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Making cities work

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**Title: The Status of Green spaces and Green space Participatory  
Management in the City of Addis Ababa**

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# **MASTER'S PROGRAMME IN URBAN MANAGEMENT AND DEVELOPMENT**

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## Summary

The unprecedented rapid urbanization of Addis Ababa, coupled the city's high population growth has been entailing intricacies on city's management, amongst which Green spaces management constitute a part. In pursuit of the brown agenda i.e. infrastructural development, expansion of construction for settlement to accommodate the ever growing population, utilization of fuel wood and charcoal as bio fuel have been contributing to green spaces depletion in Addis. Green spaces participatory management has been a problem. This requires studies to find solution for the Green space management problem. This research's aim is to determine the green spaces status and green spaces participatory management that entails stakeholder organizations and the community in the ten sub-cities of Addis Ababa. The main research methods are Land cover change detection using remotely sensed satellite multi-temporal raster data image analysis, qualitative and quantitative data analysis.

The unit of analysis of this case study is organization. The main technical approach applied was qualitative data analysis acquired through purposive (judgmental) sampled data later analyzed using Atlas ti. To supplement the study, a quantitative sampled single point in time (2014) cross-sectional surveyed data of 100 respondents from the ten sub-cities of Addis was analyzed using SPSS. For the analysis, especially oneway Anova statistical test was applied. The triangulated quantitative, qualitative, supplemented secondary and personal observations had yielded that Green spaces management in Addis Ababa has been dysfunctional. To confirm the dysfunctioning of Green space management, the change detection analysis using Remote Sensing had yielded that, a total of 1621 ha of Green spaces had already been destroyed. The principal mission of the stakeholder organizations is the maintenance of the Green spaces; the result was otherwise. The organizations mandated to maintain and develop Green spaces could not maintain the Green spaces, thus the status of Green space management has been dysfunctional.

In the context of Addis Ababa city, the main causal factors for the dysfunction are, poor community and stakeholders involvement, especially dialog and linkage among those organization mandated to steward Green spaces, constraints in resources, such as skilled geospatial, arboreal and landscape professionals, absence of Tree Ordinances, poor digital facilities, lack of database and networking to generate and share spatial and non spatial information, poor law enforcement, laxity in surveillance and monitoring of green spaces through change detection studies and in situ observations including the development of new ones. Let alone the 41% or 22 000 ha, planned for the green frame, the total loss was found to be 30% and compared to the total area of the city (54 000 ha), merely 7% is covered with Green spaces. The remaining Green spaces are under vulnerability. Thus, to ameliorate the existing management, restructuring is imperative, merging the PSBB of MUDHC with BPCDA and the formation of an Integrated Green space Management that entails skilled arboreal, landscape architecture, geospatial professionals with a robust digital facility, networking with clearing house portal for synergizing bond and cooperation. The presence of Tree Ordinance, action oriented awareness to enhance communities participation better budget allocation would create a proper participatory Green space management in Addis, that enables Green spaces to sustainably render their eco-service to the city inhabitants.

## **Keywords**

*Green space, Participatory management, Tree Ordinance, Spatial information, change detection, dysfunction.*

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At my enclosure, I wish every member of IHS staff and UMD batch, a sound health and success in all scientific and life endeavours.

## **Dedication**

It is my heart's desire to dedicate this piece of work to my heavenly Father Almighty Lord Yahwehshua Meshach who is the Lord of wisdom.

I also dedicate it to my late father Sergeant Gebremeskel Kibret, to my wife Seble Weldesenbet, to my daughter Ruh Gezahegne, to my son Ab-el Gezahegne, to my relatives, church members and friends who prayed for my success and consider my success as their own.



## **Foreword**

Green spaces are an integral component of an urban natural environmental ensemble. Under the current and impending increasing urban heat island effect and pollution, Green spaces play a pivotal role by buffering urban heat island, sifting pollutants, thus maintain air and aesthetic quality making urban scenery liveable. Rapid urbanization and booming populations have been imparting intricacies on urban green space management. This study as partial fulfilment of Master of Science degree attempts to determine the Green spaces status and the participatory management of stakeholder's engagement and the local communities' involvement in Addis. The study has applied Remote sensing change detection studies using a multi-temporal satellite raster data, including qualitative and quantitative analyses supplemented by secondary and personal observations triangulated to attain tenable research upshots.

## Abbreviations

<b>IHS</b>	Institute for Housing and Urban Development
<b>AOI</b>	Area Of Interest
<b>AUTOCAD</b>	Automated Computer Aided Design
<b>BOD</b>	Biological Oxygen Demand
<b>BPCDA</b>	Beautification Park Cemetery Development Agency
<b>COD</b>	Chemical Oxygen Demand
<b>CSA</b>	Central Statistical Agency
<b>CSW</b>	Combined Sewage Overflow
<b>CVD</b>	Cardio Vascular Disease
<b>EPA</b>	Environmental Protection Authority
<b>FAO</b>	Food and Agricultural Organization
<b>IDA</b>	International Development Agency
<b>ISO</b>	International Standard Organization
<b>LAC</b>	Local Area Network
<b>ISO</b>	International Standard Organization
<b>LAC</b>	Local Area Network
<b>MUDHC</b>	Ministry of Urban Development Housing and Construction
<b>NGO</b>	Non Governmental Organization
<b>ISODATA</b>	Iterated Self Organized Data Analysis and Transformation Algorithm
<b>PAA</b>	Policy Arrangement Approach
<b>PCD</b>	Park Cooling Distance
<b>PCI</b>	Park Cooling Intensity
<b>PSBB</b>	Planning Sanitation Beautification Bureau
<b>TCT</b>	Tasselled Cap Transportation



# Table of Contents

<b>Summary.....</b>	<b>iii</b>
<b>Keywords .....</b>	<b>iv</b>
<b>Acknowledgements .....</b>	<b>v</b>
<b>Dedication .....</b>	<b>v</b>
<b>Foreword.....</b>	<b>vii</b>
<b>Abbreviations .....</b>	<b>viii</b>
<b>List of Tables .....</b>	<b>x</b>
<b>List of Figures.....</b>	<b>xi</b>
<b>Chapter 1: Introduction .....</b>	<b>1</b>
<b>This chapter dwells on an overview of the background, research problem and the purpose of the research undertaking. Subsequently, the research subsumes the outlines of the research’s major and sub-objectives, major and sub-research questions, ..... 1</b>	
1.1 Background to the study .....	1
1.2 Problem Statement.....	2
1.3 Objective.....	2
1.3.1 The Sub-research Objectives.....	2
1.4 Main Research Question.....	2
1.4.1 Revised Sub-research questions .....	2
1.5 Significance of the Study.....	3
1.6 Scope of the Study .....	3
<b>Chapter 2: Literature review and Conceptual Framework.....</b>	<b>4</b>
2.1 Introduction .....	4
2.2 The Benefits of Green Spaces .....	5
2.2.1 The Environmental Benefits of Green Spaces.....	5
2.2.2 Social Benefits .....	7
2.2.3 Economic Benefits .....	8
2.2.4 The Socio-ecological Factor for the Use of Green spaces.....	9
2.3 Urbanization Complexities on Green spaces.....	9
2.4 The Contingency and Modern Management Theories .....	10
2.5 The Concept of Green Space Management .....	10
2.6 Community Participation.....	12
2.7 The conceptual Framework for Participatory Green spaces .....	13
Management .....	13
<b>Chapter 3: Research Design and Methods .....</b>	<b>16</b>
3.1 Introduction .....	16
3.1.1 The Revised Research Questions .....	16
3.1.2 Research Approach and Techniques .....	17
3.1.3 Operationalisation of Variables and Indicators .....	17
3.1.4 Data Collection Methods.....	20
3.1.5 Sample Size and Selection .....	21
3.1.6 Validity and Reliability .....	21
3.1.7 Data Analysis Method.....	22
<b>Chapter 4: Research Analysis and Findings .....</b>	<b>23</b>
4.1 Introduction .....	23
4.2 Background on the Green spaces Management in Addis Ababa.....	23

4.3 Green spaces status identification employing Remote sensing Technique .....	25
4.3.1 Change Detection Using Remote Sensing Technique .....	25
4.3.2 The Causal Factors for Green spaces Depletion in Addis Ababa.....	31
4.4 The Level of Stakeholders Participation in Green spaces Management.....	33
4.5The status of Community Involvement in the Green space Management .....	36
<b>Chapter 5: Conclusions and recommendations .....</b>	<b>46</b>
5.1 Introduction .....	46
5.2 Conclusion.....	46
5.3 Recommendation .....	48
<b>Bibliography .....</b>	<b>50</b>
<b>Annex 1: Interview Guide for Addis Ababa City Administration .....</b>	<b>52</b>
<b>Annex 2: Interview Guide for Environmental Protection.....</b>	<b>55</b>
<b>Authority.....</b>	<b>55</b>
<b>Annex 3: Interview Guide for Ministry Environmental .....</b>	<b>58</b>
<b>Protection Authority and Forestry .....</b>	<b>58</b>
<b>Annex 4: Survey Questionnaire Guide for the Ten Sub-cities of .....</b>	<b>61</b>
<b>Addis Ababa .....</b>	<b>61</b>

## List of Tables

Table3.1Operationalization of variables and indicators for research question 1 .....	18
Table3.2 Operationalisation of variables and indicators for research question 2 .....	19
Table3.3 Operationalisation of variables and indicators for research question 3 .....	20
Table3.4 The research strategy, method and techniques applied .....	20
Table4. 5 The spatial extent of Land cover classes in Addis, 1986.....	26
Table4.6 The spatial extent of Land cover classes in Addis in, 2014 .....	27
Table4.7 The difference in the area extent of the Land cover types from 1986 to 2014.....	28
Table4.8 Statistical output of Oneway Anova on the community participatory performance .....	36
Table4.9 The response of Sub-cities on performance of the community in greener activities .....	37
Table4. 10 Oneway Anova test score result of the Sub-cities of Addis Ababa .....	38
Table4.11 dialog between the community and stakeholder organizations .....	39
Table4.12 Rating of linkage and dialog between the community and the stakeholder organizations.....	39
Table4.13 Sub-city response on community participation in financial decisions .....	41
Table4.14 the frequency of response on the participation of communities in financial decisions .....	42
Table4.15 Community participation in consensus-based decision making .....	42
Table4.16 Oneway Anova statistical test score of sub-cities response on complaint redressing.....	43
Table4.17 The Sub-cities response on complaint redressing .....	44
Table4.18 Frequency of awareness campaign taken by the ten Sub-cities .....	45

# List of Figures

Figure 1.1 The Addis Ababa city map.....	1
Figure 2.2 the conceptual framework of Participatory Management of Greens spaces.....	15
Figure 4.3 The Gola Park in the Lideta Sub-city Administration .....	24
Figure 4.4 The Tasselled Cap Transformation for the city of Addis Ababa .....	25
Figure 4.5 map showing the extent of urban Land cover types of Addis Ababa in, 1986 .....	26
Figure 4.6 map showing the extent of urban Land cover types of Addis Ababa in, 2014 .....	27
Figure 4.7 The relative area extent of Land cover types of Addis in, 1986 .....	28
Figure 4.8 The relative area extent of Land cover types of Addis in, 2014 .....	28
Figure 4.9 The difference in the area extent of Land cover types from, 1986 to 2014.....	29
Figure 4.10 The Addis ring road overpasses and social housing (condominiums) .....	32
Figure 4.11 The ten sub-cities response on the performance of the community in greenery activities .....	37
Figure 4.12 The Sub-city responses on work performance as a priority .....	38
Figure 4.13 Responses by Sub-cities on linkage and dialog with stakeholder organizations .....	40
Figure 4.14 Community participation in decision making .....	43
Figure 4.15 The frequency of response by Sub-cities on complaint redressing .....	44
Figure 4.16 The response on awareness campaign.....	45

# Chapter 1: Introduction

This chapter dwells on an overview of the background, research problem and the purpose of the research undertaking. Subsequently, the research subsumes the outlines of the research's major and sub-objectives, major and sub-research questions,

## 1.1 Background to the study

Addis Ababa is the capital city of the Federal Democratic Republic of Ethiopia. The city has an international significance for being the seat of African Union and the United Nations Economic Commission for Africa (UNECA), see (Figure 1.1). The geodetic bounding coordinates of the city are,  $\phi=8^{\circ} 57' 05''$  N to  $9^{\circ} 04' 10''$  N and  $\lambda=38^{\circ} 42' 12''$  E to  $38^{\circ} 47' 09''$  E.



**Figure 1.1** The Addis Ababa city map

Source: *Addis Ababa City Administration*

The city of Addis Ababa is situated at an altitude of 2 300 m above msl. According to Köppen-Geiger's classification, this altitude imparts the city the class Cwb climate (subtropical highland climate) that is temperate. As per the National Meteorological Agency of Ethiopia, Addis Ababa receives 270 mm rainfall during summer season (June, July, and August) and minimum rainfall amounting 12 to 32 mm in winter season (December, January and February). Based on the UDEP Ethiopia, 2011 report, the mean annual temperature of the city of Addis Ababa has increased by 1.3 °C, between 1960 and 2006; at an average rate of 0.28 °C per decade. Climate models suggest that Addis Ababa will see further warming in all seasons between 0.7 °C to 2.3 °C by 2020 and between 1.4 °C to 2.9 °C by 2050 (UDEP, 2011). The scenario is indicative of the warming trend of the city.

Addis Ababa is a fast growing city in terms of built up area and population. As per the Central Statistical Agency (CSA) report of Ethiopia, the total population of the city is 3.041 million people (CSA, 2012). The growth rate of the population is 4.1% between 1990 and

2006 (UNHABITAT, 2008). The unprecedented population increment and urbanization entails the land use cover change of the city in which green spaces constitute a part.

## **1.2 Problem Statement**

The rapid urbanization and its unprecedented population growth have been imparting intricacies in managing the city amongst which green space management constitutes a part. Green spaces management should have moderated and controlled those negative impacts imparted by urbanization. However, different factors have contributed to the green spaces management problem for not abating green spaces depletion in Addis Ababa. A thorough assessment is imperative to discern those causal factors that have been constraints to the green spaces management in Addis Ababa. This research intends to explain the factors for the problem and strategize responses that would ameliorate green space management in Addis Ababa.

## **1.3 Objective**

The principal objective of the study is to assess the stakeholder organizations' management status and the communities' involvement in the participatory Green spaces management in Addis.

### **1.3.1 The Sub-research Objectives**

The sub-objectives of the study are itemized as follows:

1. To identify the dynamics in the spatial extent of green spaces through time series satellite raster data Land Use-Cover change detection analysis using remote sensing and relate the implication of the outcome to the current green spaces management status.
2. To take an assessment on the green spaces management status of those organizations mandated to manage the green spaces.
3. To assess the community's involvement in the participatory green space management.

## **1.4 Main Research Question**

How does the green spaces participatory management determine the status of green spaces in Addis Ababa City?

### **1.4.1 Revised Sub-research questions**

1. How much green spaces in Addis Ababa have changed since 1986 to 2014 and its implication of the green space management in Addis Ababa city?
2. How does the engagement of stakeholder organizations determine the status of Green spaces management in the city of Addis?

3. How involved are the local communities in green spaces management in Addis Ababa?

## **1.5 Significance of the Study**

The Addis Ababa City Administration is considered as one among the nine Federal states of Ethiopia. This research by applying the right research strategies and instruments would explain the green spaces management status on those organizations mandated to manage the green spaces of Addis Ababa and the participatory role of the community in greenery activities and management. The outcome of the study would have a great significance in terms of ameliorating green space management in Addis Ababa through a robust participatory green spaces management that would abate green spaces depletion so that they can sustainably render their economic, social and environmental services. The study bridges those research gaps in green space management in Addis Ababa.

The result of the study can be emulated by the other Federal Cities in lieu of duplicating efforts and resources. Moreover, the result of the study has a contribution to scientific research on green spaces lending itself as a reference material.

## **1.6 Scope of the Study**

The geographical scope of the study is limited to the City of Addis Ababa. The study is focused at the green spaces management problem and the attendant green space depletion. Green space management requires an in depth investigation to strategize responses for a robust participatory green space management to abate the green space depletion in Addis Ababa City.

Research analysis underpins the availability of quality raw data. One of the primary data sources is satellite raster data sets of 1989 and 2014 that would be employed for a change detection analysis using remote sensing technique. This is intended to relate the change in green spaces with the present management status. The main limitation of Landsat sensor data is that the spatial resolution is 30 m which is a medium resolution. The main constraint is the acquisition of high spatial resolution raster data sets for its exorbitant price. The study treats green spaces not separately, i.e. parks, gardens, urban forests, but as a whole.

## **Chapter 2: Literature review and Conceptual Framework**

### **2.1 Introduction**

In terms of Land cover types, urban areas may be characterized as dynamic entities that lack homogeneity. The urban land cover types vary from the most contending (densifying and sprawling) built up areas to vegetated and non-vegetated natural environment. Among the natural environments, urban green spaces are one of the most preeminent in degree of importance. So far, there is no a standard conventional definition on green spaces. In most scientific literatures, the terms green infrastructure, green space and open space sometimes have been loosely defined and interchangeably used that stems from consideration of as if they are synonymous.

Schipperijn defines urban green spaces as “all publicly owned and publicly accessible open spaces with a high degree cover of vegetation, e.g., parks, woodlands, nature areas and other green spaces. It can have a designed or cultural character. Only areas that can be entered by users are included” (Schipperijn, 2010, P.12).

According to Mensah, the term ‘green space’ most scholars interchangeably use green spaces with terms like ‘open space’ and ‘public open spaces’. These terms are loosely defined. The terminological usage of urban green space has subtle difference and he explains that “green spaces in urban areas cover all areas that to some extent have some vegetation either natural or artificial. It is not only limited to urban parks and gardens. It covers land that is made up mainly of unsealed, permeable ‘soft’ surfaces such as soil, grass, shrubs and trees which are privately or publicly accessible or managed” (Mensah, 2014, p, 2).

Mensah further by synthesizing the studies of other scholars like swanwick further succinctly elaborates that urban areas consist of a ‘built environment’ and ‘external environment’. In the case of the external environment, it embraces ‘green spaces’ and ‘grey spaces’. The green spaces may tend to exhibit linear shapes often aligned to roads and railways. Such include semi-natural like wetlands, woodlands. It also includes functional which includes church yards, schools, cemeteries and amenities like gardens and parks. The second entity is the ‘grey space’ that covers land that is sealed like asphalt and concrete. The grey spaces are sub-divided in to two, namely functional grey spaces like roads, railways, car parking lots. The civic grey spaces include city squares, plazas. In view of this Mensah states that “open spaces consists of both green and grey spaces, consequently green spaces are subset to open spaces “ (Mensah, 2014).

