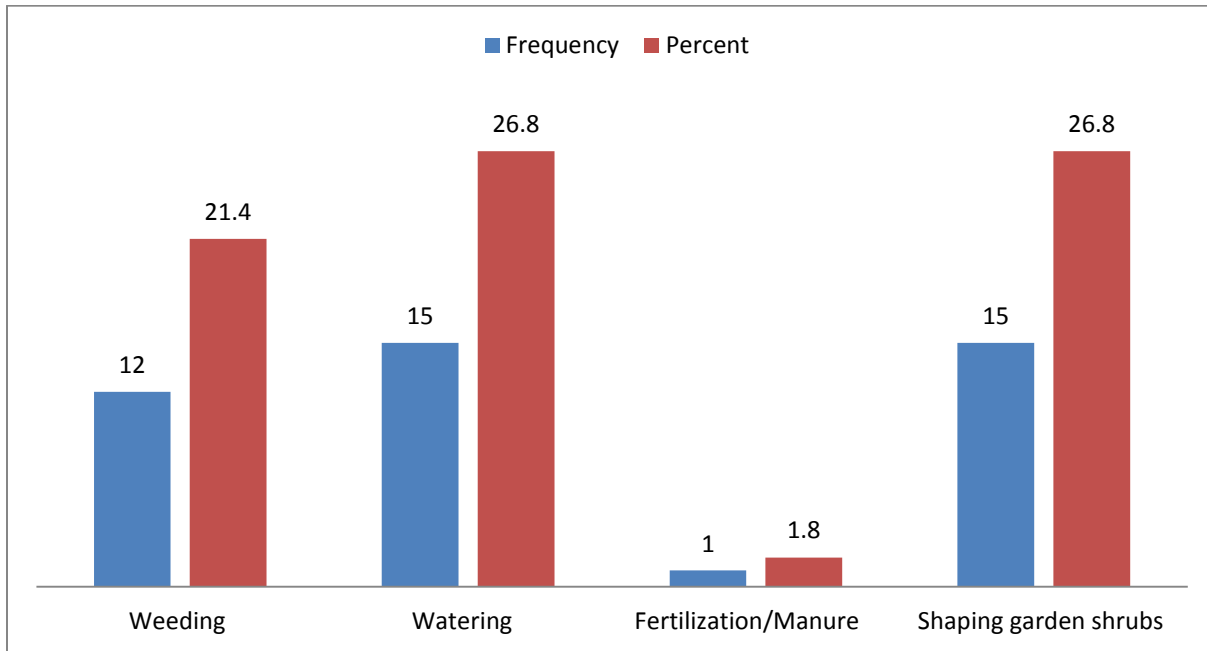


4.5.2. Tree Management/Maintenance Practices

Respondents were asked "do you perform tree management practices in your garden?" out of 96 HHs 56 (58%) of the households were involved in tree management practices whereas 40 (42%) of the sample HHs were not involved in tree management practices in their garden. 56 HHs were involved in tree management practices and asked what type of tree management activities practiced by the respondents in their garden. Respondents answered multiple responses for this question. Figure 17 indicated that 15 (26.8%) of the respondents said "Watering", 15 (26.8%) "Shaping garden shrubs", 12 (21.4%) of them responded that "Weeding" and 1 (1.8%) "Fertilization or Manure".

Figure 17: Tree Management Activities Performed by the Respondents

(N=56) [Multiple Response is Possible]



Source: Field survey data April, 2020

With green space in short supply, maintaining a healthy and abundant tree is essential for providing shade for buildings and walkways and creating restorative spaces and a sense of place for HH members and preserving wildlife habitat. Selecting a tree that is appropriate for the selected site is critical to ensuring the long-term health of the tree. However, lacking in tree maintenance caused many matured trees is fall and hazards to the public (Avolio et al., 2015). This happens when heavy rain and strong wind. Good tree management is the key basis for greener private space. Healthy trees within the garden will influence the quality of HH's life. However, lacking in trees knowledge such as pruning technique is one of the factors that trees will produce hazards to the HHs and the properties values (Kapoor, 2015). Also, the climate change cause the fallen tree occurs suddenly.

