

## **CHAPTER I: INTRODUCTION**

- Research Identifications
- Significance of the Study
- Objectives of the Study
- Data Base and Methodology
- Review of Literature
- Profile of the Study Area

Urbanization is a process in which overall development of a particular region takes place. This process consists of rapid population growth, increase in the proportion of non-agricultural workforce, and changes in land use from agricultural to non-agricultural pattern. The process of urbanization is continuous one and is generally influenced by various economic activities such as commerce, transportation and industrial activities. This process gives rise to an urban region- location having high level of accumulation and concentration of economic activities; and is complex spatial structures that are supported by various services and infrastructures (Girma, 2004; UN-Habitat 2006; Tetty, 2005).

In this process of urbanization, new industries are set up and this in turn helps to create large scale employment which is much needed in developing countries. Due to employment, the per capita income of the people rises and the region achieves an increase in prosperity. Urbanization provides better infrastructure facilities, medical facilities and educational opportunities to millions of people. Urbanization also helps to develop a scientific attitude among people. The overall standard of living of the people rises considerably because of urbanization. It helps the region to prosper and cater to the needs of a large population. Urbanization provides plenty of opportunities for people from all sections of society to excel and achieve their goals (Cohen, 2007).

It is mainly because of these pull factors that people from the countryside would migrate and settle in the urban areas to work or to look for a better quality of life. Likewise, urban areas in Ethiopia will continue to grow not only due to natural increase but also due to continued rural to urban migration. Hence, Addis Ababa remains the most attractive destinations for rural and small-town's migrants. In this regard, the challenge to provide essential urban amenities to the residents of the city will be overwhelming (Girma, 2004).

## **RESEARCH IDENTIFICATION**

### **Problem Statement and Justifications of the Study**

Africa's urban revolution was different from that of the West, where urbanization is much older and occurred in a very specific context of both increased agricultural production and industrialization, in other words, parallel to economic development (Catherine, 2005).

Although urban demographic growth is generally considered a positive force for economic development, very rapid urbanization can pose great challenges for urban economies, particularly with regard to land use, infrastructure, housing, environment and social services (UN-HABITAT, 2010). Rapid urbanization in developing countries poses great urban social, economic and environmental problems. Urban problems such as housing and its basic services, and transportation dominate the international development agenda of the 21st century. Until 1980s, the socioeconomic problems were largely associated with the rural areas in developing countries; but the situation has changed with the dramatic increase in the number and proportion of the population living in urban areas. Informal settlements also have become so pervasive that they seem to outnumber legally planned development, and their social legitimacy appears to be no longer in question. Unfortunately, the appalling urban environmental and social conditions associated with informal settlements constitute a major threat to the health and well-being of urban life (Nwaka, 2005; Potsiou, 2010).

These conditions are very severe in regions of Sub-Saharan Africa where rapid urbanization is occurring within the context of economic stagnation or low economic growth, poor housing conditions, financially weak municipalities incapable of providing basic services, a poor infrastructural facilities, etc. (UN-Habitat, 2009; CSA, 2001; Harsch, 2002). In addition to this, the authorities are inefficient in meeting the service demands of urban residents particularly the urban poor. The absence of policies on land use and economic development has also led to urban problems (Kumar and Barrett, 2008).

Like other developing countries, many social, economic and environmental problems have accompanied urbanization in Ethiopia and have been ignored for too long period of time. Urban areas are faced with problems of unrelenting shortages of housing, inadequate transportation system and range of other physical infrastructure, and environmental quality problems (Girma, 2004; Tegegne, 2002; MWUD, 2007).

## **SIGNIFICANCE OF THE STUDY**

Addis Ababa, the administrative capital of Ethiopia, is experiencing continuous growth and change. Change is experienced in all dimensions of the city but different parts of the city grow at different rates. Economically, the city is transformed from a predominantly administrative and service center into an industrial and financial center. Particularly, in the last two decades, development activities mainly, construction and industries have been growing very fast (Yetnayet, 2012; Gizachew, 2011).

This rapid economic growth and change is responsible for the intense migration of people from other parts of the country into the capital. In addition to this, natural increase is another important factor in population growth of the city. As a result of this population growth, economic development, and other related activities, the city is not in a position to provide services and other amenities. Furthermore, the rapid growth of human population is often identified as one of the main factors for environmental degradation. Population affects the environment mainly through changes in land use and industrial activities (Turner & Meyer, 1991).

In this context, the present study is aimed at assessing the impact of urbanization and industrialization on Addis Ababa city environment. So far, many studies were conducted; however, many of them were concentrated only on one particular problem. However, many urban problems are interconnected and need to be assessed together. For example, poor land use technique may result in poor housing conditions and infrastructural development. Rapid urban population growth may result in failure of urban authorities to provide basic services and amenities. Therefore, to bring sustainable development of the city, causes and consequences of urban problems should be assessed together, and long-term strategies for sustainable development should be forwarded. The

majority of urban studies conducted were on different problems. Hence, this study is aimed to fill this gap, and develop the existing body of knowledge on urbanization and its problems.

Keeping these aspects under consideration, an attempt was made in the present study to assess the nature, growth and concentration of economic activities as well as their impact on physical growth of the city, population, environment, public utilities etc. This study not only identifies problems and bottlenecks arising in various spheres but also formulates long term and short term strategies to ensure effective protection of environment, better living conditions, and streamlining of the economic development and physical growth of the city.

### **Study Area**

Addis Ababa is the capital city of Ethiopia and the African Union and is often called the "African Capital" due to its historical, diplomatic and political significance for the continent. The city has the tremendous locational advantage such as extensive tracts of suitable lands for the establishment of industries in all directions; it is located in the geographic center of the country which makes it easily accessible for all areas of the country and its high altitude makes very pleasant climate.

It is the main center for economic, social and political affairs of Ethiopia and located between 2000 and 3000 meters above mean sea level or approximately at the height of 2,355 m (7,726 ft), enjoying mild, Afro alpine and warm temperate climate. The city experiences a highly accelerated population growth, since its establishments. Several factors are responsible for rapid urbanization in Addis Ababa. Addis Ababa enjoys a relatively higher concentration of facilities, infrastructure and industries when compared to other urban areas of the country. This creates many more employment opportunities than other urban areas in Ethiopia. Therefore, in addition to population dynamics manifested in its urban population growth, rural to urban migrations are significant driving forces of urban expansion of Addis Ababa. It is because of internal and international migration that the population of Addis Ababa has steadily grown in the last hundred years faster than the pace at which urban services and housing are provided.