Mell regarding green infrastructures compares and contrasts a number of definitions and cites the definition given by the countryside agency of 2006, “Green infrastructure comprises the provision of planned networks of linked multifunctional green spaces that contribute to protecting natural habitats and biodiversity, enable response to climate change and other biosphere changes, enable more sustainable and healthy lifestyles, enhance urban liveability and wellbeing, improve the accessibility of key recreational and green assets, support the urban and rural economy and assist in the better long-term planning and management of green spaces and corridors. Countryside Agency” (Mell, 2010).

Regarding the three definitions for the three terms which are often interchangeably used, it is imperative to discern the concepts what makes them similar and different. Mell states that green infrastructure has developed conceptually as a spatial landscape planning for the management of green spaces and intends to link green infrastructures, spatial planning and environmental perception. The scope of green infrastructures in the definition is broad and it looks so all encompassing. It should be narrowed and focused and it has to lend itself that it is feasible.

In Schipperijn's definition, green spaces are considered as if they are only publicly owned; however, there exist green space that is privately owned and accessible to users. Secondly, in the definition, open spaces are considered as subsets to green spaces. In other literatures, for instance, Mensah categorizes green spaces as subsets of open spaces, (Mensah, 2014). Thirdly, the definition is restrictive by considering green spaces only those that is publicly accessible. Despite this, there are urban forested areas that are considered as enclosures prohibiting access to the public which are beneficial to urban population except their recreational benefit. In order to discern the subtle yet marked difference between open space and urban green space, it is imperative to give a succinct account on 'hard and soft land'. According to Dunnet, soft are usually permeable and are necessarily unsealed, such as soil, cover types like grass, shrubs, and trees. Hard surfaces are those that are impermeable and necessarily sealed, such as concrete or asphalt-tarmac, (Dunnet, 2002). Open spaces harbour both hard and soft surfaces, meaning both green spaces and built up infrastructures for public use. Therefore this makes urban green spaces to be subsets of urban open spaces. Green spaces can be defined as planned urban spaces occupied by cover types like forest, woodland, shrubs, grasses, parks, gardens, church yards, cemeteries, wetlands, permaculture and that cater environmental, health, social and economic benefits to urban inhabitants (Dunnet, 2002., Mensah, 2014., Schipperijn, 2010).

Forms of green spaces include:

- Afforested areas for environmental protection and hedonic objectives (beautification);
- Natural forests, parks and forests for eco-tourism;
- Forests and rangelands fringing urban areas;
- Public and private tree plantations on vacant spaces;
- Public green for instance green parks, botanical garden, recreational gardens, outdoor playing fields;
- Street trees, designated parks;
- Semi- private spaces that includes green space in residential, institutional and industrial areas.

## **2.2 The Benefits of Green Spaces**

### **2.2.1 The Environmental Benefits of Green Spaces**

#### **A. Buffering Urban Heat Island Effect**

Fam's scientific discourse shows that, there are two ways by which green spaces can neutralize the urban heat island effect. Forest canopies modify air temperature. Their canopies have a shade effect by preventing solar influx heating the surface. The second is cooling of the air through evapo-transpiration. Fam states that, "a single tree behaves as a perfect air conditioner" (Fam, 2008). Pakoradi cites a live empirical study carried out in



Czech Republic. Pakoradi states that “a canopy having a diameter of 10 m constituting trees that are larger in size can transpire 400 liters of water per day. The latent heat exchanged for a single tree stand was calculated to be 278 Kwh and the cooling efficiency was calculated to be 23 Kwh with in a diel i.e., 24 hours duration” (Fam, 2001).

Studies carried out by Tibbatti show that the role of green spaces in carbon sequestering is significant. Urban green vegetation act as a sink by sequestering carbon dioxide in their biomass. According to Tibbatti, “large trees can reduce carbon dioxide emission by 2-3% and the shaded soil below the canopy also sequesters carbon dioxide. The combined effects can offset carbon dioxide emission in cities, thus eventually mitigates the heat island effect in the urban core” (Tibbatti, 2002).

Legesse from his practical research done on 21 parks in the city of Addis Ababa testifies the role of urban green spaces in the reduction of heat island effects. Legesse also cites from other studies like Shashua-Bar, that were carried out applying ground-based air temperature measurement and which ascertained that parks impart cooling effect in the range of 1°C to 7 °C, (Shashua-Bar et al, 2009). A research carried out in 2010 in 21 medium parks in Addis Ababa using thermal infrared remote sensing, Legesse has confirmed that “Parks Cooling Intensity (PCI) and Park Cooling Distance (PCD) showed variation in shape and size. Elongated parks did exhibit lower PCI and PCD than compact and large parks” (Legesse, 2014).

Asmelash discusses on the negative impacts of urban green spaces on urban temperature. Asmelash scientific discourse shows that some forest species types are causative agents for the formation of O<sub>3</sub> which is toxic and a GHG emitter. Volatile Organic Compounds that emit chemicals like resins, oil and monoterpenes are used by the plants to attract pollinating and repel predating insects. However, these compounds are the main causes of photochemical smog and O<sub>3</sub> formation (Asmelash, 2012). Even though green spaces do have a buffering effect on urban heat island, however, well thought generalization is imperative. The heat buffering effect is a function of forest species types, morphology, size and density of the green spaces. Green spaces having large, dense, circular, broad leafed canopy are efficient coolants by avoiding heat stresses to maintain the well being of urban inhabitants (Asmelash, 2012).

High temperatures in urban core (Urban Heat Islands) sometimes heat waves affect the health, human comfort and activities. Urban warming also contributes to air pollution and tropospheric ozone formation which is toxic and a greenhouse gas. It is true that the shedding effect of canopies do play a significant role by inhibiting direct solar influx reaching the surface which otherwise may lead the surface to play its blackbody role by absorbing solar radiation and subsequently emitting thermal playing a *‘positive feedback’* i.e., leading to urban warming.

## **B) Water Pollution Purification and Flood Management**

Asmelash states that green infrastructure as interceptors of storm water act as ‘surface detention’ by retarding the surging overland flow (runoff) and facilitate pollutants percolation through soil pores. The subsequent decomposition and uptake by plant roots makes them as natural filters. Asmelash states that well thought and properly designed vegetal bio-retention sites sometimes called as ‘rain gardens’ can sieve and trap nearly 99% of common pollutants (Asmelash, 2012). Asmelash also narrates that during wet seasons, green spaces to the

greatest extent impede the combined sewage overflow i.e., the industrial waste, the untreated human waste in mix up with storm water in a pulsating flow. Therefore, green spaces impede combined sewage overflow from polluting urban streets, residential quarters and commercial centres.

Asmelash studies also show that, owing to vegetal clearance, which could have possibly served as natural filters, instead the streams in Addis Ababa are grossly polluted. Point sources or areas abutting industries, the Biological Oxygen Demand (BOD) 4 047 mg/l while the Chemical Oxygen Demand (COD) is 14 702 mg/l. Vis avis the permissible level of 80 mg/l. The amount of Suspended Solids (SS) in the streams of Addis Ababa on the average is 1 563 mg/l Vis avis the permissible amount of 100 mg/l. Owing to vegetal clearance which could have filtered out pollutants, instead the rivers of Addis Ababa are grossly contaminated with microbial life forms like virus (hepatitis) and bacteria like (E-coli). Asmelash indicates that the E-coli contamination is beyond the permissible dose reached from 30 to 100 000 000 mpn2 / 100 ml, Vis avis a clean water of 1 to 2 mpn (Asmelash, 2012).

### **2.2.2 Social Benefits**

#### **A. Socialization and Cognitive Development**

Coombses on the social significance of green spaces, his studies shows that play grounds within green spaces enhances children's cognitive capacities, emotional resilience and socialization. The availability of green spaces enhances social interactions. Tracing back the studies done by Kim and Kaplan in 2004, Coombses states that, the availability of green spaces in residential areas strengthens community bondage (Coombses, 2010).

#### **B. Health Benefits**

Coombses regarding the health benefits of green spaces discusses that urban air quality is usually poor. This is ascribed to the increased number of motorized vehicles, industrial chimneys, septic tank vents, dusts, domestic, commercial waste pump solid and liquid particulate matter (aerosol) and microbial pathogens in to the atmosphere. Noxious gases like CO, O<sub>3</sub>, CO<sub>2</sub>, SO<sub>2</sub>, and solid particulates like Pb, formation of photochemical smog make urban inhabitants vulnerable to allergens, respiratory diseases like asthma and bronchitis. According to Tibbatti, urban woodlands can scale down the amount of SO<sub>2</sub> and NO<sub>2</sub> by 4 to 5 % (Tibabati, 2002). Particulate Matter both solid and liquid commonly called as PM 10 and PM 2.5 (10 and 2, 5 µm) if inhaled, would cause serious respiratory problems. Tree canopies as natural filters sieve and sift particulate matter from urban air, thus maintain air quality.

Coomb's scientific observations show that, the salubrious healthy living conditions offered by green spaces to urban inhabitants if monetized would to the greatest extent reduce government's expenditure of health budget. For instance Coombs has estimated the monetary expenditure of the government of UK that, if 24 % of the population were active and the whole population had equal access to green spaces, the life 'cost averted saving' would reach £ 2.1 billion per annum ( Coombses, 2010).

Coombses relates the benefits of exercises for the reduction of cardio vascular disease by green spaces. The presence of green spaces in the vicinity of residential quarter prompts people for physical exercise and for recreational pursuit. Physical exercise in green spaces helps urban people to prevent themselves from maladies like, obesity, diabetes, cancer, asthma, cardiovascular diseases (CVD).An increment of distance of living site from green

spaces increases the potential to risk of the incidence of Cardio Vascular Disease (CVD) and other health related variables (Coombses, 2014).

Cicea's observation on green space benefit on economy exhibits that saving health budget through a reduction or avoidance from payment for diagnosis, treatment, compensations for sick leave and absenteeism from work site are benefits if quantified in economic terms. Cicea comparing a person that performs physical exercise and a sedentary one relates that the medical expense of the sedentary is higher and an investment of \$ 1 in physical activity leads to \$3, 20 in medical cost saving (Cicea, C. and Pîrlogea, C., eds., 2011). Taking frequent aesthetic exercise in green spaces minimize stress, attention deficit and mental fatigue, thus green spaces enhance the mental and physical well being of urban dwellers.

### **C. Educational Benefits**

O'Conner underscores green space for instance like parks have education benefits. Green spaces can serve as open door laboratories for students practically to learn the social, economical and environmental services that they render to the society. Green spaces can serve as an object of study for researchers (O'Conner, 2005).

### **D. Heritages of Culture**

Conner's observation indicates that green spaces like parks cater to community's vantages through the maintenance of heritage of a specific culture by keeping the pristine status of the environment and letting the communities meet and carry out their cultural practices. Parks also serve as nodal junctions of different cultural backgrounds. Thus, green spaces give the opportunity to people of diverse culture to know each other. Therefore, green spaces like parks serve as heritages of culture (O'Conner, 2005).

## **2.2.3 Economic Benefits**

### **A. Land and Immovable property values Elevation**

According to Macer and Fawcett, the economic vantages of green spaces are secondary (derived) vantages from the direct social and environmental benefits that are monetized to estimate and express the opportunity cost in monetary forms. Residents in urban areas usually exhibit a willingness to pay even a premium for immovable properties abutting green spaces. This is ascribed to the higher hedonic prices associated with green spaces. Macer also cites an elevated property values that reach nearly 3% to 5% within the vicinity of high quality park (Macer, G. and Fawcett, G., 2012).

Cicea, C. and Pîrlogea, assertively have stated that the housing and land values are higher by 8% to 20%, yet people show a willingness to pay for the presence of park, school and a police station. Green spaces tend to increase revenue from land market like real estate (Cicea, C. and Pîrlogea, 2011).

### **B. Tourism Promotion**

**Cicea**, affirms that green spaces play important role in tourism, in the meantime increase Gross Value Added taxes that green spaces influence through urban tourism, shopping, generation of public services, selling of cultural artefacts and traditional clothes, hotel

catering. Thus, tourism boosts hard currency income from international tourists and income from in (home) tourists. Therefore, green spaces boost revenues for state budget.

By and large, green spaces do have environmental, social and economic benefits, which we call ecological service. On the other hand degradation of green spaces means losing those services in which some of them are very critical for life. Man's existential angst resulted from the destruction of vegetal cover leading in him to an unsafe environment. In view of this, studying green economy, green spaces have been a research and policy agenda.

#### **2.2.4 The Socio-ecological Factor for the Use of Green spaces**

Schipperijn in his 'Socio-ecological framework' on what influences the use of a green space from his case study in Odense (Denmark), he accounts as follows. His case study on factors determining the use of urban green spaces by user communities, he based on four research questions identified that in the frequency of use of urban green spaces. Pertaining to factors that have controls on the frequency of use, the nearest green space he identified that, age, distance to the nearest Urban Green Space and self evaluated health had significant value for the frequency. In relation to size of the green spaces, his studies shows that the nearest green spaces having a size of greater than 5 hectare have frequent users than green spaces with 1 hectare area.

With respect to time spent in UGS, by users, the study identified through so-called compensation theory that if the UGS is far from the user community stays long time in the green space. On the other hand, if the UGS were in close proximity, they don't stay long in the green space. The studies salient point is that, UGS planners must consider the nearest neighbour (Euclidian) meaning the centroid concept while planning Urban Green Spaces.

### **2.3 Urbanization Complexities on Green spaces**

According to Mensah's, case study of Kumasi; the second largest city of Ghana, states that "Urbanization has been increasingly a predominant factor in imparting stress on urban green spaces. Urban core densification, horizontal sprawl, water and air pollution, liquid and solid waste management, rampant sporadic squatted settlements, especially green space depletion have been some of the problems associated with urbanization, (Mensah, 2012).

Employing Remote Sensing, on time series satellite raster data, Bhaskar has done a case study of Pune city (India). A multi-date change detection on the Land Use Land cover of Pune city showed that urban built up areas have been increasing at the expense of green spaces. Bhaskar states that "urbanization and coupled increasing population growth imparted an escalating demand for residential quarters. This had taken its toll on urban green spaces, arable land converting in to residential complexes and shopping molls, turning river beds in to slums, even encroaching on vegetated hills" (Bhaskar, 2012).

Urbanization has a dual nature, both a blessing and a curse unless rationally managed. Urbanization has its negative externalities sometimes not only local implication, but a global spill over effect. Rapid urbanization has been showing a bad scenario of changing green space and blue space with brown and grey spaces.

## 2.4 The Contingency and Modern Management Theories

Concepts are derived from grand theories. In view of this, two grand theories were inferred, namely the contingency and modern theory.

- A) The Contingency Theory.** –Just before advent of the ‘modern approach to management’, the ‘theory of system and contingency of management’ used to be the most dominant theory in the 1960s. This theory advocates that human or social factors alone should not be considered as the decisive factors in organizational effectiveness. The proponents of contingency theory viewed organizations as complex system of task, technology and people. According to the comments of Cole on the proponents of contingency he states that “Human or social factors alone are not the most important consideration in achieving organizational effectiveness. Organizations are part of a larger environment which they interact and in particular are affected by technical and economical factors, just as much as social ones. Organizations are open-socio-technical system” (Cole, 2004, P, 5).

Pertaining to the contingency theory, so long as organizations are considered as an ‘open system approach’, which the proponents of the theory argue that, there is no a single theory that warrants for the effectiveness of an organization. Management has to blend theories to meet its specific internal and external needs at a particular period in its life.

- B) The Modern Management Theory.** - The central tenet of modern management theory is organizational effectiveness focused on strategic issues. As per Cole’s comment on the modern theory, he states that “effectiveness implies more than just efficiency, which is concerned with doing things right with minimum expenses. Effectiveness is primarily a question of doing the right thing, even more than performing them efficiently” (Cole, 2004, p, 5). The principal focus of modern theorists is developing strategies for organizational excellence, instilling values (doing the right thing) managing impending changes, instilling Total Quality Management (TQM, conducting personal empowerment for decision making, relationship and involvement of stakeholders in the management processes. In short, consultative, collaborative and empowered participatory approaches are very central for a consensus based decision making in which stakeholders internalize common agenda.

## 2.5 The Concept of Green Space Management

To define urban green space management, the definition of Jansson has been chosen in view of the fact that, he had referred 60 literatures just to define urban green spaces. In order to define, he uses the term landscape which encompasses urban green. As per the definition of Jansson, “Green space management may be regarded as the activities performed by a management organization in order to maintain develop urban green spaces (Jansson, 2012, p, 142). Management includes institutions and people (actors). Management is not only concerned with activities on the operational level of work, but it also includes the technical, biological and human relation aspects, especially collaboration and communication.

Management as an activity is concerned about three levels of activities, namely strategic, tactical and operational. At the strategic level, the activity is concerned with allocation of the necessary resource, formulations of objectives and setting targets, fixing time frames

for the subsequently operational level for tasks to be performed. In the tactical level, the strategic and operational levels are brought together.

Management encompasses both strategic and operational level, while maintenance is more limited to technical level. Management is more dynamic and progressive and creative compared to maintenance (operation), the latter which deals with preserving, therefore it is conservative in the context of concept. All activities executed at operational level are the ones planned at the strategic and tactical level.

Based on Jansson's green space management concept, "at the management level, through a participatory communication with the local community effective green space management can be achieved. User participation is an important component. Increased participation necessitates new management process which entails changing power relations between users and providers. Some of the mechanisms in the interaction include flexibility, openness, Rights, Responsibilities and Restrictions, alternative styles of working" (Jansson, 2012). The management is also concerned with organizations and actors. It also makes dialog with user on a number of issues. At the operational all the gamut of work including park maintenance that include vegetal stewarding, useful gadgets in the green spaces. The green space management concept relates community participation with organizations mandated to steward green spaces which an effective governance system to sustainably manage urban green spaces.

Based on Keough and Blahna, collaborative involvement of stakeholders is very essential for a successful ecosystem management. They identified the critical factors for collaborative management. According to Keough and Blahna, "For a Balanced integrated economic, social and ecological goals, public inclusiveness or community involvement in the management process is essential. Empowerment of stakeholders for decision making based on consensus approach that entertains the view or opinion of all stakeholders during decisions is important. Collaborative stewardship of ecosystem, public involvement in the collection and sharing of information, incentives, especially financial stimulates stakeholders for a successful collaborative management are very central" (Keough and Blahna, 2005).