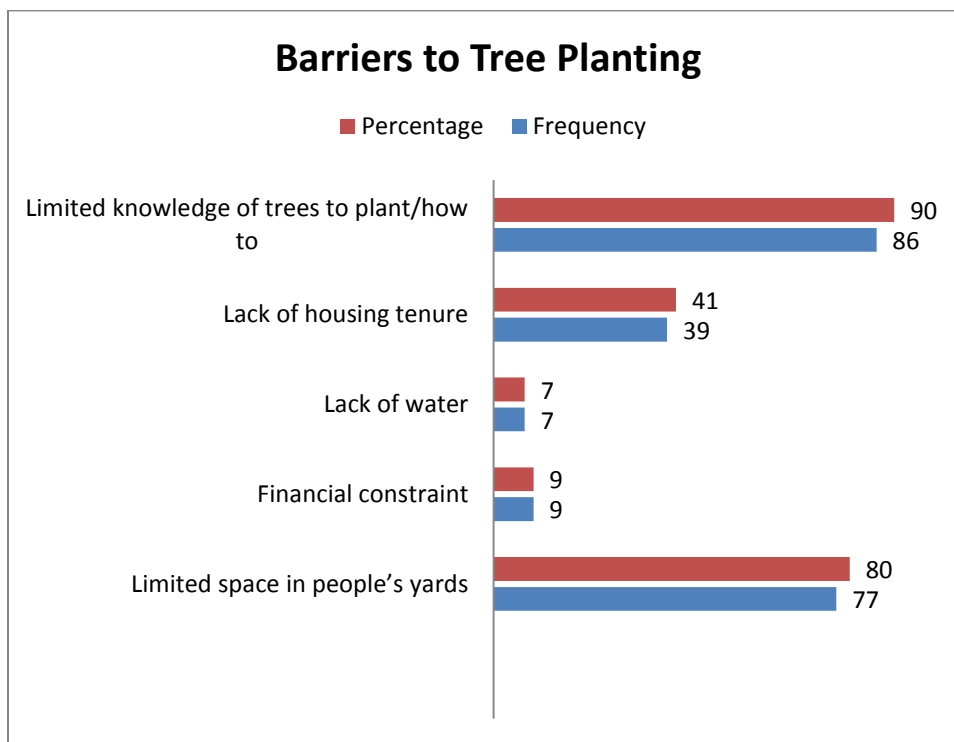
FDG participants were asked how receptive they thought their community would be to tree planting initiatives. When asked whether he thought his neighbors would care for trees, the recent high school graduate from the study area stated:

“It all depends. I think on this village it would work. I had water a tree! Some of these houses around here though, well I do not know (laughs). Some people really don’t care about that type of thing.” A man in Menaharia Kebele was less optimistic. “More trees would be nice, but we have already had trees on this village and they die. People do not water them. And most of the time, even if they do get watered, they get killed anyway by the children and even eaten by goats.”

4.6. Barriers to Tree Planting

Respondents were asked about barriers of tree planting around their property and accordingly about 90 (86%) responded ‘limited knowledge of trees to plant/how to’, 80 (77%) ‘Limited space in people’s yards’, 41 (39%) ‘Lack of housing tenure’ and 7 (7%) ‘Lack of water’.

Figure 18: What are the Barriers you find for planting Trees around Your Property?
[Multiple Response is Possible]



Source: Field survey data April, 2020

Residents identified a total of 5 barriers (Figure 18). The most mentioned barriers were resource barriers (Limited knowledge, financial constraint and lack of water), followed by physical

barriers (limited space), and then social ones (limited knowledge of trees to plant/how to) (Figure 18). Between these groupings, the three most prominent barriers to tree planting in private spaces, which are explained in detail below, were limited knowledge about which species are suitable for planting 86 (90%), limited space in people's yards 77 (80%) and financial constraint 9 (9%).

Highlighting this, an official from the municipality stated that:

“Many of those that already had trees attributed space as a barrier because they felt they could not plant any more. With those that did not already have trees, space limitation was mostly expressed in terms of them considering options such as extending their houses in the near future, and the general size of their yards, which was unanimously perceived as too small”.

Municipal officials were less vocal about what they thought could be hindering tree planting in private spaces compared to residents. In mentioning possible barriers, they mentioned one or two but never more. The impression given was people make choices about whether to plant trees or not, and it would be a matter of guessing why they would opt not to plant. Highlighting this, an official from the municipality stated that:

“Because of the socio-economic differences in our town, what I perceive as a barrier to tree planting in the private space will be a guess because the affluent area is covered with trees, and people in villages also plant trees so I cannot really pinpoint it much without guessing”.