Secondly, policies for the economic transformation of Addis Ababa which have mainly been pursued through industrialization are also responsible for the urban expansion of Addis Ababa (CSA, 1999). As a primate city, Addis Ababa has continued to absorb more than 26 percent of the total country's urban population. This is because the city acts as the major industrial and commercial center in the country.

Similar to the situation in many African cities, in Addis Ababa also, services and infrastructure including water supply, transportation, waste disposal facilities, and others are inadequately provided and poorly planned in the city. This is true especially in unplanned neighborhoods and responsible for the increasing environmental and health problems among the urban poor. The urban problem such as poor transport network, water supply, drainage and solid waste seems far from being addressed. The garbage collection level is estimated at around 65 percent, while the remainder of the waste ends up on the streets, public areas, water courses and the surrounding environment. According to studies made by Habitat, 30 percent of households of the city lack private or communal sanitation facilities and some of the available toilets are sub-standard. Subsequently, the urban environment is exposed to problems of uncollected garbage, poor housing due to poorly managed areas, health problems of the people and reduced economic productivity of households as well as loss of community amenities (UN-HABITAT, 2007)).

In this context, the city requires a systematic plan and strategies not only for proper growth of the city, but also for better living conditions and better environmental qualities. Keeping the above aspects under consideration, Addis Ababa is chosen for the study.

## **OBJECTIVES OF THE STUDY**

The General objective of the study: - The general objective of the study is to assess the impact of urbanization and industrialization on the environment of Addis Ababa city. Its specific objectives are:

- To assess the population growth of Addis Ababa city and urbanization
- To analyze the growth of industries and economic development of the city

- To study the changes in urban land use pattern and physical growth of the city.
- To assess the impact of urbanization and industrialization on the environment, and quality of human life
- To examine the status of available public utilities and amenities, and identify the problems.
- To formulate strategies and action programs for healthy and comfortable urban environment and better quality of human life

## **DATA BASE AND METHODOLOGY**

### **Level of Analysis**

The administrative structure of Addis Ababa has three levels. These are the central city administration, Sub-city, and kebele. The city is divided into ten sub-cities (Plate-1.1, 1.2 & Table-1.1) and about 99 kebeles. For the purpose of this study, the study area is classified into two distinctive morphological, demographic and functional zones, namely central and peripheral. Central Addis Ababa incorporates Addis Ketema, Arada, Qirkos and Lideta sub cities; and Peripheral Addis Ababa incorporates Akaki Qaliti, Bole, Gullele, Kolfe Keranio, Nefas Silk Lafto and Yeka.

### **Nature of Data**

This study is aimed at assessing the impact of urbanization and industrialization on urban environment in Addis Ababa city, its main emphasis on temporal and spatial variations in the development of industries, population growth, land use changes, infrastructure, public services, and housing. It is intended to cover the entire city region. Hence, data for this study was obtained from secondary sources. Therefore, this study relied on the most current socioeconomic data obtained from: Addis Ababa City Government (AACG), Central Statistical Authority of Ethiopia (CSA), traffic police officers, and kebele officials; they provided crucial information (mainly tabulated data) for this study. Secondary data for this study was also obtained from other several published and unpublished literatures. The available data covered population, economic, environment, housing and social issues of Addis Ababa.



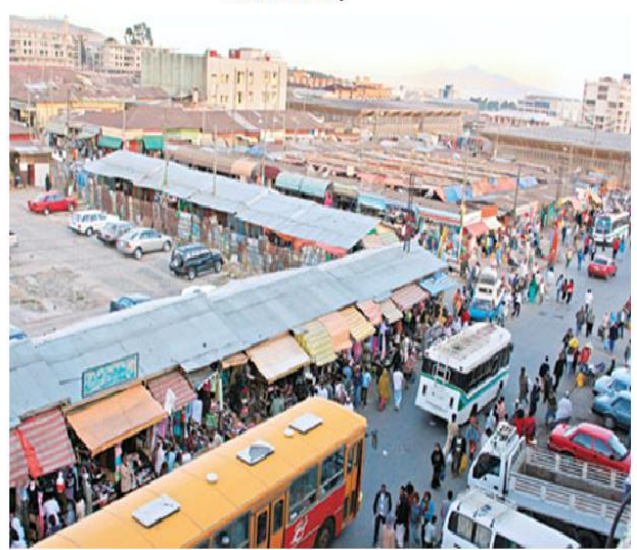
Kirkos Sub City



Lideta Sub City



Arada Sub City



Addis Ketema Sub City

Source: AACG, 2010

Plate-1.1: Central Sub Cities of the Study Region





**Nefas Silk Lafto Sub City**



**Bole Sub City**



**Akaki Qaliti Sub City**



**Yeka Sub City**



**Kolfe Keranio Sub City**



**Gullele Sub City**

Source: AACG, 2010

Plate-1.2 Peripheral Sub Cities of the Study Region

Table-1.1 Distribution of Sub Cities in the Study Area According to Density of Population

Sub City		Population size	Area in sq. km	Population Density (population per sq. km)
Central	Addis Ketema	271,644	898	302
	Arada	225,999	1,156	196
	Lideta	214,796	1,240	173
	Qirkos	235,441	1,626	145
	Total	947,880	4,920	193
Peripheral	Kolfe Keraniyo	456,219	6,510	70
	Gullele	284,865	3,273	87
	Yeka	368,418	8,230	45
	Bole	328,900	12,093	27
	Akaki Qaliti	195,273	12,613	15
	Nefas Silk Lafto	335,740	6,510	52
	Total	1,969,415	49,229	40

Source: AACG, 2010

### Methods of Data Analysis

Both quantitative and qualitative techniques were used to analyze the data. Geographic Information System (GIS) is used to produce maps showing the spatial and temporal variations of different physical and human characteristics of the study area. Physical characteristics are factors like infrastructure, land use changes, environmental impact, and urban heat islands. Human factors include housing conditions and population growth. Tables and percentages were the main techniques of analyzing and

presenting the collected data. The adequacy status of social amenities and facilities were assessed against the standard set earlier in the literature.