Molin and Konijnendijk studies discuss on "public involvement with respect to governance context that includes the structure, rules partnerships and processes that shape decisions about green spaces" (Molin and Konijnendijk, 2014). Green space governance is environmental governance yet shifting from municipal control to a management that consists of multiple actors. It is a co-governance of governmental and nongovernmental actors. This means municipal managers who used to work in a hierarchical and command method are supposed to adapt themselves with a consensus based decision making process with other actors (stakeholders). "The governance dimension of this relates to the structures, rules, partnerships and processes that shape decisions on green space maintenance" (Molin and Konijnendijk, 2014).

As per Molin and Konijnendijk, a Policy Arrangement Approach (PAA) is essential. It helps to analyze governance arrangements. The authors identify four dimensions that include "the 'actor dimension' (governmental and non-governmental actors). The second is the 'resource dimension' that refers to the relative power bestowed the actors including legal, financial and expertise aspects. 'The 'rules dimension' refers to the rules that must abide by the actors while playing their roles. The fourth dimension is the 'discourse dimension' that implies concepts and ideas that are produced by the actors to be transformed into practice" (Molin and Konijnendijk, 2014).

Keen observations show that, there exists a subtle yet marked difference between governance and management. Though governance is a co-management between governmental and non-governmental actors, its conspicuous identity is that, power is shared, decisions in all the processes is on a consensus bases, thus it is horizontal. In a co-governance green space management is out of the domain of urban municipalities. In the absence of co-governance, urban green spaces are under the domain of municipalities, decisions are top down or vertical. In developing countries where fast urbanization impart complexities in which problems override solutions, democratic cultures are not yet matured, the misconception of leaderships had gripped the minds as looking down others, pertaining to green spaces co-governance or governance is a possibility, but requires a transitional or quasi-governance where participatory management within the domain of municipality oversight yields an enhanced green spaces management. This further in due course of time develops in to a co-governance that is the true governance becomes a reality.

## **2.6 Community Participation**

According to Tufte and Mefalopulos, participation is defined as “the reach and inclusion of inputs by relevant groups in the design and implementation of a development project” (Tufte and Mefalopulos, 2009). The outcomes of a participatory strategy are impression of ownership of a given problem and predispose oneself to solve it. Participatory engagement yields an enhanced competencies and capacity. Participatory activities also influence an individual or a community.

Participatory activities of community are very essential for;

- The provision of effective basic services;
- Pursuing community advocacy goals by involving the community in public budgeting and empowerment;
- Surveillance and monitoring of progress on goal achievement i.e. performance evaluation.

As per Tufte and Mefalopulos, participation may take the form of consultative, passive, collaborative, or empowered participation. “The guiding principles of participatory communication are open dialogue, voice in engagement in solving a problem), action oriented awareness, trust” (Tufte and Mefalopulos, 2009).

The basic principles in participatory approach are inclusiveness, it is a voluntary engagement, and processes are transparent and fair. The purpose of participatory approach is:

- To improve service delivery.
- The purposes of public participatory approach are to increase the awareness through exchange of information and interactive learning.
- Enhances the provision of green space service deliveries;
- Local community participation in decision making and implementation processes poises the balance among different interests. It also strengthens transparency and accountability of decision making.
- In communities participation facilitates ease of conflict resolution.

- Green space management refers to those activities of a managing organization geared towards the maintenance and development of green spaces. Over and above this, participatory green spaces management incorporates institution, communities' even individuals. Management is not confined to the execution of planned activities, but it also includes technical, human relations, most of all communication and collaboration with stakeholders.
- Stakeholders' engagement in participatory green spaces management is important at three levels.
- Strategic and action planning;
- Operational and execution level;
- Performance evaluation level.

Participatory green space management involves the collaboration of stakeholders whose committed engagement is one of the determinants for sustainable green spaces management. The critical factors that make stakeholders involvement is to be determinant include:

- Balanced and integrated economic, social and ecological goals;
- Empowerment of stakeholders creates a consensus-based decision making processes;
- For a Collaborative stewardship of ecosystems;
- Public engagement in the collection and sharing of information.
- Public engagement in management processes.

## **2.7 The conceptual Framework for Participatory Green spaces Management**

Concepts are derived from the roots of 'Grand Theories'. For the purpose, two management theories, namely 'the contingency theory' and the 'modern theory' have been discerned to derive concepts. The contingency theory's central tenet is that, any organization as an open system is influenced by economic, social and technical factors. There is no a single theory that warrants success, therefore, it must blend theories for its internal and external needs. The modern theory advocates Total Quality Management, expressed through empowerment, creation of relations and involvement of stakeholders on the management process.

On green spaces management, Jansson had referred more than 60 literatures on participatory green space management. Pertaining to green space management, the definition on green space (Jansson, 2012, P, 142) has been utilized to abstract and present the concept of participatory green space management.

The concept of a participatory green spaces management may be understood as a function that involves a concerted effort of stakeholders. Participatory green space management underpins planning, organizing, coordinating and regulating of processes. It also underscores the importance of human relations, especially collaboration and communications for the synergetic effects geared towards a good stewardship of green spaces by way of maintenance



and development so that salubrious green spaces can sustainably render their economic, social and environmental benefits to urban inhabitants.

From the two grand theories (contingency and modern management), Jansson's elaborated discourse on green space management inferred from literature review, two major concepts have been identified for the conceptual framework. The 'decision making process' and 'participatory process' have direct bearing on the green spaces management of Addis Ababa.

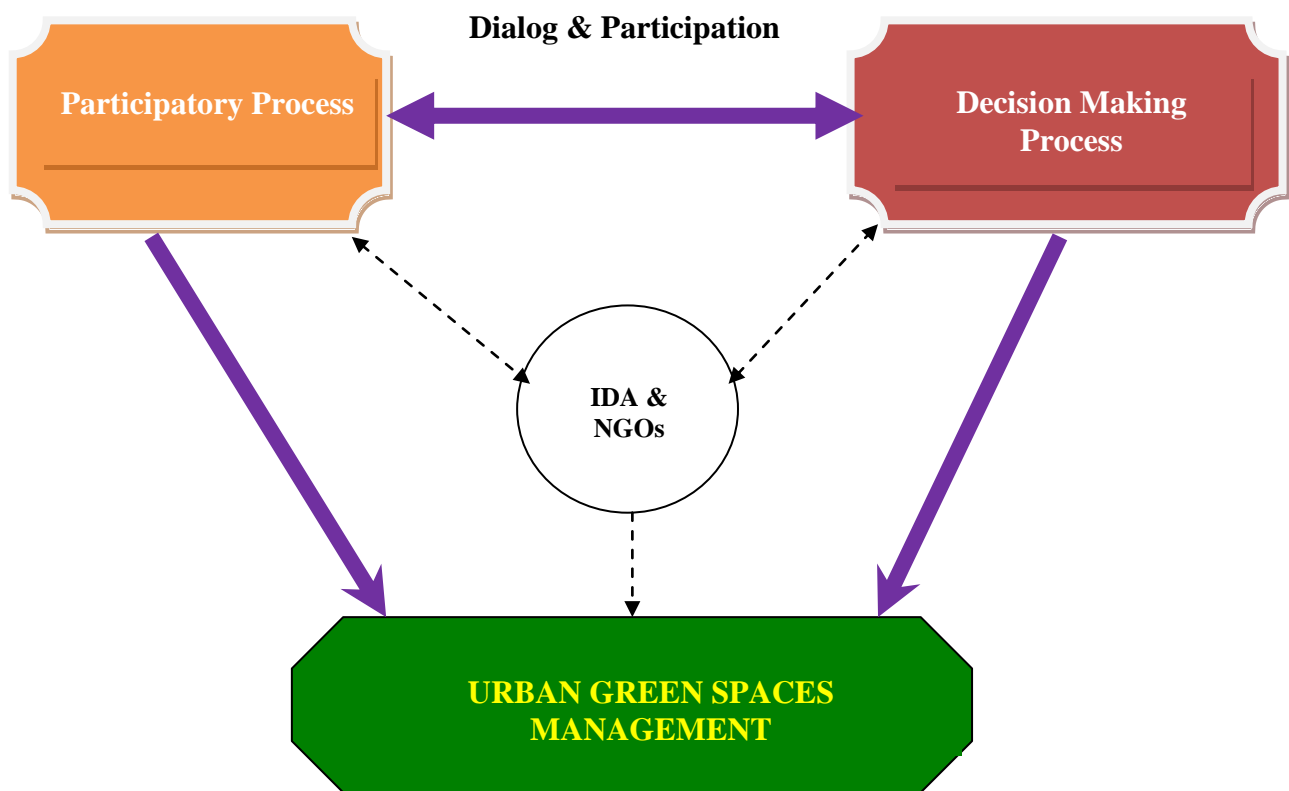
The 'decision making process ideally fits to assess the organizations mandated to steward the different green spaces in the city of Addis Ababa. The study would apply a 'three tier assessment system' i.e. at the 'decision makers' level' treats the green spaces management status at the level of policy makers (decisions makers). The second is at the 'the process owners level' that are the high level professionals usually directors of a certain process unit who usually work hand in glove with decision makers drafting strategic plans, also advise and mentor the decision makers. The third tier is 'the experts and the actual green spaces workers'.

Without the active participation of the community, Government alone can't properly manage the green spaces. The Green Spaces Participatory Management allows freedom to assess the degree of community participation in the green spaces management. How strong is the communication between the community and the authorized organizations? The assessment is not only the positive externalities, but the negative externalities imparted by the community on green spaces.

The participatory process dialog and communication with the decision making process has a contribution to the success of the decision making process. On the other hand the decision making process lending out itself in sharing information, practicing a consensus based co-decisions, cooperation and support, mutual support for a common cause improves the participatory learning of the community. The decision making process by involving the participatory process not enhances the management process, but reduces the negative externalities that can be played by the community that is involved in the participatory process when seen from the context of community's reciprocities.

The Green Spaces Participatory Management Framework also offers an opportunity to assess the different urban green spaces within the case study area, especially the parks, gardens, street trees, the forests, parks and area closures including the wetlands. The assessment would be observations taken by primary data sources using recent satellite raster data land use cover classification with ground truthing (field verification).

The International Development Agencies (IDA) and NGOs are included in the conceptual framework, because International Donor Agencies like the World Bank, IMF, Climate Fund, FAO, UNDP, UNEP, even Embassies have the potential to support urban green spaces both in terms of advocacy financial donations, capacity building, consultations, technical assistance, thus IDA (International Development Agencies) and NGOs are considered expedient to be included in the conceptual framework as a background contributors either financially or technically. The conceptual framework is shown in (Figure 2.2).



**Figure 2.2 the conceptual framework of Participatory Management of Greens spaces**

## **Chapter 3: Research Design and Methods**

### **3.1 Introduction**

This chapter treats the research methodology and the revised main and three sub-research questions employed in the study. It highlights how the research questions are further discerned through Operationalization by unpacking the variables and the attendant indicators to give a scientific recital account on how the pertinent data are collected and analyze to accentuate the validity and reliability of the study.

The principal strategy is a case study to be complemented by survey-based approach. The qualitative case study is based on semi-structured interview with key informants from Environmental Protection Authority (EPA), Beautification Park and Cemetery Development Agency (BPCDA), Ministry of Environmental Protection and Forestry (MEPF), Planning Sanitation Beautification Bureau (PSBB) of the Ministry of Urban Development Housing and Construction. The study would apply explanatory approaches, in so far as it seeks to answer the 'How' question. The case study uses a single embedded technique, because it considers Addis Ababa as a case and would acquire data from different key informants from the different stakeholder organizations. Personal observations and Remote Sensing technique would be applied for a Land Use change detection using time series satellite raster data (1986 and 2014). A classification based on ISODATA algorithm which is an unsupervised image classification approach followed by analysis on attribute information was employed to determine the green spaces spatial change and subsequently relate it with the status of green spaces management. Moreover qualitative data was acquired from different stakeholder organizations for analysis. To fill the pitfalls of case study strategy, a complementary survey based quantitative data was acquired through Cross-sectional surveys, single point in time (2014) from the 10 Sub-cities of Addis.

#### **3.1.1 The Revised Research Questions**

The main research question is, how does the level of stakeholder organizations and community participation in Green Space management determine the status of urban green spaces in Addis Ababa City?

##### **The Revised Sub-research questions**

1. How much green spaces in Addis Ababa have changed from 1986 to 2014 in Addis Ababa?
2. How organized and coordinated are the various stakeholder institutions engaged in urban green spaces management in the city of Addis Ababa?
3. How involved are the local communities in green space management in Addis Ababa?

### **3.1.2 Research Approach and Techniques**

This case study's qualitative approach had acquired data on a 'three tier system interview with decision maker's level, process owner's level and experts and park workers in four organizations. The organizations are mandated to manage the green spaces in Addis, namely the Addis Ababa Environmental Protection Authority (EPA), Beautification Park Cemetery Development Agency (BPCDA) and the Gulele Sub-city Beautification Park Cemetery Development Office (BPCDO) and Ministry of Environmental Protection and Forestry (MEPF). A survey strategy, cross-sectional survey single point in time (2014) was applied to supplement the case study so as to acquire data from the ten sub-cities of Addis Ababa for the subsequent triangulation. from the various responses on community participation in the greenery activity from the ten sub-cities.

In so far as it seeks to answer the 'How' question, the study would apply explanatory and exploratory approaches. As a complementary, quantitative data would be acquired through non-probability purposive (judgmental) sampling; a single point in time (2014) Cross-sectional survey type from the 10 Sub-cities. Qualitative data was acquired through interviews and quantitative approaches were applied through questionnaires for data acquisition by the researcher to accurately measure and describe the variables in order to achieve trustworthy results.

### **3.1.3 Operationalisation of Variables and Indicators**

Operationalization of the variables stems from the concepts of 'decision making processes' and 'participatory processes' which in turn emanated from the two management grand theories further augmented by discerning the different definitions on participatory green space management discussed in chapter 2. For 'Decision making process', and 'participatory process', the variables and indicators including the rationale for the choices have been exhibited in a matrix form in Table 1. To operationalize, the conceptual framework given definition, the concepts have been discerned and unpacked (unfolded) to smaller units or 'variables'. In order to select the corresponding indicator, three criteria were implemented.

- Measurability;
- Verification of its actionability;
- Whether it is leading to the identification of key issues of the respective research question.

Accordingly, for decision making process for instance for action planning information is very central for informed decision. For the assessment, both spatial and non-spatial information have been identified as variables. For information, four indicators have been identified and assigned. For decision making, the second variable chosen is resource that incorporates three sub-variables such as financial, man power (knowledge and skill) and technological. The third variable for decision making is environmental effectiveness that helps to assess how in the green spaces stewardship how frequently surveillance is being taken. For this variable, two indicators has been assigned i.e. .the frequency of green spaces maintenance and reporting and number of targets in the Action Plan accomplished with minimum resource expenditure. The fourth variable in the decision making process is the regulatory framework is Law enforcement which is very central to the management of green spaces. Two indicators have been chosen for regulatory framework, namely existence of environmental policies,

laws, regulations, and tree ordinances and number of targets in the action plan accomplished with minimum resource expenditure.

In a participatory management, the participation concept is identified to show how the communities are very central to a successful green space management and the intention is to operationalize and assess this independent variable. As per the conceptual framework, dialog and communication with the decision making process is important in green space management. For the participatory process, four variables have been identified, namely participatory performance, transparency, accountability and awareness as variables have been set with their respective indicators. For the variable participatory performance, performance index, number of periodic joint assessment on project performance, quality of services rendered and number of service complaints entertained. For variable transparency, two indicators have been set, degree of access to disclosed information, level of participation in financial, tender and procurement issues. For the variable accountability, the rationale for the choice is to assess how in the participatory decision each partaker is accountable. Three indicators have been set namely level and quality of participation in decision making, number of consistent & consensus based decisions taken and ensured complaint redresses. Awareness is very critical to minimize the negative externalities that can be played on green spaces and to raise the level of consciousness on action oriented green space participatory management to enhance their contributions to the management process, thus two indicators have been set number of awareness campaign and provisioned training to the community. The operationalisation of variables and indicators is given (Tables, 3.1, 3.2 and 3.3).

**Table 3.1 Operationalization of variables and indicators for research question 1**

RQ1	Concept: “Decision making Process” and “Participatory Process”			
	How much green spaces in Addis Ababa have changed since, 1986 till 2014?			
	Variable	Indicators	Data Source	Type of Analysis
1	Land Cover Changes	1. The percentage of green space lost from 1986 to 2014.	1.Secondary data (Addis Ababa Municipality Department of Master Plan Preparation)	Both .Qualitative & quantitative
		2..Level of awareness on the use of Land Cover changes	1. LULC change detection Thematic Map produced from satellite raster data of 2014 and 1986	Both .Qualitative & quantitative
		3.Quantity of spatial information for decision making process	(Addis Ababa Sub-city Administration)	1. Qualitative
		4..Frequency of Updating of existing Land Cover maps	(EPA, BPCDA,, Gulele Sub-city BPCDO, MEPF,BPCDO) 1.Secondary data (EPA, Addis Ababa Municipality Department of Master Plan Preparation)	1. Qualitative

Table3.2 Operationalisation of variables and indicators for research question 2

RQ2		Concept: “Decision Making Process”				
1. How organized and coordinated are the various stakeholder institutions engaged in urban green space management?						
		Variables		Indicators	Data Source	Type of Analysis
1	Information Sub-variable: SPATIAL		1. Percentage of green space to total urban area. 2. Quantity of ISO compliant spatial data available for decision making. 3. Access right available for spatial data		1.Interview with BPCDA, EPA, Gulele Sub-city BPCDO, Ministryh of Urban Development Housing and Construction’S PSBB.	1.Qualitative Analysis  2.Qalitative & Quantitative
	Sub-variable: NON-SPATIAL		1.Quantity of relevant information available for decision making		1. Interview with BPCDA, EPA & MEPF, PSBB,	1.Qualitative Analysis
2	Resource		1.The amount of budget allocated		1. Interview with BPCDA, EPA & MEPF, PSBB,	1.Qualitative Analysis
	Sub-variable	Financial	2.Quantity of funds-grants available			
		Human	3. Critical mass, Level of knowledge & skill		1. Interview with BPCDA, EPA & MEPF, PSBB,	1.Qualitative Analysis
		Material & Technical	4. Inventoried available logistics and equipment			
3	Environmental Effectiveness	1.Frequency of green spaces maintenance and reporting			1.Interview ( BPCDA, EPA & MEPF, PSBB,	1.Qualitative
		2. Number of targets in the Action Plan accomplished with minimum resource expenditure.			1.Interview ( BPCDA, EPA & MEPF, PSBB,	1.Qualitative
4	Regulatory Framework	1.Existence of Environmental Laws, Regulations, and tree ordnances.			1.Interview ( BPCDA, EPA & MEPF, PSBB,	1.Qualitative

**Table3.3 Operationalisation of variables and indicators for research question 3**

RQ3	1. Concept: “Participatory Process”			
	Variables	Indicators	Data Source	Type of Analysis
1	Participatory performance	1. Performance Index		
		2. Number of periodic joint assessment on project performance	1. Questionnaire (Addis Ababa Sub-City Administration)	1. Quantitative
		3. Number of networks for cooperation.	1. Interview	1. Qualitative 2. Quantitative
2	Transparency	1. Degree of access to disclosed information	1. Questionnaire (Addis Ababa Sub-City Administration)	1. Quantitative
		2. Level of participation in financial issues.		
3	Accountability	1. Quality of participation in decision making.	1. Questionnaire (Addis Ababa Sub-City Administration)	1. Quantitative
		2. Number of consistent & consensus based decisions taken.		
		3. Ensured complaint services rendered		
4	Awareness	1. Number of awareness creations campaigns taken	1. Questionnaire (Addis Ababa Sub-City Administration)	1. Quantitative

### 3.1.4 Data Collection Methods

Appropriate Primary and secondary data from pertinent sources is one of the fundamental tasks in research undertakings. In view of this, for the research, primary including satellite sensor data, qualitative, quantitative and secondary data collection methods were applied which together with personal observation were the main ingredients for triangulation. Regarding which research strategy, method and techniques were applied for study, it is exhibited in (Table 3.4).