One official specifically mentioned that they do not know why some people do not plant trees. He said *“we do not go too much into private with anything so it's a bit difficult to answer that one. If somebody want to plant, they can do it”*, while the other alluded to his assumption that everybody else should feel the same way as he does about his preference to be surrounded by trees and nature all the time. According to him *“People are just not planting trees because they do not want to. I do not see any plausible reason why anyone would not be able to plant a tree, unless they just do not want to. They are not thinking about the benefits, maybe”*

Another spoke about how people are different, and therefore their preferences also differ, explaining that some care about their surroundings, while others do not:

“Maybe people are just not interested in tree seedling planting because it is not like they have to buy them, we give them away. But there are people with beautiful yards and you can see that they are making the effort. Some people do not care about their yards. It is up to the people. Some people love nature and others do not and do not love the environment. Personality also plays a role.”

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATIONS

This chapter contains conclusions and recommendations of the study.

5.1. Conclusion

In conclusion, this study has given some insight into urban dwellers' attitude towards tree planting on private land in the study area. Urban residents demonstrated their interest in planting and managing trees on their homesteads simply because of the benefits that are perceived to be derived from them. The most popular reasons for planting and retaining trees within private land were related to the functional, environmental and aesthetic character of trees. More specifically residents of the town reasons for tree planting and management within the respondent's garden were for the purpose of shade; to reduce air pollution; and for aesthetic values. On the other hand the resident's reasons to remove different types of trees because of disease, root damage to foundations, hide the sun too much and cause allergies.

Regarding urban dwellers' attitude towards tree planting on public land, the majority of the respondents were willing to be involved in tree planting campaigns created by the municipality. Moreover, the majority of the respondents were satisfied with the municipality's tree planting practices along Wolkite town asphalt main road.

Regarding tree planting and management practices 40 (42%) of the respondents has not planted tree seedling in 2019/2020 Financial Year. Furthermore, 40 (42%) of the sample HHs were not involved in tree management practices in their garden, while the rest were involved in tree management practices in their garden such as watering to seedlings, shaping garden shrubs, weeding and application of manure. The barriers to tree planting around the sample HHs were resource barriers (Limited knowledge, financial constraint and lack of water), followed by physical barriers (limited space), and then social ones (limited knowledge of trees to plant/how to)

5.2. Recommendations

Based on major findings of the study, the following recommendations are forwarded.

Raising of the awareness

Raising awareness of the residents about their local environment in general and about tree planting and management in particular in the town through the provision of environmental education will help the communities to appreciate sound tree planting and management practices. Awareness rising should be done to enhance peoples' interest to plant trees, to maximize peoples' willingness to participate in tree planting campaigns created by the municipality in public space and to encourage them to apply tree management practices such as watering, weeding, application of manure etc.

Increase the Participation of the Community towards tree planting

If the town administration prefers to implement tree planting and management successfully, it should involve the residents in the whole process of tree planting and management. Municipalities should consult residents in terms of what types of trees to plant and where. One way to do this would be to initiate neighbourhood greening committees.

Formulation and enforcement of regulatory tools

Many of the problems associated with tree planting and management identified in this paper are related to lack of adequate emphasis from the responsible government bodies. Sustainable tree planting and management in general requires detailed and strong rules and regulations as well as standards.

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Appendices

Appendix 1: Questionnaire for the Sample Household

This questionnaire is prepared to gather information about “*Urban Dwellers Attitude and Tree Management Practices towards Tree Planting in Wolkite Town.*”

The questionnaire is purely used for academic purpose and it will not be available for others. Thus your honest response to this questionnaire will have of a paramount importance to the researcher for better understanding of the issue and to recommend for better options. To ensure confidentiality, your name and house number will not be recorded. Give your answer by encircling your choice and write on the blank spaces for those questions that require explanation. Thanks for your cooperation.