### **Research Significance**

Urbanization has resulted in many problems over the years in the developing countries of which Ethiopia belongs. Some of these problems include inadequacy of infrastructural facilities, waste management systems and housing shortages. In this thesis the author wants to reveal the impact of economic development on land use, population growth, infrastructures, public services, housing, and transportation systems in the Addis Ababa city. This study, therefore, aimed at giving the contemporary housing, transportation and other infrastructure conditions of the city to the urban development policy makers and planners of the country and municipality of the city to improve the living standards of the Ethiopian urban residents in general and the city's in particular. It also aimed to motivate other concerned bodies and NGOs to alleviate problems of the structural characteristics of housing, housing facilities and housing conditions of the study area. The thesis can also provide preliminary information which serves as a springboard for other planners and researchers who are interested in further study in the area and in other parts of the nation at large. Last but not least, the paper provides the concerned agents with possible recommendations.

### **Limitations of the Study**

It is known that service economic sector, typically commercial activity is one of the most important economic activities of modern cities including Addis Ababa. The absence of service and commercial activities in the assessment of the pattern of economic development may make this study to lose its balance. However, due to lack of documented data, this study based its discussion on industrial activity mainly on micro and small scale industries; workforce, number of jobs, informal sectors, and dependency burden.

## **REVIEW OF LITERATURE**

### **Urbanization as a dominant demographic process**

Many urban studies (UN-HABITAT, 2010; Kaltheier, 2002; Ichimura, 2003; Allis and Harris, 2004; *Raymond J. et al*, 2002; WRI, 2002; Linares, 1994, 2003; United Nations, 2004; Ziegler et al, 2003) indicate that more than any other time in history, urbanization became a dominant demographic process in the developing countries especially those in Africa and Asia. This is especially significant after the second half of the 20<sup>th</sup> century. As a result, today, more than half of the world's population is living in a settlement designated as an urban area.

The causes and determinants of rural–urban migration were elaborated in the works of Todaro (1997), and Richard Jolly (1970). Extensive urbanization in industrialized countries involved a process that took well over a century. Heavy industrialization induced massive inflows of people from rural hinterlands (Kojima, 1996; Girma, 2004).

In developing countries mainly in Africa, however, the case of unprecedented urban growth is mainly due to high natural urban population growth and massive rural urban migration. The lack of possibilities for development in rural areas, climate change as well as insufficient infrastructure and working opportunities still forces more and more people to migrate to cities that are ill-prepared for the influx and are unable to supply necessary services and infrastructures. Important literatures in this regard are: - Wegelin and Borgman, 1995; Brunn and Williams, 1983; Drescher and Iaquina, 2002; Coquery-Vidrovitch, 2005; Barrios et al, 2006; Domenach-Chich, 2000; Harsch, 2001; UNEP, 2003; United Nations Population Reports, 2002; Cohen, 2005; Balchin *et al*, 2000; Mohammad et al, 2007. Beside these, urban bias, nature of investment and policies of various governments serve as a pull factor for migration in the urban areas (Lipton, 1977).

Kitchin and Thrift (2009) described migration as a principal factor influencing patterns of urbanization. Migration from rural to urban areas, and from smaller to larger urban areas, is a principal contributor to increasing levels and rates of urbanization.

Emigration and immigration can also be important processes, affecting levels and rates of urbanization within both sending and receiving countries.

Of the above mentioned two factors of urban growth, rural-to-urban migration has been the principal focus of researchers because of the reason that: there is common belief that migrants to cities present greater challenges in terms of labor absorption and political stability naturally has led to the intense focus on this phenomenon (Bienin, 1984; Herrick & Hudson, 1981).

### **Nature of Urbanization in Africa**

The nature of urbanization in Sub-Saharan Africa has dual dimensions; first there is an increasing but steady growing in industrialization, service sector, infrastructure and communication; second, increasing vulnerability to environmental, social and economic challenges (Obudho & Juma, 2000).

The study made by Todaro (1997) has made clear that rates of urbanization have greatly exceeded rates of urban job creation and swamped the absorptive capacity of both formal-sector industry and urban social services in Africa. Likewise, the study made by Mohammad *et al* (2007) on demographic dimensions of the urbanization process in selected East African countries showed that population growth will require unprecedented investment in new infrastructure and create undreamed challenges for political and social institutions in Sub-Saharan Africa.

### **Environment and Ecology**

These days, studies of environmental and ecology are gaining importance, especially in cities of developing countries because, rapid economic development due to urbanization affects the quality of the environment. Important studies regarding the environment and ecology are: Listengurt, F.M (1976), C.S. Yadav(1986), K.C. Pattnayak et al(1986), Eric. L. Hyma (1987).

## **Urban Challenges**

Many studies show that urban areas of the Third World predominantly lack basic municipal services such as water, sanitation, waste collection facilities, storm drainage, street lighting, paved foot paths, and road for emergency access. They also do not have schools and clinics within reach, safe areas for children to play and places for the community to meet and socialize. More than one million people live illegally or informally developed settlements, with little or without drinking water, sanitation or other services (World Bank, 2001; Potter & Lloyd-Evans, 1998; WFP, 2006).

## **Infrastructure**

The importance of urban infrastructure facilities for efficient urban services is described in the study of Estache et al, 2004. It has long been recognized as a key element of the enabling urban environments for economic, technological and social growth. Freire (2006) puts public transport as the most valued services in making the development of successful cities. He also points out adequate infrastructure as one of the most important factors for city comprehensive development.

However, several studies (Estache, et al, 2004; UN Population Reports, 2002; Alguliyev & Abdullayev, 2008; Gwilliam, 2003) show that mainly due to rapid rural-urban migration, in many urban areas of developing countries key infrastructure services including that of transportation system are still in serious short of supply and of poor quality. This results in traffic congestion, traffic accidents and peak hour problems. These in turn result in waste of time and funds, and loss of ecological environment.

Some scholars have studied the transportation system and its problems in Addis Ababa. Important studies in this respect are: Mintesnot and Takano, 2007; Yetnayet, 2012; Ethiopian Road Authority, 2005. These studies show that the majority of the city's road network is gravel and do not have drainage and foot path facilities.

## **Housing**

According to some studies, the majority of the Addis Ababa city population lives in substandard housing. The quality and quantity of houses in the city are in very severe conditions. Important studies are: AACG, 1998; Tegegne, 2002; Solomon, 1999; OXFAM, 1990; Tarekegn, 2002; CSA, 1994; PADCO, 1996; UN Habitat, 2000.