**Table3.4 The research strategy, method and techniques applied**

Nº	Research Question	Research Strategy	Method	Technique
1	How much green spaces have changed from 1986 to 2014	1. Case study	Both Quantitative & Qualitative Quantitative (image pixel spectral reflectance) data for analysis. Qualitative: Image visualization	Remote sensing Image interpretation and analysis for Land cover change detection
2	How organized and coordinated are the various stakeholder institutions engaged in Greens space management	1. Case study	Qualitative	Structured interview
3	How involved are the local communities in Green spaces management in Addis	1. Survey	Quantitative	Questionnaire

The primary data were acquired through questionnaire, from the ten sub-city administrations. An interview was held with four organizations responsible for green spaces management, namely the Beautification Park and Cemetery Development Agency (BPCDA), and the Environmental Protection Authority (EPA) and The Ministry of Environmental Protection and Forestry (MEPF), the Gulele Sub-city Beautification Park Cemetery Development Office (BPCDO as a sample for the similar offices in the rest nine Sub-cities and the Planning Sanitation Beautification Bureau (PSBB) of the MUDHC. Primary data is acquired from thematic map produced from satellite raster data, having an accuracy test with Jeffries-Matusita Distance spectral separation in the classification was validated during ground truthing field works.

**Secondary Data.**-The secondary data, such as strategic planning, policy, proclamations, Memorandum of understanding, Terms of Reference, publications, articles, brochures, and reports were acquired in their soft copies from the organizations respective repositories.

### 3.1.5 Sample Size and Selection

In contrast to quantitative sampling where from sample frame you calculate for sample size, the sample size for qualitative data acquisition differs from quantitative data. This case study's qualitative data acquired through purposive sampling (judgmental) technique. For the case study, from a small homogenous group, tenable information was acquired. As a criterion, maximum heterogeneity observed during the interview. In view of this, an in-depth interview with respondents of the four government organizations on a 'three tier' approach i.e., at the decision making, process owner level and experts-Park workers level was conducted. A sample size of 20 was acquired for information saturation for the four government organizations. The quantitative sampling is to acquire response data for the participatory activities from the community based on a single point in time (2014) cross-sectional survey type from the 10 Sub-cities apportioning 10 samples for each Sub-city making a total sample size of 100. The qualitative, quantitative, secondary, personal observations, change detection through remote sensing technique had enabled the triangulation works for further analysis and subsequent validation and reliability works to ensure the trustworthiness of the study.

### 3.1.6 Validity and Reliability

Validity refers to whether the study measures or examines what it claims to measure or examine (Mathiyazhagan and Nandan, 2010). The research is a case study also complemented by survey-based quantitative approach. The construct validity in terms of content of the questionnaire, due prudence have been taken to avoid overlapping construct, maintaining continuous measurement, avoiding a single method for measurement and operational definition. The construct validity is achievable, in so far as the Operationalization of the variables under scrutiny, are treated by the number of questions asked in the questionnaire would cover all the relevant aspects to reach tenable results.

Reliability refers to how consistent a measuring device is. A measurement is said to be reliable or consistent if the measurement can produce similar results if used again in similar circumstances (Mathiyazhagan and Nandan, 2010). In the case study qualitative instrument, unlike the quantitative questionnaire has its own paradigm. In qualitative research, reliability



and validity are conceptualized as trustworthiness, rigor and quality in qualitative paradigm (Bashir, et al., 2008). In this study, multiple information acquisition techniques such as personal observation using remote sensing techniques with groundtruthing, credible information was acquired on the spatial extent of green spaces which were later easily related to the green space management.. The strategy is analogous to construct in construct validity for quantitative. Among the ten strategies for validation and reliability, the decisive ones include,

1. Prolonged and persistent field work (corroboration to ensure match between findings and participants reality);
2. Participant language verbatim accounts including record precise, almost literal, and detailed descriptions of people and situations.
3. Multi-method strategies, triangulation from different data sources, secondary, primary would ensure the validity and reliability of the instruments used.

The qualitative instrument would apply observation (including the application of remote sensing technique with the attendant groundtruthing), an in depth interview and recording that makes is valid and reliable and diverse construction), acquisition of primary data and secondary data with the subsequent triangulation were applied to ensure the credibility, trustworthiness of the research instrument, thus which had resulted in being valid and reliable.

### **3.1.7 Data Analysis Method**

To answer the three research questions, three methodical approaches were applied. In order to answer research question one, Remote sensing with its attendant image analysis based on pixel spectral statistical reflectance values were applied for the Land cover change detection employing a multi-date satellite raster data. To explain research question two and three, the study has applied a mixed strategy i.e. qualitative and quantitative approaches. Two data analysis methods were employed. For the quantitative data, the analysis was done using SPSS statistical software that requires encoding of data acquired in to numeric form for the subsequent statistical test. Later, oneway Anova statistical test was carried out with the subsequent Tukey post hoc and frequency analyses for the analytical outcomes. The qualitative data was analyzed employing the Atlas. Ti software. Furthermore, secondary and personal observations were incorporated and triangulated in which tenable results were obtained.

## **Chapter 4: Research Analysis and Findings**

### **4.1 Introduction**

This chapter dwells on explaining the factors related to urban green space management that leads to changes in the status of green spaces in Addis Ababa.

First, highlights on the succinct historical discourses on green spaces management in Addis Ababa are given. To reach at tenable results, with respect to the research questions of this study and the methodical approaches discussed in chapter 3, first the status of green spaces were determined employing Remote sensing technique. This is to answer the first research question ‘how much green spaces in Addis Ababa have changed from 1986 to 2014. The main reason for choosing the time was the availability of Landsat TM data which was by far better in its spatial resolution than the Landsat Multi- spectral scanner which had a coarse resolution making quite unfit for the study. The image analysis indirectly has shown the status of green space management in Addis.

Before treating research question 2 and 3, background information has been given to acquaint which organizations are currently managing the green spaces in Addis Ababa. Sequent to this, the status of Participatory Green spaces management in Addis are presented to seek the answers for the research questions posed in research question 2 and 3. Research question 2 is intended to assess the stakeholders’ participatory engagement in green spaces management while research question 3 is to overhaul how organized and coordinated are the various stakeholder institutions engaged in urban green space management in Addis Ababa and the involvement of the local communities’ participation in green spaces management. The analyses in research question 2 and 3 are through quantitative analysis using SPSS and qualitative analysis using Atlas ti on data acquired during field work. Supportive secondary data and personal observations were also incorporated and triangulated for evidenced and cohered analytical outcomes.

### **4.2 Background on the Green spaces Management in Addis Ababa**

The Addis Ababa Forest formerly was under the ‘Addis bah’ forest enterprise, now it is under the Ethiopian Heritage Fund. The Addis Ababa Parks and gardens are being administered and managed by the Beautification, Parks and Cemetery Development Agency (BPCDA). The agency was formerly called as the Sanitation, Beautification and Park Development Agency (SBPDA). The agency was re-established by proclamation 15/2009 by the Addis Ababa City Government executive and municipal service organ. Prior to the establishment of the agency, green spaces used to be managed at a Team management level under various service sections of the municipality, such as Natural Resources Protection and Health Office.

The Beatification, Park and Cemetery Development and Administration Agency is duty bound to:

- Administer and develop the city’s zoo, recreational and closed parks, cemeteries and so called ‘river buffer zones’ astride rivers channels, a 25 meter protected Green spaces;
- Administer and develop new parks, city plazas;

- Contract out or outsource green spaces to private developers, render services on payment bases for instance ground tennis court for sports and ceremonial processes such as wedding.
- Provide awareness to the green space beneficiaries in order to protect the parks from abuse.
- Draft regulations that are consistent with the Ministry of Environment Protection and Forest.

The agency has its offices in each of the ten sub-cities and Wereda. Wereda is the lowest unit of administration. The Wereda administrative unit carries out the protection of not only green spaces, but also areas designated for green spaces from squatting and conveys the information to the Sub-city Beautification, Park & Cemetery Development Bureau which is responsible for green spaces management in Addis Ababa.

Currently there are nearly 16 parks in Addis. This number increases with the development of new parks. Among the 16 parks, Park Africa in the Kirkos sub-city and the Ethio-Cuba memorial park in the Lideta sub-city had already been outsourced to private developers. The Yeka and Ferensay legation parks are being administered and managed by the Yeka Sub-city administration. The Bhare Tsige is managed by the Nifassilik lafto sub-city. The peacock park is being administered by the Bole Sub-city administration. The Gola Park, see (Figure 4.3) and Teklehaymaanot parks are being administered by the Lideta sub-city administration. The Ambassador and the Anbassa gibi are managed by the Arada sub-city administration. The Kolfe parks are administered by the Kolfekeranyo sub-city. The Millennium Park is managed by the Akaki sub-city and finally the three; the Hamle 19, the Korean memorial and the Sheger parks are managed and administered by the Gulele sub-city administration.



**Figure4.3 The Gola Park in the Lideta Sub-city Administration**

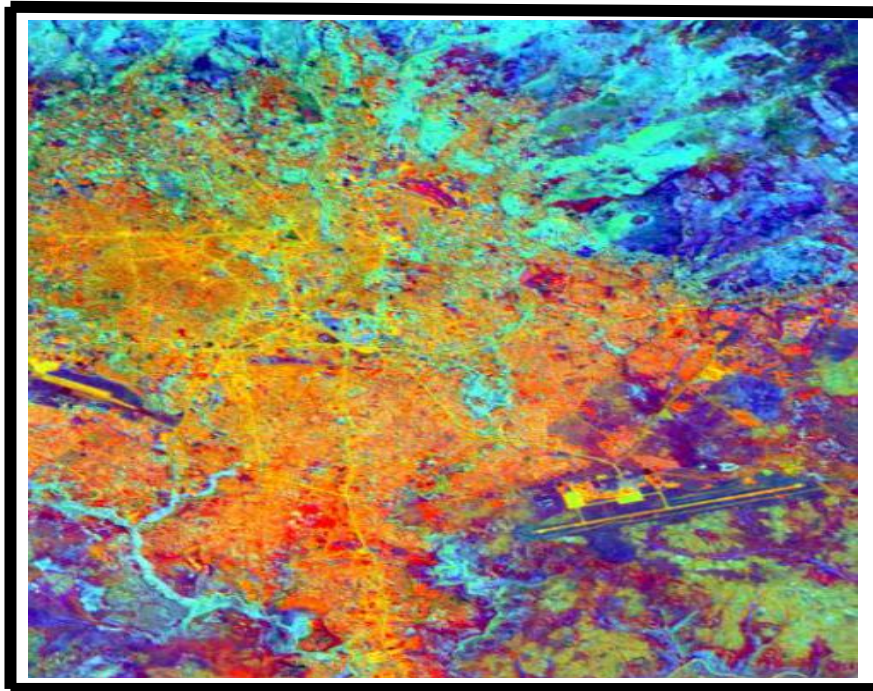
### **4.3 Green spaces status identification employing Remote sensing Technique**

In order to determine how much green space in Addis Ababa have changed since the last 28 years posed in Research Question 1 'how much green spaces have changed since 1986 till 2014 in Addis Ababa?', Remote sensing technique was applied for a change detection study. Remote Sensing is the acquisition of data using sensors that have no contact with the object of investigation. Remote Sensing is not only confined to the acquisition of data, but it also includes the subsequent digital image analytical activities for the extraction of meaningful information on natural resources, in which green spaces constitute a part. The outcome of the digital image analysis works would answer sub-research question 1.

#### **4.3.1 Change Detection Using Remote Sensing Technique**

Change detection is one of the strongest assets of Remote Sensing. In view of this, to determine the status of green spaces from 1986 to 2014, a multi-temporal Landsat sensor data were employed for digital analysis. Landsat sensor data has a 30 m x 30 m spatial resolution. Albeit its medium resolution, it is quite fit enough for the assessment of the city wide green spaces change from 1986 to 2014 in Addis Ababa.

According to Landsat WRS (World Reference System), Addis Ababa city falls within the 168 path by 054 Row. The sub-scenes of Addis using the current boundary were extracted from full Landsat scenes. Pre-image classification, a Tasseled Cap Transformation (TCT) algorithm was executed in order to digitally discriminate the wetland, bare land and green biomass. Six-TM bands of Landsat except the thermal infrared were used for the Tasseled Cap Transformation band combination. The thermal band was excluded for its coarse spatial resolution (120 m by 120m). The TCT (Tasseled Cap Transformation) helps to visually discriminate the three features on the image. The output of TCT is shown in (Figure 4.4).



**Figure 4.4 The Tasseled Cap Transformation for the city of Addis Ababa**



Unsupervised classification was executed using ISODATA (Iterated Self Organized Data Analysis and Transformation Algorithm). Five major land cover types, namely Green spaces, dense settlement, settlement, Agricultural area & exposed soil and Bare land were identified. The ISODATA is a parametric classifier that runs on six iterations to classify pixels based on their spectral reflectance statistics. Knowledge of the City and Grountruhting done during the field work in Mid-June 2014 had greatly facilitated the feature identification works. The image classification outputs are given in (Figure 4.5 and 4.6). The attendant attribute information containing the spatial extent (area) is given in (Table 4.5 and 4.6). In the classification, settlement was considered as Dense settlement and settlement for their density variations to avoid so-called ‘mixels’ or mixed pixels that create mixed classes. Later, for the estimation of their spatial extent, Dense settlement and Settlement were merged as Built-up area.

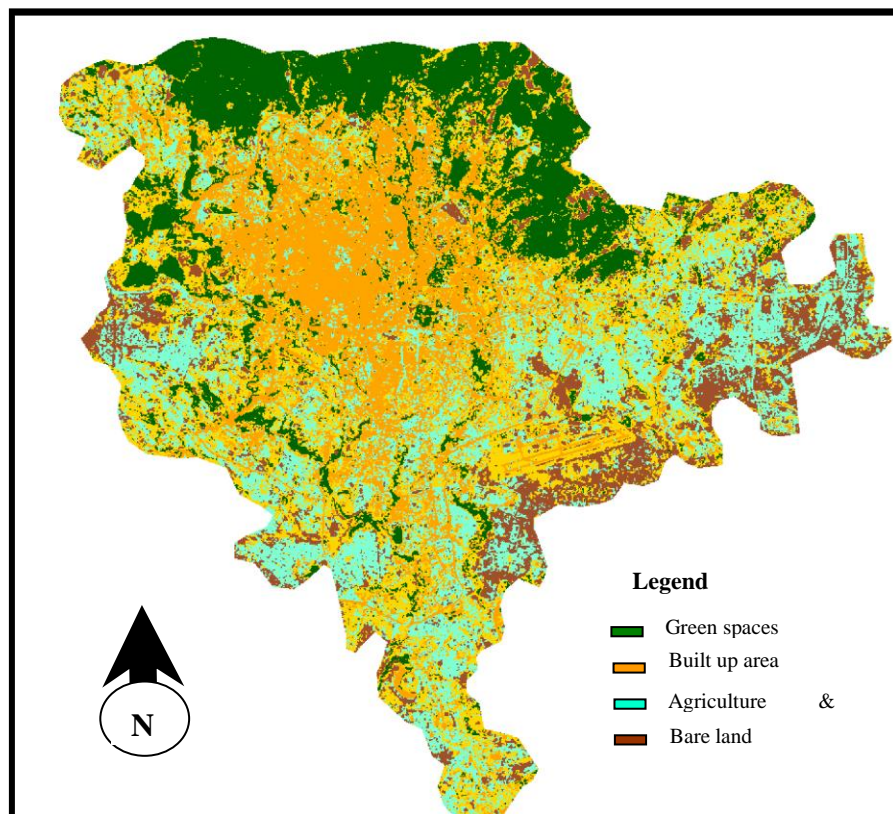


Figure4.5 map showing the extent of urban Land cover types of Addis Ababa in, 1986

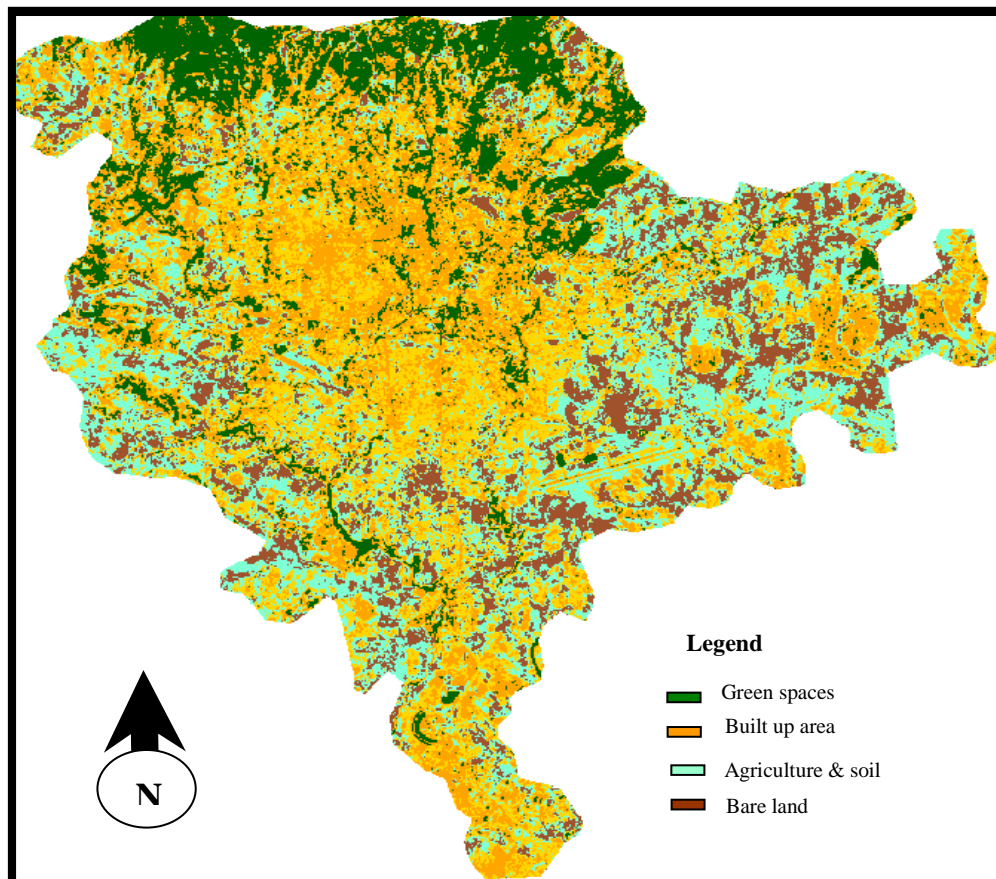
Table4. 5 The spatial extent of Land cover classes in Addis, 1986