Zerihun Workneh

Part I: Socio-economic variable

1. Sex a. Male b. Female
2. Age of respondent a. 18-35 b. 36-45 c. 46-60 d. above 60
3. Level of Education
 - a. Primary
 - b. Secondary
 - c. University
 - d. None
4. Security of tenure a. Own house b. Rented house

Part II: Attitudes (positive and negative) towards tree planting on private land

5. Do you have interest of planting tree seedlings in your garden? a. Yes b. No
6. Why would you plant trees in a garden? [Multiple Response is Possible]
 - a. Shade house or garden
 - b. Improve appearance garden
 - c. Enhance privacy

- d. Reduce air pollution
 - e. Improve appearance house
 - f. Provide Fuel wood
 - g. Beautify my home
7. Why would you remove a tree in a garden? [Multiple Response is Possible]
- a. Roots damage foundations paths
 - b. Diseased or of advanced age
 - c. Branches sometimes fall on people or car
 - d. Hide the sun too much
 - e. Cause allergies
 - f. To replace it with another tree
8. What are the barriers you find for planting trees around your property? [Multiple Response is Possible]
- a. Lack of enough space
 - b. The maintenance costs are high
 - c. It is time demanding
 - d. The trees require too much water
 - e. The house is rented
 - f. It is not a priority in my free time
 - g. Don't like planting trees at all
 - h. Don't find any obstacle for planting
 - i. Lack of professional advice from the municipality
 - j. I don't know how to plant
9. Would you like to be involved in tree planting programs created by the Municipality in your area?
- a. Yes
 - b. No
10. If your answer for question number 9 is No, please specify your reason.[Multiple Response is Possible]

- a. I do not have the time
- b. Weather conditions
- c. Physical limitations
- d. Not sure where to find the information about participating
- e. I think there are enough trees already
- f. I think it is municipalities's responsibility only
- g. It is too hard to fit into my schedule
- h. I think it is a risk to my safety
- i. I contribute with my garden maintenance only

11. Please rate your satisfaction with the municipality's tree planting and maintenance along Wolkite town asphalt main road.

- a. Very Satisfied
- b. Satisfied
- c. Neutral
- d. Dissatisfied
- e. Very Dissatisfied

Part III: Tree planting practices

12. Have you or anyone in your family planted any trees within your yard from the time you occupied this house? a. Yes b. No

13. In 2019/2020 budget year approximately how many trees did you planted in your garden?

- a. 1-5
- b. 6-10
- c. 11-15
- d. 16-20
- e. Above 20

14. Who provides seedlings to you?

- a. The municipality
- b. micro and small enterprises
- c. Unorganized individuals
- d. Non-Governmental Organizations

15. Do you pay for seedlings?

- a. Yes b. No

16. If your response to question number 15 is “Yes”, on average how much do you pay per seedling?

- a. 1-5 birr
b. 6-10 birr
c. 11-20 birr
d. 21-30 birr
e. Above 30 birr

Part IV: Tree Management/Care activities

17. Do you perform tree management/maintenance in your garden? a. Yes b. No

18. If your answer for question 17 is "Yes" What activity/activities do you perform in your private garden maintenance? [Multiple Response is Possible]

- a. Weeding
b. Mulching
c. Watering
d. Fertilization
e. Shaping garden shrubs
f. Pruning

Part VI: Recommendations

19. In your opinion what measures do you suggest to improve the overall tree planting and management activities?

Thank You for Your Cooperation and the time you have invested in completing the questionnaire!

Appendix 2: Municipal Officials'/Experts' Interview Checklist

This interview is prepared to gather information about *“Urban Dwellers Attitude and Tree Management Practices towards Tree Planting in Wolkite Town.”* The study is academically oriented to be undertaken for the partial fulfillment of Master’s Degree in Environment and Sustainable Development in Addis Abeba University. Besides, the response you provide will be kept confidentially. Thus your response has of a paramount importance in getting the right information. Thank for your cooperation.

Zerihun Workneh

Part I: Respondent Profile

1. Sex a. Male b. Female
2. Age of respondent a. 18-35 b. 36-45 c. 46-60 d. above 60
3. Position/Official designation: _____
4. Years on the job: _____
5. Your field of specialization/qualification: _____
6. What does your job entail?

Part II: Background information of the study area

7. Average annual rainfall_____
8. Average annual temperature_____
9. Total area of the town_____hectare
10. The total population_____yearly growth rate_____

Part III: General Tree Planting and Experiences

1. Personal involvement in tree planting and urban green space management, and in what capacity?
2. Tree planting and urban green space establishment in the town.
3. Maintenance of trees and green spaces (current strategies)
4. Current or past urban tree planting programmes in town.