## **Physical Expansion**

Currently, the rapid rate of urban growth in developing countries does not correspond to economic development, social change, and technical advancement. Further, the unplanned and uncontrolled physical expansion of cities greatly exceeds the resources available and has posed economic, social, and environmental challenges to the governments of the respective countries (Hardoy *et al.*, 2001).

Most municipal governments of developing countries lack financial and administrative resources to provide newly expanded areas with infrastructure and basic urban services. As a result, there is inadequate provision and the existing services are not sufficiently maintained (Cheema, 1993).

Lowton (1997) showed the impact of horizontal expansion of cities on agricultural lands and areas of natural beauty. Cities of developing countries are expanding horizontally and the population is moving to unplanned settlements on the peripheries at the expense of agricultural lands and areas of natural beauty. According to Hardoy *et al* (2001), unplanned and uncontrolled expansion of cities' built-up areas usually leads to problems of soil erosion, segregation of low-income groups in ecologically sensitive areas, and increased costs in terms of infrastructure provision.

The study made by Minwuyelet (2005) showed that the degree of urbanization in terms of physical expansion has outpaced the infrastructure and basic urban service provision capacity of Addis Ababa city, which as a result, are inadequately provided. According to the study conducted by the Urban Development and Works Bureau of Addis Ababa in the year 2000, the total area covered by squatter settlements in Addis

Ababa was circa 2000 hectares and about 300,000 people were living in 60,000 squatter housing units (UDWB, 2002).

## **PROFILE OF THE STUDY AREA**

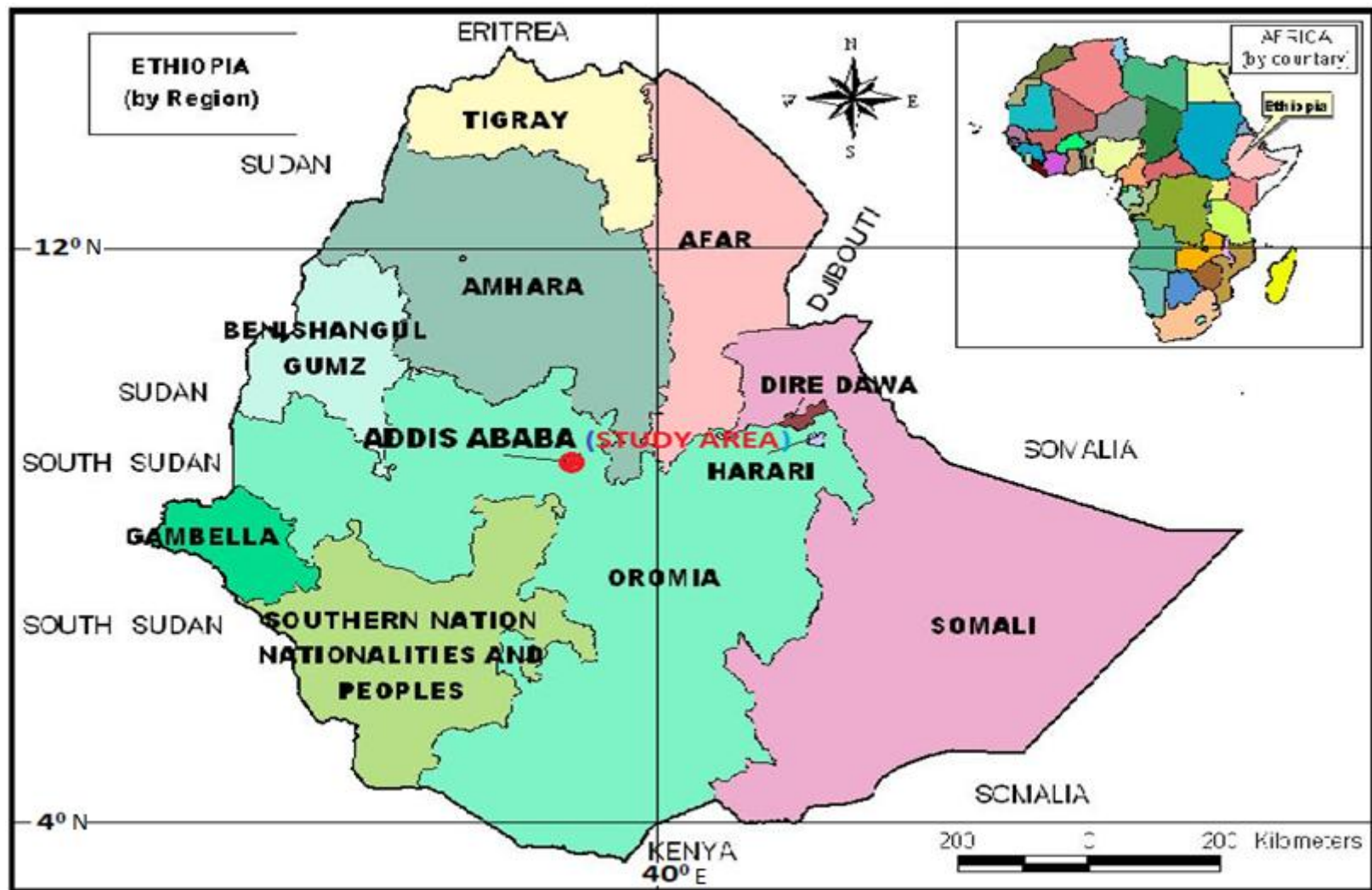
### **Location and Area**

Addis Ababa city, capital of Ethiopia is situated in the plateau of central Ethiopia in the North-South oriented mountain systems neighboring the Great Rift-Valley (Fig-1.1& 1.2). It is located between the geographical coordinates of 09°02'N latitude and 38°44'E longitude, with an elevation ranging from 2000-2800msl and it is the highest capital in Africa and the third highest capital in the World. Its topography is constituted by hills, rivers and streams. The city is surrounded by Mount *Yarer* to the east having approximately the same height as Mount *Entoto* and Mount *Wochecha* to the west (Beyene, 1999; Tamiru et al, 2005; Kebede & Tadesse, 1990). It is estimated that the total area of the city covers 54000 hectares, of which about 22000 hectares of land is designated for green frame. Out of the 22000 hectares of land designated for green frame, only about 7900 hectares are estimated to have been covered by trees. According to the revised master plan of Addis Ababa, 12500 hectares are to be covered with forests (AACG, 2010; CSA, 2010).