Row	Class Names	Area	Colour
0	Background	30436.4	
1	Green spaces	5468.22	
2	Dense settlement	6485.13	
3	Settlement	7501.77	
4	Agriculture & Exp.soil	6475.14	
5	Bare land	3631.68	

Based

on the

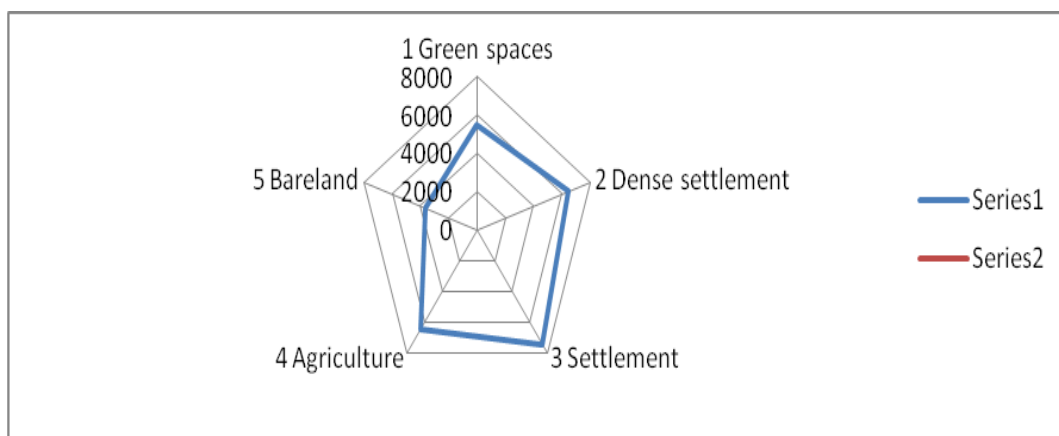
pseudo-colour assignment of classified thematic maps, the deep green represent green spaces. The northern ridge bounding Addis called the ‘Entoto’ ridge is the urban forest of Addis was well vegetated in 1986. However, after 28 years, it has lost some of its forest covers and bold watershed developing can be observed in the image. The same is true of the vegetal cover loss over the city in general. On the other hand, the orange colour represents the built up area. It has significantly increased its spatial extent in 2014. The attribute information is presented in a radar diagram; see (Figures 4.7 & 4.8) including their difference in (Figure 4.9).



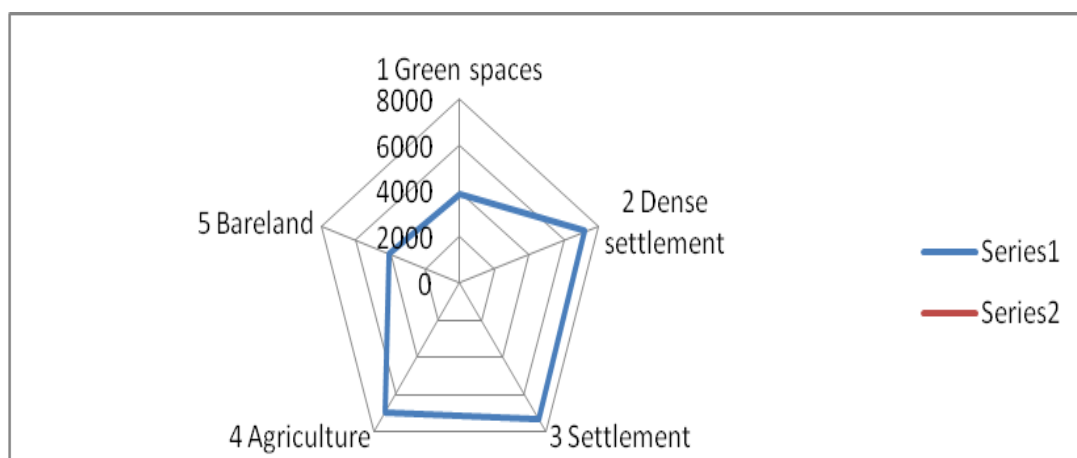
**Figure4.6** map showing the extent of urban Land cover types of Addis Ababa in, 2014

**Table4.6** The spatial extent of Land cover classes in Addis in, 2014

Row	Class Names	Area	Colour
	<b>Background</b>	30436.4	
1	<b>Green spaces</b>	3846.51	
2	<b>Dense settlement</b>	7255.44	
3	<b>Settlement</b>	7385.31	
4	<b>Agriculture &amp; Exp.soil</b>	6986.61	
5	<b>Bare land</b>	4088.07	



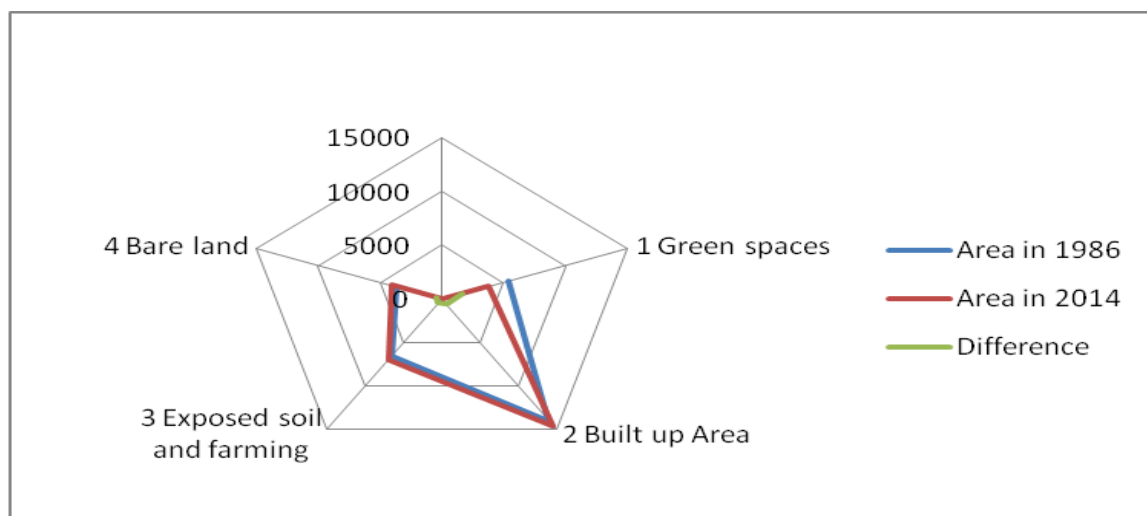
**Figure4.7 The relative area extent of Land cover types of Addis in, 1986**



**Figure4.8 The relative area extent of Land cover types of Addis in, 2014**

**Table4.7 The difference in the area extent of the Land cover types from 1986 to 2014**

№	Name of the Land Cover Type	Area in 1986	Area in 2014 Unit in ha	Difference	
1	Green spaces	5468.22	3846.51	-	1621.71
2	Built up Area	13986.90	14640.75	+	653.85
3	Agriculture & Exposed soil	6475.14	6986.61	+	511.47
4	Bare land	3631.68	4088.07	+	456.39



**Figure4.9 The difference in the area extent of Land cover types from, 1986 to 2014**

Dense settlement and settlement were merged as Built up area and the attribute information derived from the classification of 1986 was 13986.90 ha and in 2014 was 14640.75 ha. Green spaces coverage in 1986 was 5468.22 ha, in 2014 3846.51 ha. Agricultural & Exposed soil in 1986 was 6478.14 ha and in 2014 was 6986.61 ha and finally, Bare land constituted 3631.68 ha in 1986 and in 2014 was 4088.07 ha, see the spatial extent differences in (Tables 4.4).

For research question 1, there is one variable 'Land Use-Cover changes and four indicators incorporated in the variable 'Land Cover-changes'.

The image classification output had yielded the attribute information, particularly the spatial extent differences through temporal variations.

1. The total area of Green spaces in 1986 was 5468.22 km<sup>2</sup>, by the year, 2014 it shrunk to 3846.51 km<sup>2</sup>. The Green spaces area within the time span of 28 years had shrunk by 1621.69 ha.
2. The total Built up area in 1986 was 13 986. 90 ha, yet the spatial extent of Built up area increased and reached 14 640 ha, thus the Built up areas gained a total of 653.85 ha.
3. The Land Cover Agriculture and Exposed soil had an area of 6475.14 ha. Exposed soil had increased in area; reached 6986.61ha in 2014. Agriculture & Exposed soil gained a total of 511.47 ha. This is ascribed to the fact that once vegetated turned out to exposed soil.
4. Bare land had an area extent of 3631.68 ha in 1986, and had expanded in extent and reached 4088.07 ha in 2014. As a result, Bare land had gained an area of 456.39 ha.

The first research question's variable 'Land Cover changes' indicator 1 is intended to find the loss of green spaces from 1986 to 2014. In view of this, taking 1986 as a reference year and 2014 has a terminal year of analysis; the total area of green spaces in 1986 accounted 5468.22 ha. It reduced in 2014 by 1621.69 ha. This accounts for a total of 30% Green spaces loss in Addis Ababa.



Indicator 2 is to determine the percentage of green space to the urban area for the terminal year of analysis. Even though the Boundary of Addis Ababa is frequently changing, however, for practical purposes, it is considered to be 54 000 ha (540 km<sup>2</sup>). Accordingly, the percentage of green space to the total area of Addis was, merely 7% for the terminal year of analysis.

From the Remote sensing image analysis attribute information, it is evident that the Built up area had increased by 653.85 ha, Agriculture-Exposed soil by 508.41ha, and Bare land by 456.39 ha. This is indicative that Greens spaces as they are cleared turned out to be exposed soils and in turn exposed areas are supplanted for Built up areas. The root predisposing factor of Green space clearance is ascribed to the rapid urbanization that has created so-called 'urban complexities', such as chaotic development in the land use and cover, changes in fractal dimensions, inconsistencies in the land use and implementation of Land Use-cover plans etc.

Indicator 2 was intended to assess the level of awareness on the Land cover changes. An interview was carried out with Respondents from the Environmental Protection Authority's Natural Resources Development Utilization and Regulation Core Process, BPCDA, the Gulele Sub-city Sanitation, Park, Cemetery Development Office invariably had responded that they are aware that cover type in Addis Change. However, it is from their physical observations, but not based on any spatial information, such as a thematic map of Land cover changes. From personal observations, the EPA research laboratory had produced a substandard Land cover thematic map old and which does not depict the current features, thus does not fit for current use, such as knowing the Land cover changes. The Addis Ababa Municipality's master plan section are well aware, thus they are currently doing the Master plan revision. Not knowing the spatial extent is indicative that, action plans and decision making on green space management processes are not based on concrete information. Both maintenance and development of new ones for instance parks ought to be based on spatial information, such as for the identification of their exact locations and area extent. The awareness of stakeholder is not action oriented awareness.

Indicator 3 was intended whether or not stakeholder organizations at their disposal have the required quantity of spatial information for their decisions making processes. From the response of the respondents from EPA, MEPF, BPCDA, PSBB and Gulele Sub-city BPCDO had responded that, they don't have a standard Land cover thematic map on green spaces. In view of absence of digital geospatial production facility, they don't update maps.

Regarding indicator 4 which is on the frequency of updates of existing Land cover maps inquired to be investigated, an interview were carried out with stakeholder organizations. From interviews with the project managers and personal observations on the GIS laboratories of the Addis Ababa Master Plan project and the EPA, the project manager had responded that, the Addis Ababa Master Plan is now being updated and its cycle of updating is every three to five years. EPA doesn't have a definite regular updating of its existing Land Use-Cover thematic maps. The Sub-cities do not have a thematic map of their own on Land-cover, but base themselves on the old master plan of the city, which had already changed since then. Currently, there are attempts to produce the sub-city atlases. Their scale however is so small that, it is not be appropriate to apply them for green spaces which require large scale at the scale of 1: 2 000 or larger. The master plan's cycle of updating is not frequent, to keep pace with vegetal loss. Stakeholders do not have a database for retrieval or updating, to plan and turn plans in to actions. Thus, this also has been contributing to the vegetal loss in Addis.

Environment as an ‘open system’ is subject to external impacts, thus it is susceptible to changes. Green spaces are one of the constituents of an urban environment which have been severely impacted by the fast urbanization of Addis Ababa city.

#### 4.3.2 The Causal Factors for Green spaces Depletion in Addis Ababa

In the context of Addis Ababa, as per Mensah, **the principal causal factors for green spaces depletion are ascribed basically to supplanting green spaces for built up area, especially for expansion of settlement for accommodating high urban population, infrastructural development and utilization of the biomass as energy resource** (Mensah, 2012)

- A. Need for Accommodation.** - The unprecedented urban population growth exacerbated by a high rural to urban migration has been creating pressing demand for accommodation. In Addis Ababa, bricks and concrete materials are expensive for low income people to construct their houses. ***The main source of constructional material for houses is wood.*** Even the modern high rise building constructional scaffolds are made of wood.

To solve accommodation problem, the city government of Addis Ababa has been persuading a ‘social housing project’ where condominium houses are being built by clearing green spaces, wetlands and urban agricultural lands, thus has been contributing to the depletion of green spaces. On (Figure 4.10), the yellow clustered building with red roofs are the social housing (condominium) built through the social housing projects. Several of such already have being constructed in Addis contributing to the substitution of green spaces and spaces allocated for green spaces for built up area.

Side by side with regular settlement expansion, irregular settlement building through land squatting has been going still now. Land squatting of Green spaces, wetlands and other open spaces including urban agricultural land through vegetal clearance for settlement has been one of the factors for green spaces depletion in Addis Ababa city. Apart from that, private companies for real estate development have been competing to acquire land for real estate development. Low income populations’ house is made of wood with mud walls. The wood is derived from the urban forests. Wood mills and timber enterprises have been also the active contributors to the Green space depletion in Addis. Thus, settlement for accommodating growing urban population has been the factor for green spaces depletion in Addis Ababa.

- B. Infrastructural Developments.**-Rapid expansion of road networks has been imparting an adverse effect on green spaces. Infrastructural development agencies usually take pre-emptive measures bypassing green space managing institutions in the destruction of green spaces. They have been clearing green spaces for the construction of Roads, bridges, quarry development within green spaces including mining of laterite soil for brick factories by degree have been degrading green spaces and sometimes creating derelict landscapes.



**Figure4.10 The Addis ring road overpasses and social housing (condominiums)**

Source: Addis Ababa city Administration

- C. **As Energy Source.** The Forest enterprise of Addis Ababa was supposed for forest exploitation, meaning for the generation of money through a balanced afforestation and deforestation activities to meet the city's timber and energy needs. However, usually the rate of deforestation has been surpassing reforestation. Now, the forest is under the Ethiopian heritage fund. Illegal cutting of trees has also been contributing to urban Green spaces loss.

Due to the incapacity to pay for the initial client registration fees and monthly payment, a bulk of the city population has been using wood and charcoal as energy source. Low income populations' houses are constructed from wood with mud walls. The wood is derived from the urban forests. Wood mills and timber enterprises have been also the active contributors to the Green space depletion in Addis. Therefore, the aforementioned are the principal causal factors for Green spaces depletion in the city of Addis Ababa. Due to the incapacity to pay for the initial client registration fees and monthly payment, a bulk of the city population has been using wood and charcoal as energy source. Therefore the aforementioned are the principal causal factors for Green spaces depletion in the city of Addis Ababa.

## 4.4 The Level of Stakeholders Participation in Green spaces Management

In order to determine ‘how organized and coordinated are the various stakeholder institutions engaged in Green space management in Addis Ababa? Posed in Research Question 2, a total of 5 variables and the attendant preset indicators were analyzed to analyze and explain the answers.

**D) The variable ‘Information.’** - Has two sub-variables spatial and non spatial information.

Indicator 1 was intended to determine the ‘percentage of green spaces to the total area of Addis Ababa. To identify whether or not the stakeholder organizations have spatial information under their disposal. Pertinent questions were posed to acquire the necessary information. To identify whether or not they know the spatial Green spaces extent in Addis posed in the indicator **‘the percentage of green spaces to the total area of Addis’** an interview was carried out with the stakeholder organizations. The pertinent organizations were, Environmental Protection Authority (EPA), the Planning, Sanitation and Beautification Bureau (PSBB) of Ministry of Urban Development, Housing and Construction (MUDHC) and Gulele Sub-city Beautification, Park and Cemetery Development Office (BPCDO). Representatives at the decision making level, middle management and expert level were delegated. The representatives had responded that, in so far as they are lacking a standard Land Cover thematic map with attribute information and for not carrying out research on Green spaces they couldn’t tell the current total area of green spaces in Addis. Personal observation on a secondary data acquired from EPA, the thematic map was done using AUTOCAD software without any proper database and standard, thus the area of green spaces couldn’t be known. The Gulele sub-city BPCDO had responded that, there are three parks under their disposal, namely the Sheger, Korea memorial, Hamle 19, river buffer zones and forest coverage, but they had stated that, let alone the Addis Ababa Green spaces, they don’t know the spatial extent of the Green spaces within their jurisdictions. A similar response was attained from MUDHC’S PSBB and Beautification Park Cemetery Development agency (BPCDA) all responded that they couldn’t figure out the spatial extent of green spaces of Addis even Green space under their jurisdictions. Stakeholder agencies do not know the current green spaces in Addis. The stakeholder agencies at least, could have consulted the academia, especially the Ethiopian Institute of Architecture, Building and Construction. However, not knowing the spatial extent is indicative of the status of planning and execution of plans in the maintenance and development of the green spaces.