5. Residents' participation in the tree planting programmes.
6. Tree planting in private spaces.
7. Regulations or bylaws or standards regarding the planting or removal of trees *by residents* in both the private and public spaces
8. Barriers to tree planting in the public and private space
9. Current strategies to address barriers
10. Current strategies to enhance enablers
11. What measures do you suggest to improve tree planting and management activities in the town?

Thank You for Your Cooperation and the time you have invested for the interview!

Appendix 3: Focus Group Discussion Questions

1. What is the current procedure with regards to tree planting in this town?
2. What is “wrong” with the current procedure with regards to tree planting?
3. Whose role is it to plant trees in the town?
4. What role can communities play in ensuring that tree seedlings are planted in their town?
5. What do residents perceive as barriers to the planting of trees in the town?
6. What could enable the successful planting of trees in the town?
7. How can community participation contribute to the effective greening of the town?
8. How would we go about greening our town if we were given that opportunity as a community?
9. How could this method be more sustainable than the current one?







Appendix 4: URKUND Anti Plagiarism Report



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CHAPTER ONE 1. Introduction 1.1. Background

Today, 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050. Projections indicate that urbanization, the gradual shift in residence of the human population from rural to urban areas, combined with the overall growth of the world's population could add another 2.5 billion people to urban areas by 2050, with close to 90% of this increase taking place in Asia and Africa. (UN DESA 2018).

As urban areas expand, green infrastructure faces a very serious fight for space (Davison & Kirkpatrick 2014), making it difficult to achieve tree planting goals for the wellbeing of the community. This is due to the alteration of natural conditions, high-energy consumption, and decreased biodiversity associated with urbanization (Young 2010), all of which have an impact on sustainability and the ecosystem services it provides to residents (Eigenbrod et al. 2011).

In urban areas, urban forests are important because they help to solve problems such as urban heating and climate change mitigation by improving air quality and microclimate conditions (Brown et al 2013). Urban forests also provide social benefits such as the recreational, mental and physical health for people (Shanahan 2014), thereby maintaining community health and wellbeing (Wolch, Byrne & Newell 2014), while balancing built and green infrastructures (UN-HABITAT 2013).

Seeking opportunities to expand the urban forest within the city nowadays is crucial for urban sustainability (Nowak & Greenfield 2012), not only from an ecological and physical perspective (Niemelä 2014), but also from a social viewpoint exploring the challenges of urban forest management (Johnston & Hiron 2014) where it is most needed (Davison & Kirkpatrick 2014). Humans perceive trees either in an ownership sense, with emotional attachment or by associating trees with positive and negative experiences (Head & Muir 2005, Kirkpatrick & Davison 2012).

Urban landscape preferences and attitudes towards trees and tree planting therefore are an important means to improve green infrastructure in urban environment (Kirkpatrick & Davison & Harwood 2013). This can be practiced through tree-planting activities within private and public green spaces in urban environment (Head & Muir 2005). Likewise, the urban forest is affected by stewardship structures, fragmented objectives, political regimes and responsibilities that inflict uncertainty on its management (Kilgore, Hibbard & Ellefson 2006), thus implicating the decision-making process as a crucial factor in urban sustainability (Davison & Kirkpatrick 2014).

The study was conducted in Wolkite town which is under the administration of Guraghe Zone of the SNNPR government.

1.2. Statement of the problem

Every year thousands of seedlings are planted in both public and private spaces of Wolkite town. Wolkite, the capital of Guraghe zone, is characterized by poor environmental conditions caused by different problems.

The problem might be many but the major ones emanate from the poor organizational structure of the town, which is responsible for keeping the town green and clean. The other cause that contributes to the poor environmental condition of the town goes to the attitude and practices of the inhabitants towards tree planting and management. These and other related factors have been affecting the environmental condition of the town.

Wolkite town strategic frameworks emphasize sustainable development, environmental protection and the creation of quality living and working environments. Tree planting and management play a critical role in achieving these objectives and therefore these valuable environmental assets need to be provided and managed in a manner that will optimize the outcomes of key city strategies.

Tree planting and management within the urban environment is an on-going challenge in that the management and survival of trees are often at risk. Due to numerous challenges associated with harsh urban environments, tree management can be extremely difficult. This is especially true of newly planted trees, which have been shown to have higher mortality rates compared to those that are established.

The challenges of urban tree planting and management could be the attitude of people towards tree planting & its management, community participation, an increasing demand for land development, urbanization and space usage, changing societal needs and demands resulting in trees being considered a nuisance rather than a benefit.