### **Administrative Structure**

The administrative structure of Addis Ababa has three levels. These are the central city administration, sub-cities and kebeles. The city is divided into ten sub-cities and 99 kebeles. The administrative structure of the city is shown in Fig-1.3.





Source: CSA, 2010

Fig-1.1 Location Map of Ethiopia and its States in Relation to Africa

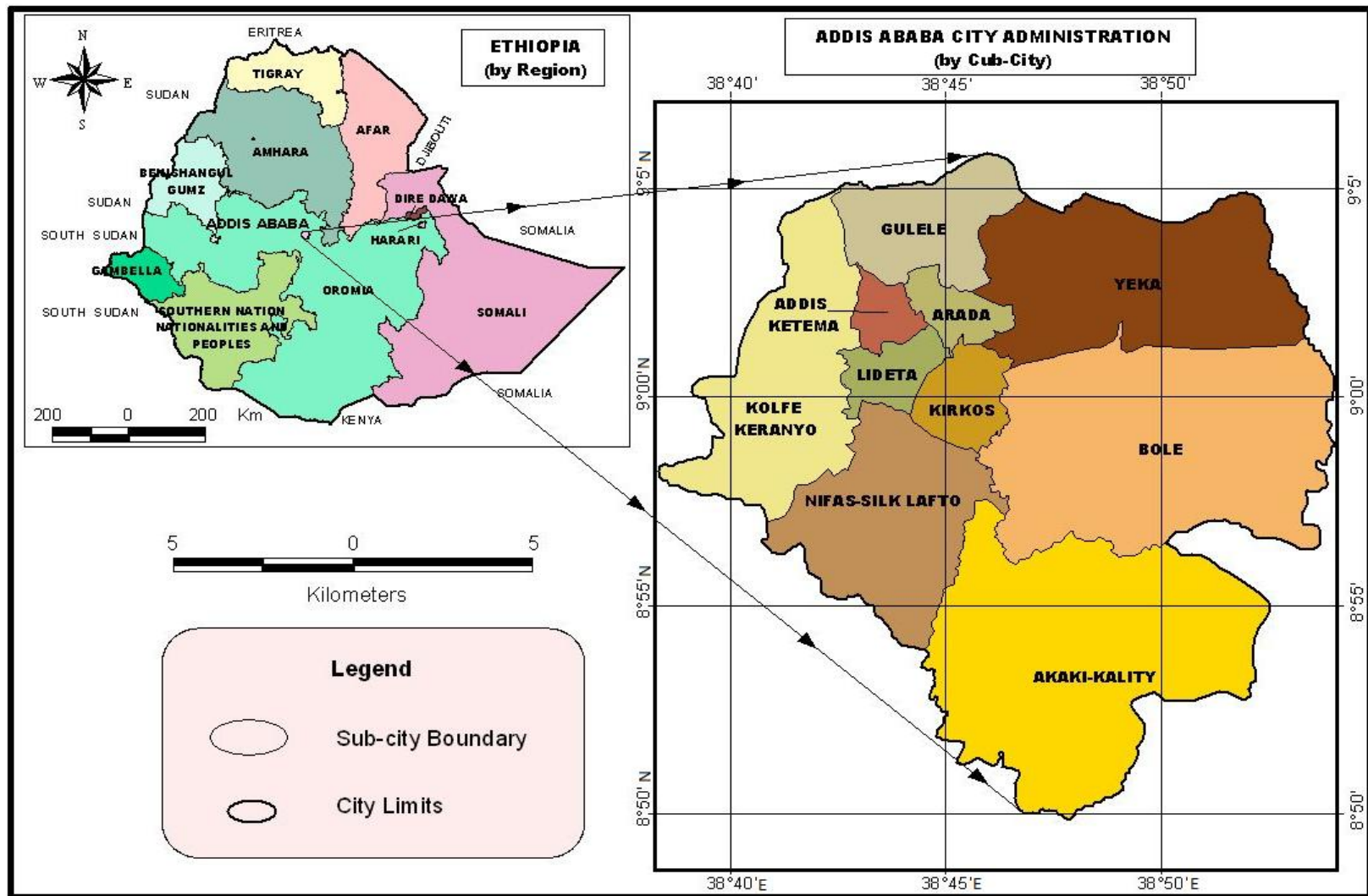


Fig-1.2 Location Map of Addis Ababa in Relation to Ethiopia

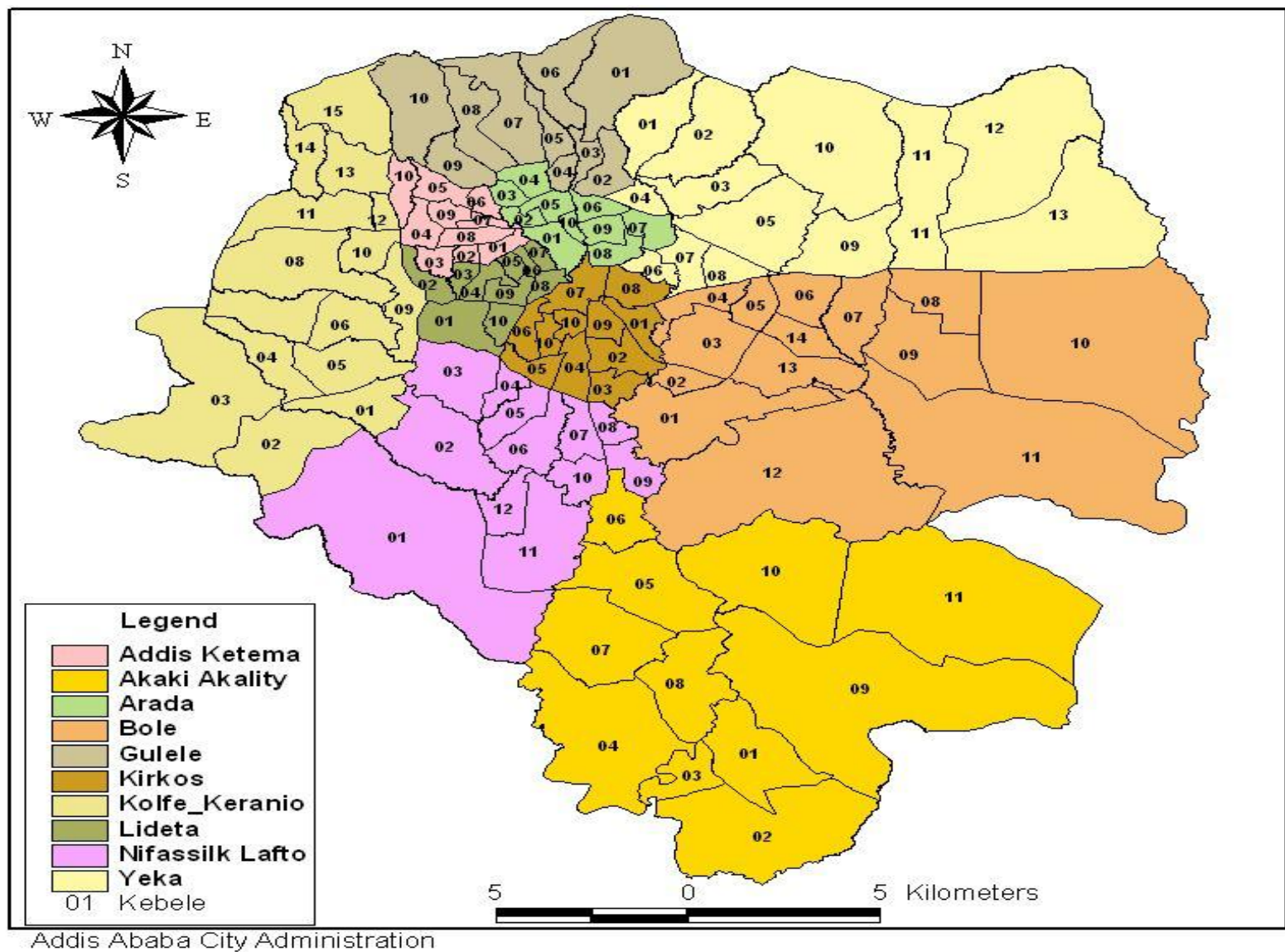


Fig-1.3 Administrative Structure of Addis Ababa According to Sub Cities and Kebeles

## **Historical Background of Addis Ababa City**

Addis Ababa has a history of an about 120 years. In these years, the city has shown an extensive socioeconomic and physical growth. It has already emerged as a city that has both international and national significance. The international significance of the city is revealed as the city serves as seats of various international organizations and embassies whereas the national significance comes from its position serving as major commercial, industrial, education and political center of the country.

In the course of its history, the city was having around 6 master plans in which many of them prepared by foreign consultants and institutions. Nevertheless, none of them fully implemented. This was mainly of the poor enforcing and implementation capacity of the city/municipal administration.