Indicators 2 & 3 are intended to acquire information on the Quantity of ISO compliant spatial data available for decision making and access right available for spatial data. The respondents in the three organizations had confirmed that, they are currently lacking a robust GIS database and proper networks for data dissemination including geospatial professionals in the area. Personal observations in their labs and workplaces showed that, indeed they lack the expertise, and robust digital facilities. They are producing sub-standard spatial outputs which are not ISO compliant. Since they lack proper digital facility, by implication, they don’t even the network for accessibility let alone access right. Green space management is not based on credible information for planning and execution which is a major setback.

Pertaining to the sub-variable, non-spatial information, the indicator was the quantity of relevant information available for decision making. The stakeholder organizations have responded that, basic sources of information such as strategic and action plans, regulatory documents which are handy are well archived, except documents on Tree Ordinances.

**II) The variable Resource.** - has three sub-variables, namely financial, human, material and technological.

**(a) Sub-variable Financial**

Indicator 1 was to assess the amount of budget allocated by the Government and the other indicator associated with finance is the availability of external fund for Greens spaces maintenance and development.

The respondents from EPA have confirmed that, they don't have any external funds to apportion to their green spaces programs or to offer to the other stakeholder organizations. They also confirmed that the government's budget allocation is not enough. The Gulele Sub-city BPCDO have responded that, based on their strategic planning, they would forward their budget claims and it would be released based on the span of work. The MUDHC's planning; Sanitation and Beautification Bureau respondents have confirmed that budget is released with reference to targeted plans. The stakeholder organizations had responded that, the government's budget allocation is not enough to cover all the gamut of work for the maintenance and development of green spaces.

Indicator 2 was the quantity of external fund available intended to identify whether stakeholder organization have access to external fund. Invariably all stakeholder organizations have responded that they haven't had any external fund for Green spaced maintenance and development.

Poor budget allocation by the government for the maintenance and development of green spaces, meagre salaries of workers, and lack of external funds are some of the financial constraints that are the limiting factors to green space maintenance and development activities.

**(b) Sub-variable Human resource**

This Sub-variable has two indicators, namely the critical mass (the minimum number of workers below which the organization can't function) and the availability of skilled and knowledgeable work force.

The MUDHC's, Planning, Sanitation and Beautification Bureau (BPCDO), EPA, the Gulele Sub-city's Beautification , Park, Cemetery Development Office) were interviewed to respond to questions posed under the indicator critical mass, Level of knowledge & skill. From the interview and personal knowledge, the Ministry of Urban Development Housing and Construction is one of the agencies responsible for infrastructural development, much concerned with 'the brown agenda'. Except MUDHC's PSBB (Planning, Sanitation and Beautification Bureau), respondents from EPA, Gulele's sub city BPCDO, BPCDA (Beautification, Park, Cemetery Development Agency) have stated that, they are currently lacking high skilled professionals like Landscape architectures, geospatial experts and arboreal experts. They had responded that with the meagre government salary, it is unlikely to get such professionals.

When interviewed, whether or not they have arboreal professionals to scientifically manage the green spaces, they responded that they don't have it. Inadequacy of skilled professionals, such as arboreal experts who know what type of tree species are suitable to the edaphic and the micro-climatic conditions of the area, which ornamental trees as street trees must be planted with reference to Tree Ordinances, it is unlikely for the stakeholders agencies to achieve the beautification of the city through greenery activities. Personal observation taken during the field work in mid June, 2014, gravelia tree seedlings have been planted as street trees which are not permissible for their great height and extensive root networks with high

osmotic potential having a damaging effect by cracking the road ceilings (tarmac). The stakeholder organizations also lack landscape architectures for designing parks, gardens and plazas. Moreover, the high turnover of workers in search of a better salary has been creating negative impacts on the success of their green space management works. In terms of the critical mass, level of knowledge and skill, manpower resource is not adequate in the aforementioned stakeholder organizations.

**(c) Sub- variable Technological.** – This sub-variable has an indicator ‘inventoried available logistics and equipment for green space maintenance and development’. To acquire the necessary information for the questions posed under the indicator ‘inventoried available logistics and equipment’, an interview was carried out with representatives from EPA, BPCDA, Gulele’s sub-city BPCDO. Invariably, all of the stakeholder organizations have responded that, logistics has been a major problem. The current vehicles have outlived their service time and there are no maintenance service facilities like garage. The instruments being used are antiquated and lack modern equipment for the green spaces maintenance and development activities. Among the technological constraints, there are no modern digital laboratories for landscape architectures and arboreal professionals for designing and implementation.

The absence of standard equipment and other pertinent gadgets have been the constraints to carry out green spaces maintenance and development of gardens, urban forest and new recreational parks with sport fields such as tennis courts, wedding stages and different amusement facilities within the park. Such constraints have been inhibitive for not generating revenues to support financial problems. Apart from support, it would diversify and enhance the eco-service of green spaces.

**III) The variable Environmental Effectiveness.** This variable has two indicators, namely:

1. Frequency of surveillance and monitoring of green spaces;
2. Number of targets in the Action plan accomplished with minimum resource.

Respondents from Gulele Sub-city BPCDO, the Ministry of Urban Development Housing and Constructions; Planning, Sanitation and Beautification Bureau of the Environmental Protection Authority of Addis Ababa have confirmed that, they undertake surveillance and monitoring on green spaces once in a month.

To acquire information for the indicator ‘Number of targets in the Action Plan accomplished with minimum resource expenditure’, the same stakeholders were interviewed whether or not the number of targets in their action plans pertaining to green spaces have been accomplished with minimum resources. The respondents have reacted in such a way that, the budget though minimal, however, they have been effectively using the meagre budget for green space maintenance and development. Apart from financial constraints, logistics and lack of proper personnel for instance the absence of landscape architects for design and planning of closed and recreational parks have been the constraints in developing new green spaces. In view of this, the action plan’s targets have been hardly met.

The variable Regulatory Framework has one indicator i.e., the Existence of Environmental Laws, Regulations, and Tree Ordinances.

Respondents from the ten sub-cities Beautification, Park and Cemetery offices confirmed that, the offices already had all the regulatory documents pertaining to environmental laws, and regulations except ‘Tree ordinance’.

The Environmental Protection Authority as the green spaces regulatory organization is duty bound for the formulation and dissemination of environmental policies, laws, regulations and

Tree Ordinances. When interviewed whether or not they have produced and disseminated the pertinent documents to the stakeholders, the respondent have confirmed that they had done so, except Tree Ordinance which they haven't yet formulated and availed to the stakeholders.

Tree ordinances establish the authorization, regulation and guidelines to help facilitate by which stakeholders and community's role and responsibilities are explicitly stated for green space management. Usually it is in Tree Ordinance that regulations are laid how green spaces are developed, maintained including the permits necessary for green space clearance.

Regarding the law enforcement on green spaces damage by developing agencies or by any agent, the four organizations (EPA, BPCDA, MUDHC's Planning, Sanitation and Beautification Bureau, Gulele-Sub-city's (BPCDAO) all responded that despite their effort by appealing to the developing agencies through phone calls, letters and court cases, yet developing agencies have been encroaching and destroying the green spaces. They responded that developing agencies infringement in green spaces has been pre-emptive. Law enforcement regarding green spaces has been to no avail or it has remained to be a failure.

#### 4.5 The status of Community Involvement in the Green space Management

The research question in this topic is 'how involved are the local communities in green spaces management in Addis Ababa? To discern tenable answers, a quantitative approach using SPSS was used for the analysis of ten respondents from each 10 sub-cities of Addis Ababa. The analysis was also supplemented by qualitative approach using Atlas ti and personal observations.

**I) The Variable Participatory performance** has three indicators were set, namely Performance Index, Number of periodic joint assessment on project performance, Number of networks for cooperation.

Indicator 1 Performance Index was set to assess the performance of the communities in the ten sub-cities of Addis in greenery activities. A one way Anova was applied to test the qualitative performance index on how they can rate their participatory performance in greenery activities out of five points, the test result showed that,  $F(9, 88)$ ,  $p = 0.000$ , see (Table 4.8).

**Table 4.8 Statistical output of Oneway Anova on the community participatory performance**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	42.429	9	4.714	3.855	.000
Within Groups	107.622	88	1.223		
Total	150.051	97			

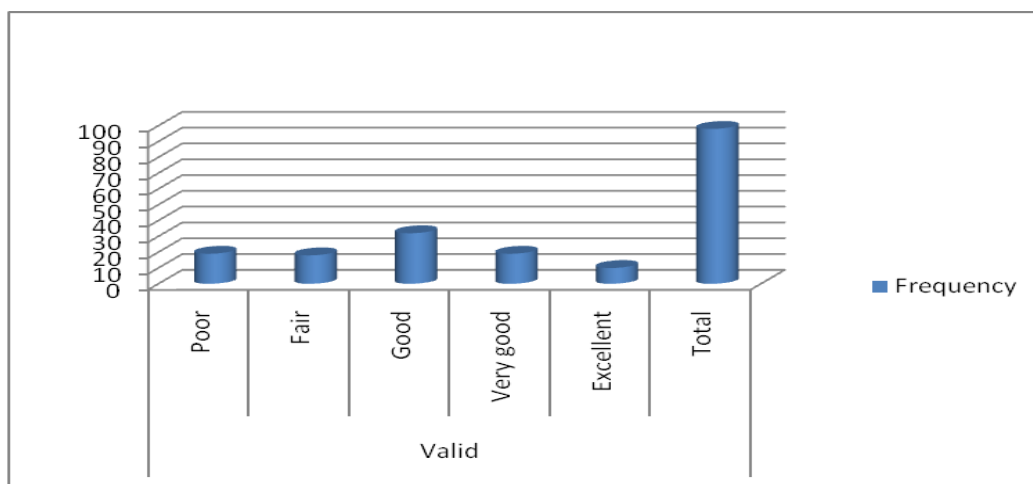
The Tukey post hoc test result showed that Gulele showed significant difference compared to Addis Ketema ( $M=4, 56, SD=0.0527, p = 0.000$ ), Niffas silk lafto ( $M=2.10, SD = 1.370$  and  $P = 0.000$ ) Akaki ( $M = 2.50, SD = 0.850$  and  $p= 0.004$ ) and Kolfe ( $M = 2.70, SD = 1.252$   $p = 0.015$ ). The other sub-cities didn't show difference.

From the frequency in (Table 4.9) and the graph in (Figure 4.11), it is evident that the participatory performance of the local communities in greenery activities in accordance with a qualitative scale from 1 to 5 had a frequency of 32 rated as 'good'. There was also a response of 19 rated as 'poor' and 18 as 'fair'.

To augment the quantitative analysis, qualitative approach was persuaded. An interview with Gulele sub-city BPCDO has showed that, the local communities though are not involved in the strategic plan preparation; however, they are involved in the execution of strategic plans. Interviews with EPA, MUDHC's planning, sanitation and Beautification Bureau had responded that, the communities are involved in the execution of plans, especially during seedling of trees. In that regard their performance is good,

**Table4.9 The response of Sub-cities on performance of the community in greener activities**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	19	19.4	19.4	19.4
	Fair	18	18.4	18.4	37.8
	Good	32	32.7	32.7	70.4
	Very good	19	19.4	19.4	89.8
	Excellent	10	10.2	10.2	10.2
	Total	98	100	100	100



**Figure4.11 The ten sub-cities response on the performance of the community in greenery activities**

The statistical test score shows that, the next frequent value is 19 those who approved that performance of the community are poor. This shows that the communities' performance is a collaborative participation, but not of an empowered participation. The local communities



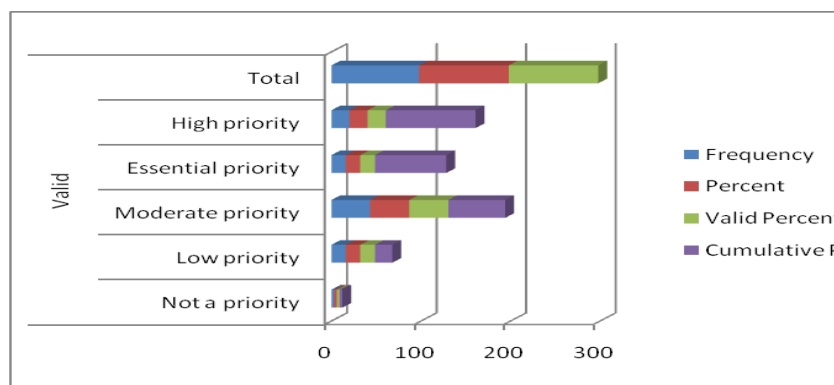
collaborate, but the collaboration is not strong as it should be. The lack of empowerment is partly ascribed to the absence of Tree ordinance which contains a referential document as guideline that explicitly states the legal bases of the bestowed empowerment of communities and stakeholders.

A test was done to assess the indicator 2, number of periodic joint assessment on project performance. A oneway Anova was applied to discern the difference among the test scores among the ten sub-cities whether or not the extent of joint evaluation of project performance is a priority in the sub-city administration pertaining to green spaces. The statistical test scores differed significantly across the ten sub-cities. The value of  $F(9, 88) = 4.125$ ,  $P = 0.000$ .

The Tukey post-hoc exhibited that Gulele compared to Akaki, Addis Ketema and Nifassilk lafto sub-cities showed significant difference (0.000, 0.001 and .002 respectively). The frequency of response is given in (Table 4.10). The histogram of the frequency of response is also exhibited in (Figure 4.12).

**Table4. 10 Oneway Anova test score result of the Sub-cities of Addis Ababa**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not a priority	3	3.1	3.1	3.1
	Low priority	16	16.3	16.3	19.4
	Moderate priority	43	43.9	43.9	63.3
	Essential priority	16	16.3	16.3	79.6
	High priority	20	20.4	20.4	20.4
	Total	98	100	100	100



**Figure4.12 The Sub-city responses on work performance as a priority**

As per the statistical data taken from the ten sub-cities of Addis, the frequency output out of 98 respondents, the most frequent response was 43; indicating work performance evaluation is of moderate priority. In order to make the analysis comprehensive, qualitative approach was also applied. A three tier level interview with the Gulele Sub-city Beautification, Park and Cemetery Development Bureau at the decision making level, mid management level and expert level were interviewed. They responded that, work performance evaluation

incorporating the community is not taken. However, the office evaluates the performance of communities during the tree planting activities only. This is indicative that, there is no empowered participation by the side of the local community.

Indicator 3 was intended to assess whether or not there exists a dialog between the community and stakeholder organizations in the Green space management. The indicator was ‘number of networks for cooperation’.

To assess the level of linkage and dialog between a community-based participatory processes with organizations mandated to manage the green space in Addis Ababa, oneway Anova statistical test was done on how they rate the linkage and dialog with stakeholders. The statistical test showed that  $F(9, 89) = 2.995$  and  $P = 0.004$ , see (Table 4.11).

As per the one way Anova statistical test result, there exists a significant difference among the respondents in the ten sub-cities. From the statistical frequency of response from the respondents from the ten sub-cities, the most frequent response was 31 those who chose that ‘there exists linkage with fair dialog, and sequent to this ‘there is linkage, but poor dialog’ accounted for 28, ‘linkage with dialog’ accounted for 26, those respondents who responded that there exists ‘linkage with strong dialog; accounted for 9 and finally those who responded that ‘there is no linkage at all’ accounted merely 4, see rating level on linkage and dialog (Table 4.12). This is graphically is presented in (Figure 4.13).

**Table4.11 dialog between the community and stakeholder organizations**

	Sum of Squares	df	Mean Square	F	Sig.
<b>Between Groups</b>	24.702	9	2.745	2.995	.004
<b>Within Groups</b>	80.644	88	.916		
<b>Total</b>	105.347	97			

**Table4.12 Rating of linkage and dialog between the community and the stakeholder organizations**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No linkage at all	4	4.1	4.1	4.1
	There is linkage but poor dialog	28	28.6	28.6	32.7
	Linkage with fair dialog	31	31.6	31.6	64.3
	Linkage with good dialog	26	26.5	26.5	90.8
	Linkage with strong dialog	9	9.2	9.2	100.0
	<b>Total</b>	98	100.0	100.0	

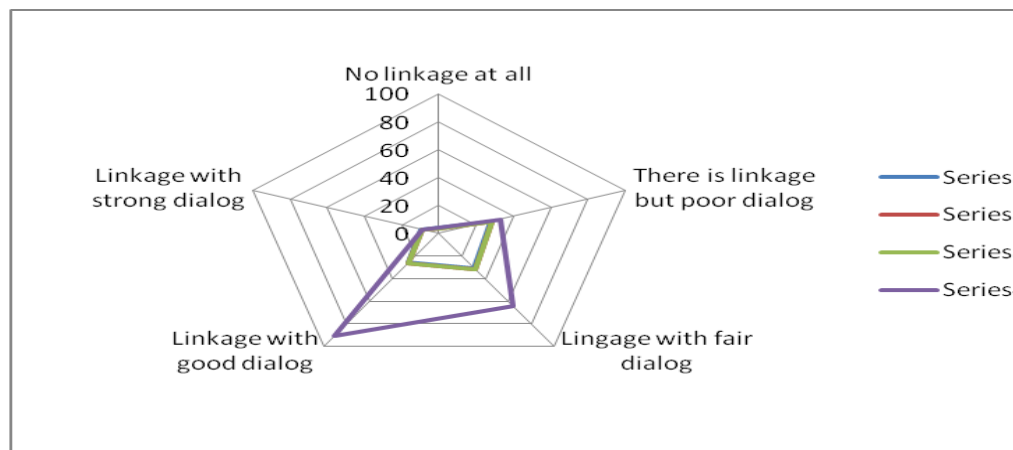
Cumulative percentage and cumulative frequency are the same. Cumulative percentage computes the cumulative frequency within each interval as much as relative frequency distribution calculates the percentage of frequency. Cumulative percentage better shows

comparative data sets. The cumulative percentage is computed by dividing the cumulative frequency by the total number of observation (n) and then multiplying it by 100 where the last result would be 100. In view of this, it makes no difference in the forth coming analysis if some tables do not contain the cumulative percentage.

The linkage and dialog is multi-faceted. It includes reviewing action plans in the maintenance and development of Greens spaces, in the protection of allocated green spaces from squatting, mutual counselling in case of Green space destruction, awareness campaigns etc.

The statistical result indicates that there exists a linkage between the stakeholder organizations and the community through their sub-cities Beautification Park Cemetery Development Offices which are affiliates to the central agency i.e., the Beautification Park Cemetery Development Agency, but the dialog is from fair to poor. This shows that, the relation and cooperation is not strong enough. To support the quantitative analysis a qualitative approach was persuaded.