As the result, the development of the city during much of its history continued in a haphazard fashion. To guide the city's development in an integrated way, a new development plan made in 1986 by a national institution called NUPI (National Urban Planning Institute). This master plan again revised by ORAAMP (Office for the Revision of Addis Ababa Master Plan) in 2002. One of the major objectives for the revision of the city's master plan was "to facilitate the expansion of infrastructure and urban services.

## **Physical Characteristics**

### **Climate**

As the study area is located at high altitude, the climate is comfortable with optimum temperature and rainfall. Meteorological data show that the average rainfall of Addis Ababa is about 1127 mm per year, with the major rainfall occurring between July and September. The minimum mean monthly temperature of the region ranges between 8 °C to 12 °C, while the maximum mean monthly temperature varies between 20 °C to 25 °C, throughout the year (AACG, 2010; CSA, 2010).

## **Geology**

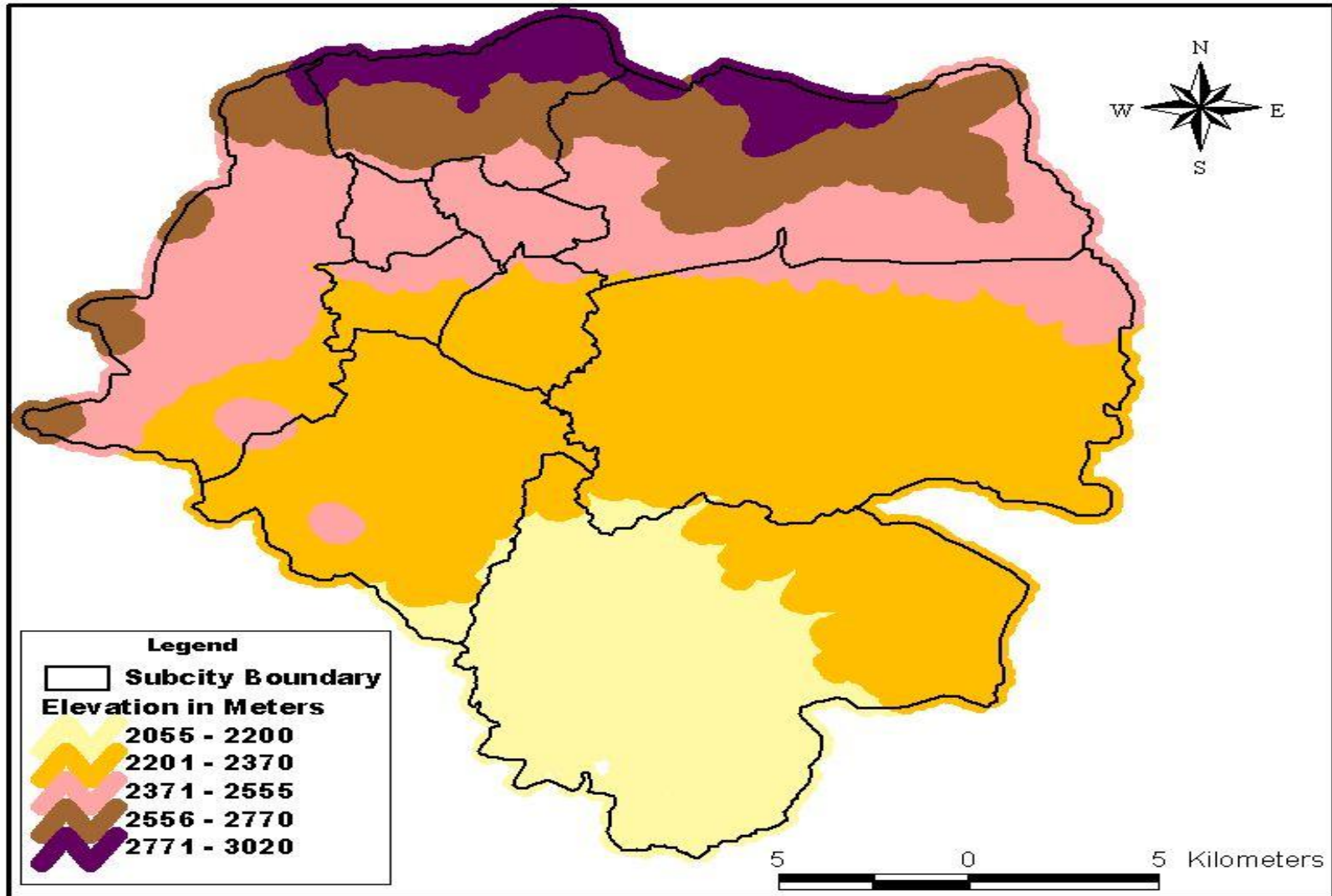
Initially, Addis Ababa was founded on the southern edge of the Entoto ridge (3139 m. a. s. l.) and expanded in all directions. Other prominent volcanic features surrounding the city are Mt. Wochacha in the west (3385m. a. s. l.), Mt. Furi (2839m. a. s. l.) in the southwest and Mt. Yerer (3100m. a. s. l.) in the southeast. These typical volcanic features are mainly built-up of acidic and intermediate lava flows. Thus, they are characterized by rugged landscapes and steep slopes. The topography slopes down from the Entoto Mountain in the north to the southern border of the city (Fig-1.4), with a number of steep-sided valleys, rivers and streams. The center of Addis Ababa lies on an undulating topography with some flat land areas.