As per the interview carried out with the pertinent organizations, such as the EPA, BPCDA, the Planning, Sanitation and Beautification of Bureau (PSBB) of the Ministry of Urban Development Housing and Construction, they had responded that, without the participation of the local communities, government organization can't successfully and sustainably manage green spaces.



**Figure4.13 Responses by Sub-cities on linkage and dialog with stakeholder organizations**

In view of this, the organizations although do not have strong dialog, but have linkages. Linkage without dialog serves little purpose in the green space management of Addis. Therefore, this shows that there is loose cooperation between stakeholder organizations with the communities in the ten sub-cities BPCD offices.

**II) The Variable Transparency.** To overhaul how transparent is the green space management process, two indicators were selected, namely the degree of access to disclosed information and participation in financial issues.

A one way Anova statistical test was executed to assess how local communities have access to information. The test result showed that there is no significant variation in responses from the sub-cities. The statistical outcomes showed that  $F(9, 88) = 1.118$ ,  $p = 0.359$ .

The frequency output showed that the most frequent response from the ten sub-cities was 55 yes, 23 No and 23 was I don't know. Thus, participating local communities have access to information regarding green spaces.

Interview with Gulele sub-city's BPCD office revealed that during meeting with the local communities, issues regarding the green spaces are disclosed to them. In the meantime the local communities also render information the green spaces including areas reserved for green space development for instance, land squatting of areas preserved for green spaces. The Wereda administrative level BPCD offices also disclose information regarding Green spaces.

To take an assessment on the Indicator related to the level of participation of the community in financial decision making, Oneway Anova test was executed. The test result showed that, there is a significant difference among the sub-cities, where the  $F(9, 88) = 3.257$  and  $p = 0.002$ , see (Table 4.13).

The frequency in (Table 4.14) indicated that those sub-cities that responded that communities rarely participate accounted for 26 % a similar response sometimes participate accounted for 26% in public budgeting. This participation in the least does not mean that they have a voice in budget decision. Interviews with EPA, MUDHC's Planning, sanitation and Beautification Bureau, had responded that the local communities' role in budgetary participation is insignificant. This is not a direct participation sitting with management of the BPCD, but the communities are informed about the budget as a side issue when they have mutual counselling on green spaces.

**Table4.13 Sub-city response on community participation in financial decisions**

	Sum of Squares	Do	Mean Square	F	Sig.
<b>Between Groups</b>	38.086	9	4.232	3.257	.002
<b>Within Groups</b>	114.322	88	1.299		
<b>Total</b>	152.408	97			

Mutual decision making is an empowered form of participation which currently has not yet developed in the sub-cities. In view of this, it is evident that communities do not directly participate in financial decisions.

**Table4.14 the frequency of response on the participation of communities in financial decisions**

	Frequency	Percent	Valid Percent	Cumulative
Valid	They never participate	25	25.5	25.5
	Rarely participate	26	26.5	26.5
	Sometimes participate	26	26.5	26.5
	Very often participate	12	12.2	12.2
	Always participate	9	9.2	9.2
	Total	98	100	100

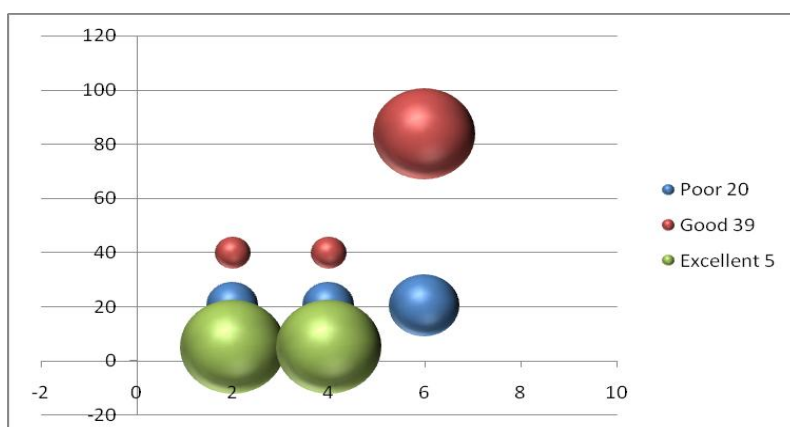
**III) The variable Accountability** has three attendant indicators, namely Quality of participation consensus based decisions taken and ensured complaint services rendered were set to explain the decision making issues.

Indicator 1 was intended to assess the quality of participation in consensus based decision making. A one way Anova statistical test showed that a significant difference exists among the sub-cities regarding the test the quality of communities participation in consensus-based decision making the  $F(9,89) = 3.649$ , and  $p = 0.001$

From the statistical test results shown in (Table4.15) and the bubbles in (Figure 14), it is evident that, the most frequent response was 39 that chose that it is good while 29 chose that it is poor and 5 chose that it is excellent. From interviews taken with the Gulele sub-city BPCDO, the communities' do not take part in the decision process.

**Table4.15 Community participation in consensus-based decision making**

Scale	Frequency	Percent	Valid Percent	Cumulative Percent
Poor	20	20.4	20.4	20.4
Fair	23	23.5	23.5	43.9
Good	39	39.8	39.8	83.7
Very good	11	11.2	11.2	94.9
Excellent	5	5.1	5.1	5.1
Total	98	100	100	100



**Figure 4.14 Community participation in decision making**

Their participation is in the execution of what had already been decided. Sometimes they may be invited for counselling. Thus, communities' participation in consensus based decision making on green spaces can be considered not appreciable. Decision making participation in principle is an empowered form of participation that requires legal bases and accountability and liability. However, from the interviews and personal observations in the sub-cities, an empowered form of participation is non-existent at present.

Indicator 3 ensured complaint services redressed was set to assess how the Wereda BPCD offices redress the complaints of communities in their greenery activities.

Regarding the percent of complaints satisfied in redressing grievances in relation to the community, oneway Anova statistical test was conducted. The test result showed that, there is a significant variation among the sub-cities. The one way Anova test resulted in  $F(9, 88) = 1.285$  and  $p = 0.257$ , see (Table 4.16) and (Table 4.17)

The Tukey post hoc statistical output indicated that there is no significant difference among the sub-cities in their responses. From the statistical output shown in (Table 4.16) and (Figure 4.17) the frequency of respondents from the ten sub-cities 55% to 75% accounted for 29 and 45 % accounted for 27 and 75 % to 95 % was accounted for 20. This shows that the sub-cities are better off in solving complaints raised by the use communities.

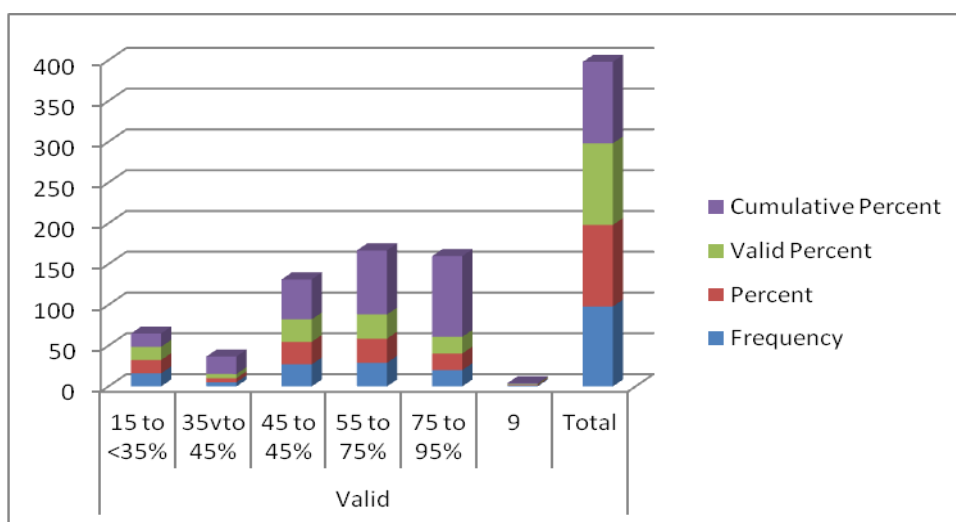
**Table 4.16 Oneway Anova statistical test score of sub-cities response on complaint redressing**

	Sum of Squares	df	Mean Square	F	Sig.
<b>Between Groups</b>	23.143	9	2.571	1.285	.257
<b>Within Groups</b>	176.122	88	2.001		
<b>Total</b>	199.265	97			

**Table4.17 The Sub-cities response on complaint redressing**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15 to <35%	16	16.3	16.3	16.3
	35vto 45%	5	5.1	5.1	21.4
	45 to 45%	27	27.6	27.6	49
	55 to 75%	29	29.6	29.6	78.6
	75 to 95%	20	20.4	20.4	99
	9	1	1	1	1
	Total	98	100	100	100

When grievances and complaints are redressed, local communities are better motivated to involve themselves in the green spaces participation activities. From the statistical tests analytical outcomes and interviews done in the sub-city and personal observations, complaints and grievances are readily redressed.



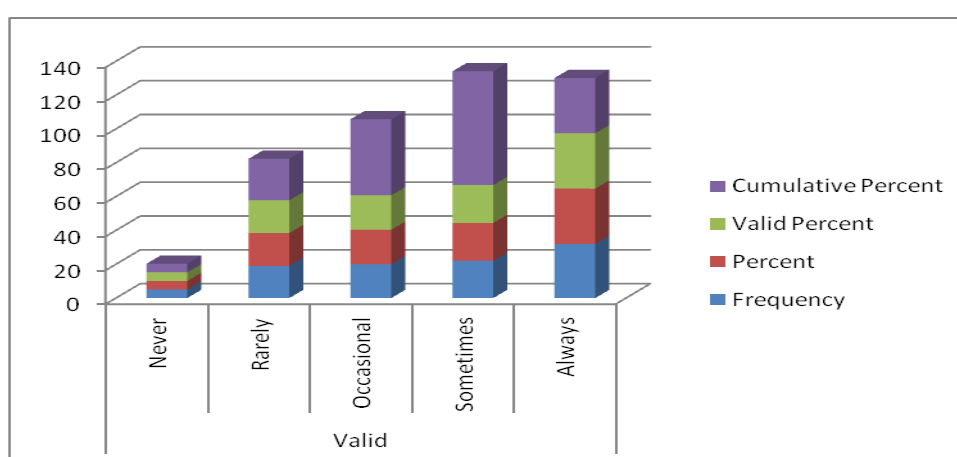
**Figure4.15 The frequency of response by Sub-cities on complaint redressing**

**IV) The variable Awareness.** - Two indicators were set; number of awareness creations taken and provisioned training. Accordingly, to know how frequently awareness creations are being done by the sub-cities to raise the level of awareness of the local communities, a statistical test was done using Onaway Anova.

From the frequency Table (18) and Figure (16), the most frequent response from the sub-cities is 32 showing that the sub-cities always give awareness, 22 responses were 'sometimes', 20 'occasionally', 19 rarely and 5 responses showed that awareness is 'never' given. From the field observations and interviewed done, awareness is always given but not on a regular bases and not frequently. Therefore, it may be concluded that awareness campaign is not regular, but episodic. This imparts little impact on the community. Awareness is multi-faceted in its essence. It includes consultative, participatory and empowered types of awareness. First of all, the community must be instilled on the vitality of Green spaces in-terms of their eco-service as discussed in detail in chapter 2.

**Table4.18 Frequency of awareness campaign taken by the ten Sub-cities**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	5	5.1	5.1	5.1
	Rarely	19	19.4	19.4	24.5
	Occasional	20	20.4	20.4	44.9
	Sometimes	22	22.4	22.4	67.3
	Always	32	32.7	32.7	32.7



**Figure4.16 The response on awareness campaign**

Secondly, the ideas that gripped the minds of the community in turn become a great material force inhibiting them from destroying Green space. However, apart from that, the type of awareness that should have been was action oriented awareness facilitating legal, economic and social bases for the full participation of the local communities in Greenery activities. Such basic conditions have not been fulfilled by the Sub-cities at the Wereda level where communities have linkages.



## Chapter 5: Conclusions and recommendations

### 5.1 Introduction

The principal aim of the research study was to determine the status of Green spaces and the participatory Green space management in which the organized and cooperative engagement of stakeholders and the involvement of community can impart on the status of Green spaces.

The study was intended to answer the research question 1 how much green spaces have changed between the reference year 1986 and terminal year, 2014. This research question had its tenable answers through Remote sensing image analysis change detection on a multi-date satellite raster data. So long as it is a case study, research questions 2 treats how organized and coordinated are the stakeholder institutions engaged in the Green space management and research question 3 is on the status of local communities' involvement in the Greens spaces participatory management. The qualitative data acquired through the semi-structured interview single embedded. Moreover, to reach at trustworthy results, the supportive quantitative data was acquired through non-probability purposive (judgmental) sampling single point in time (2014) were used to be assessed by SPSS for the quantitative and ATLAS ti for the qualitative data. Secondary data and personal observations were incorporated for triangulated cohered tenable answers for the research questions.

### 5.2 Conclusion

The research study was undertaken to answer the questions presented sequentially as follows.

The first research question is **‘how much Green spaces have changed in Addis Ababa since the last twenty eight years?’**

The Green space loss from 1986 to 2014 was determined employing Remote sensing image analysis and interpretation for Land cover change detection. A total of 1621 ha of Green space had already been lost. This accounts for 30% Vis avis the Green space coverage in 1986. Compared to the total area of the city (54 000 ha), the remaining Green spaces is merely 7%.

Stakeholder organizations are well aware that the Land cover, especially vegetal covers are changing. However, it is not on evidence based such as on regularly updated Land cover maps. Their awareness is not ‘action oriented’ which has its reflection in not establishing robust digital facilities for the production of Land cover maps for action planning and decision making.

Due to the lack of robust digital facilities for spatial designing and Land cover thematic map production, stakeholder organizations do not have the right quantity of spatial information for action planning and decision making. They are also unable to update the scanty spatial information already available at their disposal.

The principal implication of the Green spaces loss is that, the stakeholder organizations mandated in relation to their explicitly stated mission is the maintenance and development of green spaces. However, the study showed that, these organizations are lagging behind what they had envisioned to reach and have been unable to meet their institutional mission i.e., the

Government's expectation to achieve when it established them. Thus, the analytical outcome showed that, the Green spaces management has been dysfunctional.

The second research question is **'how organized and coordinated are the various stakeholder institutions engaged in urban green spaces management'?**

Both spatial and non-spatial information are very essential for action planning and informed decisions. Without information, impaired decisions have serious repercussions on Green space management.

Since stakeholder organizations do not have robust geospatial production digital facilities they have been unable to produce standard Land cover thematic maps. In view of this, they don't know the percentage of Green spaces to the total area of Addis Ababa; even the Green spaces under their jurisdictions.

From the triangulated analytical outcomes, stakeholder organizations either have a very old scanty and non-ISO compliant Land cover thematic maps unsuitable for current use or they are using very rudimentary plans. This is one of the inhibitive factors for not taking the appropriate interventions to abate green spaces losses.

Stakeholders lack robust digital facility with a database and network to facilitate spatial attribute information production, archiving and dissemination, thus access right is only for information that is in analogue form.

Except the scanty spatial information, stakeholder organizations have the relevant information for decision making

Poor government's budget allocation has been a big constraint in the Green spaces maintenance and development works of stakeholder organizations. Moreover, stakeholder organizations yet do not have external funding for Green space management. Thus, financial constraint has been one of the major limiting factors in the maintenance and development of Green spaces.

There is an incompatibility between the planned manning and actually available work force. The absence of appropriate professionals in green spaces such arboreal professionals, geospatial profession and landscape architectures and the high turnover mid carrier professional and low profile workers have been imparting serious negative repercussions on stakeholder organizations' committed engagement in green spaces management in Addis.

The absence of a robust digital facility, such as database, standard potent software, hardware and network for archival, analysis and portal for dissemination have been imparting adverse effect by limiting a synergized dialog and cooperation among stakeholders.

Laxities in Green space maintenance and reporting have been observed ascribed to the lack of logistics, proper technical gadgets and proper spatial information.

Owing to financial, human and technical constraints targets in the actions plans are not met.

Invariably all stakeholder organization do have environmental policy, law and regulation except the Tree ordinance. The later is a central referential guide determining how stakeholders and communities can participate in green space development.

To conclude, the poorly organized and coordinated engagement of the various stakeholder organizations in Green space management is ascribed to the interplay of lack of digital facilities for the production and dissemination of spatial and non-spatial information, constraints in resources such financial, manpower and Technological..

### **The third research question is ‘how involved are the local communities in Green spaces management in Addis Ababa?’**

The third research question is intended to investigate how involved are communities in green space management. So long as the communities work with the affiliated Sub-cities Beautification, Park Cemetery Development offices, much of the information was derived through quantitative analyses using 100 samples distributed in the ten sub-cities supported by qualitative analysis using interviewed data from respondents.

To investigate communities’ participation in greenery activities, the performance index rating of sub-cities response showed that it was good, but when interviewed the respondents have specifically confirmed that, the communities’ performance is limited to tree planting during wet seasons.

Regarding linkage and dialog with stakeholders, the quantitative and qualitative including personal observations showed that, the linkage and dialog is not significant to bring a noticeable positive impact on greenery activities.

To assess their participation in decision making, the quantitative and qualitative analytical outcomes showed that, the communities do not have an empowered participation that allows them to participate in any form of decision making process.

As per the analytical outcome the participation of the local communities in the Green spaces management via the Sub-cities Beautification, Park and Cemetery Development Offices is found to be insignificant to lend out itself to a sustained participatory Green spaces management in Addis Ababa.

The aforementioned are the principal upshots of the analytical studies showed that Green spaces participatory management has been dysfunctional and requires ameliorative measures. An integrated participatory approach synergizing stakeholders’, communities, private developers and non-profit organization in the presence of ‘Tree Ordinance’ that allows a consultative, collaborative and empowered participation of stakeholders and communities with an enhanced capacity building would ameliorate the green space management so that properly managed Green spaces can sustainably render their eco-service to the Addis urban inhabitants

## **5.3 Recommendation**

1. It is imperative to establish an integrated green space management to synergize efforts and resources including for the avoidance of institutional inertia. Before the integration, some organizations require merging. For instance, the Planning Sanitation and Beautification Bureau (PSBB) of the Ministry of Urban Development, Housing and Construction should be merged with the Beautification, Park and Cemetery Development Agency to avoid duplication of effort and resources. Later on, to bring the Forest management which is under the Ethiopian Trust Fund, the Beautification, Park and Cemetery Development Agency and its affiliated ten Sub-cities BPCD Offices under a single integrated Green space management. This avoids power fragmentation and inter-institutional inertia. This facilitates linkage and dialog including the full involvement of the community and private developers in the Green spaces management endeavours.