The topography is undulating and form plateau in the northern, western and southwestern parts of the city. However, Bole and south western part of the city are characterized by gentle morphology and flat land areas. As a result, the stream drains towards south from the Entoto ridge; southeast direction from Mt. Wechecha and Mt. Furi and towards southwest direction from Mt. Yerer and other elevated areas of the eastern outskirts of the city.

## **Soils**

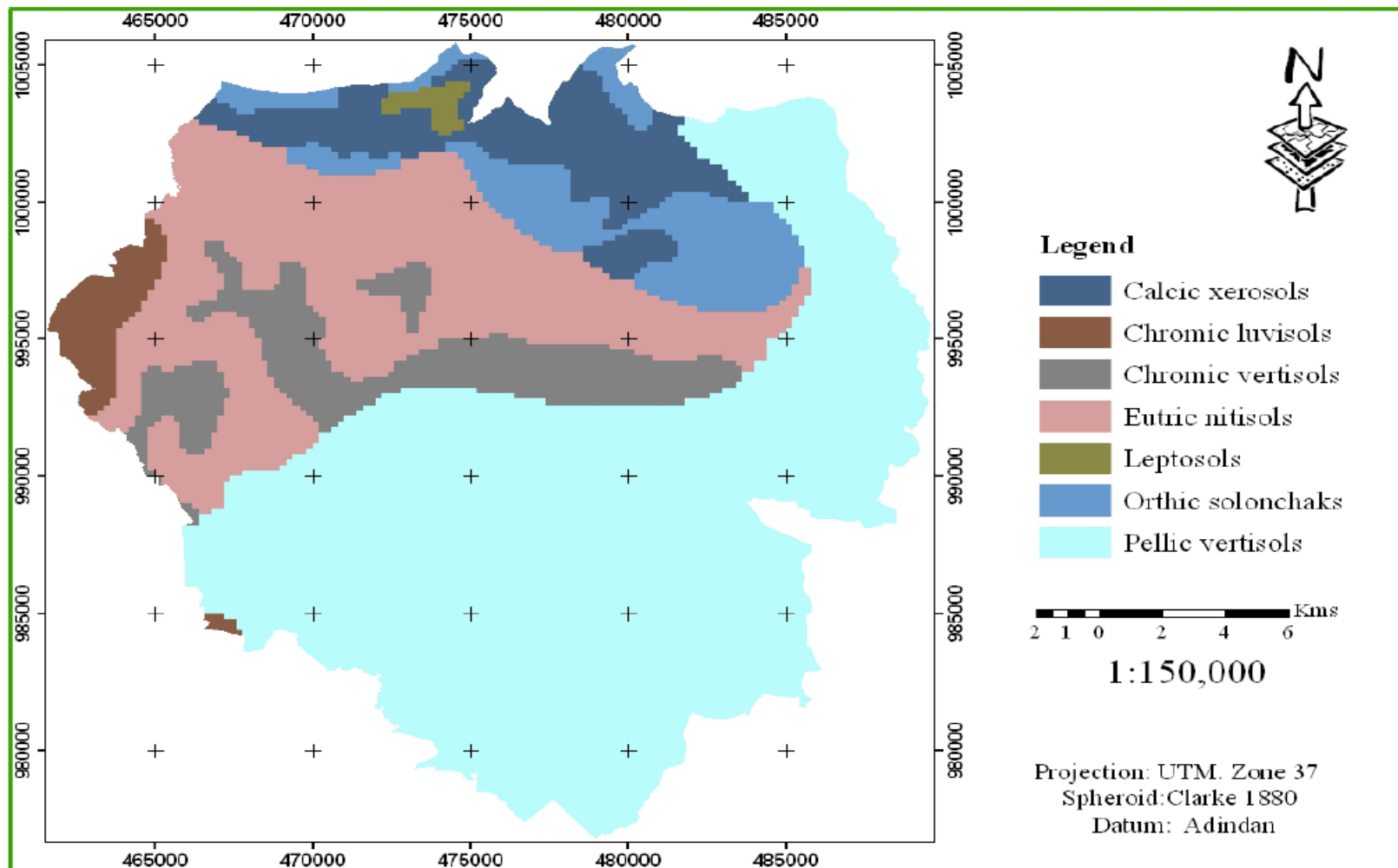
The five soil forming factors namely climate (temperature and rainfall), topography, parent material, biological activities (flora and fauna) and time determine the types of soil that are formed in a particular area. As a result, soil can vary from place to place. Accordingly, the soil of Addis Ababa is classified into seven major types (Fig-1.5) namely Calcic Xerosols, Chromic Luvisols, Chromic Vertisols, Eutric Nitisols, Leptosols, Ortic Solonchaks and Pellic Vertisols (Ethiopian Ministry of Water and Energy, 2004). The dominant soil of the region is Pellic Vertisol (277.23 Sq.km) which is found in the south and northeast part of the city. Eutric Nitisol (111.55 Sq.km) is the second most dominant soil found in the central and North West part of the region. Calcic Xerosols (39.79 Sq.km) is the third most dominant type of soil found in the northern part of the city. Chromic Vertisols are the forth dominant soil of the region covering an area of about 34 Sq.km and found in the central part of the city center. The rest soil types are found in the northern part of the center covering smaller areas (Gizachew, 2011).