2. Establishment of a robust digital database system that entails Local Area Network (LAC), and a portal for data dissemination. This includes Standard ISO compliant geospatial production system through potent software for updating the Land Cover thematic maps for planning and decision processes. Moreover, this should not be limited to hardware and software, but must also include skilled professionals like arboreal, geospatial and Landscape architects for the design implementation of parks, street trees, urban forests and Gardens.
3. The formulation of 'Tree Ordinances' as the basic documents for facilitating an empowered stakeholders and community participation, for a principled permits of standardized street planting, park and garden developments including the law enforcements pertaining to Green spaces management.
4. Regular undertaking of on action oriented awareness to be given to the local communities.
5. It is expedient if the government through the affiliated Sub-city Beautification Park Cemetery Development Offices involve the communities in the Green space Management in terms of their consultative, collaborative and empowered participation.
6. The need for an agreement with developing agencies and making them signatories of an actionable Memorandum Of Understanding to stick to the Land Use-Cover Master plan and consistently to observe it. The need for to conduct periodic counselling with the developing agencies on how to handle the 'brown agenda' and 'green agenda' to maintain a balanced development.
7. From the Government's side, better allocation of budget for green spaces maintenance and development. Allocate better salary and fringe benefits for the workers to motivate them.
8. Practicing the culture of creating linkages with international development agencies, non-profit organization for fund soliciting and for technical assistance.

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## Annex 1: Interview Guide for Addis Ababa City Administration

Name of the Institution: Beautification Park Cemetery Development Agency (BPCDA)

General Information

Position.....

Directorate.....

Date.....

Introductory Remark (Introduction, Purpose of the Interview/Research)

Research Question Number 1: How does the involvement of stakeholders determine the status of green spaces management in the city of Addis Ababa?

### (I) Introductory

1. Would you briefly explain what necessitated the establishment of SBPDA?
2. What does the government expect from SBPDA in relation to its mandated mission?

The Variable 'Information' has two sub-variables, namely spatial and non spatial information

Indicator: Percentage of green space to total urban area.

3. Would you please tell me the spatial extent of Addis Ababa?
4. Do you utilize spatial information for your planning purposes, decision making and execution processes?

Indicator: Quantity of ISO compliant spatial data available for decision making.

3. Do you consider the availability of ISO compliant spatial information is adequate for the execution of you action plans?
4. Do you have a spatial database and clearinghouse portal for spatial data capture, retrieval, analysis and dissemination?

Indicator: Access right available for spatial data

5. If you have a spatial database, how do briefly describe the network and the access right in relation to 'ftp' (file transfer protocol)?
6. If you do not use spatial information for your planning, decision making and execution process, how do you determine the spatial extent of green spaces in Addis Ababa?

. Indicator: Quantity of relevant information available for decision making

7. Any developmental decisions on green spaces depend on knowing the actual extent of green spaces, how judicious have been your decisions in the absence of spatial information?
8. Is there prior notification (information) on the impending destruction of green spaces by infrastructure developmental agencies?
9. What are your reactions in case of pre-emptive measures taken by the infrastructure and developmental agencies?

Indicator: .The amount of budget allocated

10. Do you have any budget constraints for the execution of your action plans?
11. What percentage from the total budget of your authority apportions for green spaces development?

Indicator: Quantity of funds-grants available

12. Do you have any funds from extra sources?
13. Have you ever solicited funds for green spaces?
14. Do you involve stakeholders in your financial reviews and decisions?
15. Do you have any mechanism to ensure invitation of bids and selection of service delivery are done without any impartiality and favouritism to be transparent in actions and decisions?
16. Do you readily get land allocated for green space development? If not, what reasons do you ascribe?
17. Pertaining to man power resources, does you agency consider to have maintained the right manning (critical mass)?
18. How do you rate the human resource turn over in you authority?
19. If you have a high turnover of man power, what are the reasons for that?
20. How do you characterize the adequacy of logistics and equipment for green spaces development and maintenance?

For Indicator: Frequency of green spaces maintenance and reporting

21. Would you mind explaining the environmental (green spaces) effectiveness in terms of frequency of green spaces development, maintenance and reporting and Number of targets in the Action Plan accomplished?
22. How do you rate your organization's level of environmental (green spaces) effectiveness Vis avis the existing and impending infrastructural development?

For Indicator: Number of targets in the Action Plan accomplished with minimum resource expenditure.

23. Would you please briefly explain your annual action plan targets are met in relation to the minimum resource allocation?
24. In case you are off-target in fulfilling annual action plans, what reasons do you ascribe for that?

For Indicator: Existence of Environmental Laws, Regulations, and tree ordnances

25. Is there government ratified and published environmental Policy, Law and Regulation regarding the environment, especially on green spaces?
26. If you lack any of the specified regulatory documents, what reasons do you ascribe for the absence of such documents?
27. How do you execute your regulatory works in the absence of a ratified and published regulatory document?
28. If you have regulatory policy document, are there any explicitly stated articles on green spaces and their attendant management?



Research Question Number 3: How much green spaces in Addis Ababa have changed since the last fifteen years?

For Indicator: Available mechanism for land use-cover change detection

29. What mechanisms do use a tool to discriminate changes in the Land Use-Cover, especially green spaces in Addis Ababa?
30. For Indicator: Level of awareness on the use of Land Use-Cover changes
31. Do you have awareness programs to instil ideas and practical training on the development and maintenance of green spaces?
32. How do you rate the level of awareness of your authority's workers on the Land Use-Changes in Addis Ababa?

For Indicator: Consistency of Land Use-Cover Planning practice

33. Your part in the Land Use-Cover of the city is green spaces, in relation to this; do you consider that you are consistent in practicing it?
34. What measures have you taken so far to the inconsistencies of planning use by other agencies on Land Use Cover, especially on green spaces?

Indicator: Frequency of Updates of existing Land Use-Cover plans

35. In your opinion, do you think that the frequency of updating of existing Land Use-Cover plans is compatible to the Land Use-Cover changes?

## **Annex 2: Interview Guide for Environmental Protection**

### **Authority**

Introductory Remark (Introduction, Purpose of the Interview/Research)

Name of the Institution: Environmental Protection Authority (EPA)

General Information

Position.....

Directorate.....

Date.....

### **(II) Introductory**

Would you briefly explain what necessitated the establishment of SBPDA?

What does the government expect from SBPDA in relation to its mandated mission?

Sub-variable: Regulatory Framework

For Indicator: Existence of Environmental Laws, Regulations, and tree ordinances

1. Would you briefly explain what necessitated the establishment of the Environmental Protection Authority?
2. What does the government expect from EPA in relation to its mandated mission in the development of green spaces?
3. Is there government ratified and published environmental Policy, Law and Regulation regarding the environment, especially on green spaces?
4. If you lack any of the specified regulatory documents, what reasons do you ascribe for the absence of such documents?
5. How do you execute your regulatory works in the absence of a ratified and published regulatory document?
6. If you have regulatory policy document, is there is an explicitly stated article on green spaces and their attendant management?
7. Is there any article in the regulatory policy stating the involvement of the community on green spaces management?
8. In the absence of provisions in the article regarding community participatory management, do you think, the Government alone can manage green spaces without the participation of the community? Would you briefly elaborate on that?
9. If there were an article on community participatory management, is there ‘a tree ordinance’ that bestows a legal based participatory role to be played by the community?
10. Do you have regulatory strategic and action planning for green spaces management?
11. Pertaining to green spaces, which government and non-government organizations are your stakeholders?
12. In your opinion, under who should bring under a law suit a culprit be it a developing agency or whosoever has perpetrated damage on green spaces?

13. In your opinion, under who should bring under a law suit a culprit be it a developing agency or whosoever has perpetrated damage on green spaces?
14. What according to your opinion would be the fate of green spaces in the nearest foreseeable future in which mandate fragmentation of green spaces among different organizations which have no or have loose bond with community to play their participatory role in a participatory green space management?
15. The SBPDA and EPA both are at par in authority and mandated by proclamation and have stake in green spaces. In your opinion, is there any mandate overlap with SBPDA that can be a constraint in your regulatory activities?
16. Whose responsibility is to formulate urban forest policy and tree ordinance for Addis Ababa City?
17. The Addis Ababa City Administration has allocated 41% of the urban area for green spaces. What have been your interventions on the clearance of green spaces for infrastructural development by development agencies, especially by Ministry of Urban Development and Construction?
18. How do you apportion the fund among the different greens spaces managing organization? Or do you use it exclusively for your organization's various needs?  
For Indicator: Percentage of green space to total urban area.
19. Would you mind telling me, at least the most recent total spatial extent (area) of green spaces in Addis Ababa?  
For Indicator: Available mechanism for land use-cover change detection
20. Do you apply spatial information such as thematic maps or satellite image maps in your surveillance and monitoring activities on green spaces? If not, what other methods do you involve for the purpose of surveillance and monitoring?  
For Indicator: Quantity of relevant information available for decision making
21. Your regulatory decisions on green spaces depend on knowledge on the actual extent aces, how judicious have been your regulatory decisions in the absence of use of spatial information?
22. Would you confirm the presence or absence of spatial database and clearinghouse portal for spatial data capture, retrieval, analysis and dissemination of regulatory assessments on the green spaces of Addis Ababa?  
For Indicator: Number of awareness creations taken
23. How do you capacitate the community, green spaces management organizations in terms of giving awareness on green space regulations and rendering technical support and on the importance of urban greenery and green spaces management?  
For Indicator: The amount of budget allocated
19. How do you apportion the fund among the different greens spaces managing organization? or do you use it exclusively for your organization's various needs?
20. Have you ever apportioned money for green spaces development and maintenance, especially for green spaces of Addis Ababa?  
For Indicator: Frequency of green spaces maintenance and reporting

21. How frequently does your authority undertake surveillance and monitoring activities on the greens spaces of Addis Ababa?

For Indicator: Available mechanism for land use-cover change detection

22. Do you apply spatial information such as thematic maps or satellite image maps in your surveillance and monitoring activities on green spaces? If not, what other methods do you involve for the purpose of surveillance and monitoring?

Research Question 3: How involved are the local communities in green spaces management in Addis Ababa?

Concept: 'Participatory Process'

For Indicator: Number of networks for cooperation.

23. Do you involve pertinent stakeholders in the strategic action planning? If not, why?
24. According to your opinion, whose responsibility is to coordinate the activities of the different green spaces managing organizations?
25. Is there a robust green spaces participatory management in which EPA is involved for its regulation? In case of its absence, who do you think is the responsible body for the establishment of participatory green spaces management in which the community's involvement is central?
27. How do you briefly characterize your cooperation with SBPDA, Ministry of Agriculture (MOA) Department of Forest Development and Soil Conservation (DFDSC), Ethiopian Heritage Trust and Addis Bah Enterprise in green spaces management?

## Annex 3: Interview Guide for Ministry Environmental Protection Authority and Forestry

Name of the Institution: Guide for Ministry Environmental Protection Authority and Forestry

General Information

Position.....

Directorate.....

Date.....

Introductory Remark (Introduction, Purpose of the Interview/Research)

Research Question Number 1: *How does the involvement of stakeholders determine the status of green spaces management in the city of Addis Ababa?*

### (I) Introductory

Would you briefly explain what necessitated the establishment of MEPF?

What does the government expect from MEPF in relation to its mandated mission?

Variable the 'Information' sub-variables spatial and non spatial information

Indicator: Percentage of green space to total urban area.

Would you please tell me the spatial extent of Addis Ababa?

1. Do you utilize spatial information for your planning purposes, decision making and execution processes?

Indicator: Quantity of ISO compliant spatial data available for decision making.

2. Do you consider the availability of ISO compliant spatial information is adequate for the execution of you action plans?
3. Do you have a spatial database and clearinghouse portal for spatial data capture, retrieval, analysis and dissemination?

Indicator: Access right available for spatial data

4. If you have a spatial database, how do briefly describe the network and the access right in relation to 'ftp' (file transfer protocol)?
5. If you do not use spatial information for your planning, decision making and execution process, how do you determine the spatial extent of green spaces in Addis Ababa?

Indicator: Quantity of relevant information available for decision making

6. Any developmental decisions on green spaces depend on knowing the actual extent of green spaces, how judicious have been your decisions in the absence of spatial information?
7. Is there prior notification (information) on the impending destruction of green spaces by infrastructure developmental agencies?
8. What are your reactions in case of pre-emptive measures taken by the infrastructure and developmental agencies?

Indicator: The amount of budget allocated

9. Do you have any budget constraints for the execution of your action plans?
10. What percentage from the total budget of your authority apportions for green spaces development?

Indicator: Quantity of funds-grants available

11. Do you have any funds from extra sources?
12. Have you ever solicited funds for green spaces?
13. Do you involve stakeholders in your financial reviews and decisions?
14. Do you have any mechanism to ensure invitation of bids and selection of service delivery are done without any impartiality and favouritism to be transparent in actions and decisions?
15. Do you readily get land allocated for green space development? If not, what reasons do you ascribe?
16. Pertaining to man power resources, does your agency consider to have maintained the right manning (critical mass)?
17. How do you rate the human resource turn over in your authority?
18. If you have a high turnover of man power, what are the reasons for that?
19. How do you characterize the adequacy of logistics and equipment for green spaces development and maintenance?  
For Indicator: *Frequency of green spaces maintenance and reporting*
20. Would you mind explaining the environmental (green spaces) effectiveness in terms of frequency of green spaces development, maintenance and reporting and Number of targets in the Action Plan accomplished?
21. How do you rate your organization's level of environmental (green spaces) effectiveness vis-à-vis the existing and impending infrastructural development?  
For Indicator: *Number of targets in the Action Plan accomplished with minimum resource expenditure*
22. Would you please briefly explain your annual action plan targets are met in relation to the minimum resource allocation?
23. In case you are off-target in fulfilling annual action plans, what reasons do you ascribe for that?  
For Indicator: *Existence of Environmental Laws, Regulations, and tree ordinances*
24. Is there government ratified and published environmental Policy, Law and Regulation regarding the environment, especially on green spaces?
25. If you lack any of the specified regulatory documents, what reasons do you ascribe for the absence of such documents?
26. How do you execute your regulatory works in the absence of a ratified and published regulatory document?
27. If you have regulatory policy document, are there any explicitly stated articles on green spaces and their attendant management?

Research Question Number 3: *How much green spaces in Addis Ababa have changed since the last fifteen years?*

For Indicator: *Available mechanism for land use-cover change detection*

28. What mechanisms do you use a tool to discriminate changes in the Land Use-Cover, especially green spaces in Addis Ababa?

For Indicator: *Level of awareness on the use of Land Use-Cover changes*

29. Do you have awareness programs to instill ideas and practical training on the development and maintenance of green spaces?
30. How do you rate the level of awareness of your authority's workers on the Land Use-Changes in Addis Ababa?

For Indicator: *Consistency of Land Use-Cover Planning practice*

31. Your part in the Land Use-Cover of the city is green spaces, in relation to this; do you consider that you are consistent in practicing it?
32. What measures have you taken so far to the inconsistencies of planning use by other agencies on Land Use Cover, especially on green spaces?

Indicator: *Frequency of Updates of existing Land Use-Cover plans*

33. In your opinion, do you think that the frequency of updating of existing Land Use-Cover plans is compatible to the Land Use-Cover changes?

## **Annex 4: Survey Questionnaire Guide for the Ten Sub-cities of Addis Ababa**

### **Survey Questionnaire**

Name of the Sub-city Administration.....

Name of the Interviewee.....

Please put a tick mark inside the box in reference to you gender category

Male ☐ Femal ☐

I implore you kindness to answer the following questions with best of your knowledge by putting a tick mark in the box for the answer that you think is right.

- 1. To what extent work performance evaluation is a priority in your organization related to green spaces management?**

- ☐ Not a priority  
☐ Low priority  
☐ Moderate priority  
☐ Essential priority  
☐ High priority

- 2. How often do you carry out joint assessment on work performance on green spaces?**

- ☐ Never  
☐ Almost never  
☐ Sometimes  
☐ Almost every time  
☐ Every time

- 3. How do you rate the level of linkage and dialog between your community-based participatory processes with organizations mandated to manage the green spaces in Addis Ababa?**

- ☐ No linkage at all  
☐ There is linkage but poor  
☐ Linkage with fair dialog  
☐ Linkage with good dialog  
☐ Linkage with strong dialog



4. To which participatory type does your community based green space management belong:

- ☐ It is a voluntary establishment without any legal agreement
- ☐ It is a legally based voluntary establishment
- ☐ It is an ad hoc based without any legal agreement
- ☐ It is an ad hoc based with legal agreement
- ☐ It is an ad hoc based with legal agreement to mature a full organization in the future.

5. Suppose your qualitative performance index is rated out of five points, how do you rate the participatory performance in greenery activity?

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Very good
- ☐ Excellent

6. How do you rate the level of awareness of the local communities and the workers in your Sub-city Administration that participate in greenery activity?

- ☐ Not at all aware
- ☐ Slightly aware
- ☐ Moderately aware
- ☐ Somewhat aware
- ☐ Extremely aware

7. How often do you carry out awareness campaign on the importance of urban green and greenery activities?

- ☐ Never
- ☐ Rarely
- ☐ Occasional
- ☐ Sometimes
- ☐ Always

8. How do you rate the level of participation of other stakeholders in the decision making processes of greenery activities?

- ☐ They are not involved
- ☐ Rarely involved
- ☐ Sometimes involved
- ☐ Frequently involved
- ☐ All the time involved.

9. In which group do you categorize your participatory management with respect to percent of complaint satisfied with response and grievance redress?

- ☐ 15 to <35%
- ☐ 35 to 45 %
- ☐ 45 to 55%
- ☐ 55 to 75%
- ☐ 75 to 95%

10. Do you have any mechanism to ensure invitation of bids and selections of service delivery? are openly done without any impartiality or favouritism?

- ☐ Yes                      ☐ No                      ☐ I don't know

11. According to your observation, do participating communities have full access to disclosed information that has important implication on participatory green spaces management?

- ☐ Yes                      ☐ No                      ☐ I don't know

12. How do you rate the participation of communities in public budget decisions for green spaces?

- ☐ They never participate
- ☐ Rarely participate
- ☐ Sometimes participate
- ☐ Very often participate
- ☐ Always participate

13. What is the percentage of community contributions in the annual execution of green spaces action plans targets?

- ☐ 15 to <35%
- ☐ 35 to 45 %
- ☐ 45 to 55%
- ☐ 55 to 75%
- ☐ 75 to 95%

14. In your opinion, how do you categorize the quality of community participation in consensus based decision making?

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Very good
- ☐ Excellent

15. Community score cards tool enhances community's participatory role and power and accountability in decision making. How often do you use Community Score Card in the participatory process?

- ☐ Poor
- ☐ Fair
- ☐ Good
- ☐ Very good
- ☐ Excellent