Source: EMA, Topographic map 1:50,000

Fig-1.4 Elevation Map of the Study Area



Source: Ethiopian Ministry of water & energy (2004) cited in Gizachew, 2011

Fig-1.5 Soil Map of the Study Area

## **Drainage**

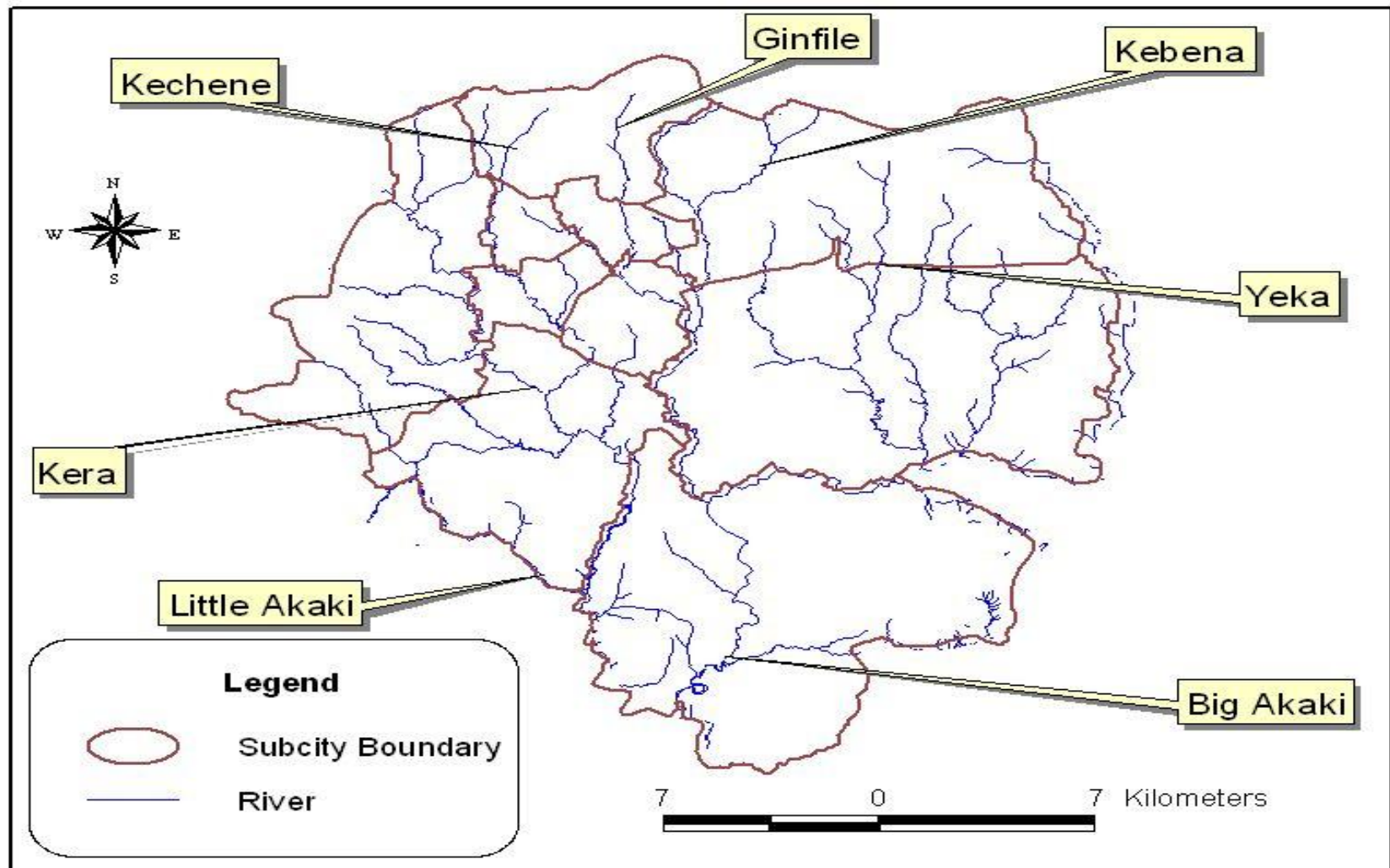
The region is also characterized by permanent and perennial rivers. On the tops of the hills and ridges, streams are dense and form radial drainage pattern, whereas on the slope and most part of the study area, they form a dendritic pattern. The major perennial rivers of the study area are Kebena, Little Akaki, Big Akakai, Kotebe, Ginfile, Tafo and Harku (Fig-1.6). There are also several intermittent rivers in the study area (Beyene, 1999; Tamiru et al, 2005; Kebede & Tadesse, 1990). Figure 1.4 and 1.6 depicts the elevation and drainage pattern of the study area respectively.

## **Vegetation**

The catchment areas of the rivers crossing Addis Ababa are on the one-hand characterized by the large urban area of Addis Ababa. On the other-hand, cultivated area, woodland and grassland are found on the banks of the rivers. The eastern part (Hanku river basin) is mostly covered with grassland. The northern part (Little Akaki, Kechene and Kebena river basins) is more or less covered with woodland but a certain part is intensively cultivated land and the urbanization is closed to the basin boundary and expands further.

Since the turn of the century, shortly after the foundation of the town, a number of eucalyptus plantations were founded in Addis Ababa and on the hills around (Inxoxo) in order to cover the demand of wood of the city. Due to enormous population growth, deforestation became a serious problem in the last two decades. In addition, mismanagement of the forest resources and failure in reforestation programs resulted in deforested hills in the mountainous region of the Inxoxo (EPAAA, 2010).





Source:- Addis Ababa City Administration

Fig-1.6 Drainage Map of the Study Area