



**COLLAGE OF SOCIAL SCIENCES AND HUMANITY**

**DEPARTMENT OF URBAN DEVELOPMENT MANAGEMENT STUDIES**

**THE EFFECTIVENESS OF URBAN LAND USE AND ITS  
DEVELOPMENT: THE CASE OF DEBRE BERHAN CITY, AMHARA  
REGIONAL STATE; ETHIOPIA**

**BY:**

**SEBLEWONGEL GELETAW**

**ADVISOR:**

**GETAMESAY TEFERA. (PhD)**

**NOVEMBER, 2013 E.C**

**DEBRE BERHAN, ETHIOPIA**



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A THESIS SUBMITTED TO THE DEPARTMENT OF URBAN DEVELOPMENT  
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**DEBRE BREHAN UNIVERSITY**

**COLLAGE OF SOCIAL SCIENCES AND HUMANITY**

**DEPARTMENT OF URBAN DEVELOPMENT MANAGEMENT STUDIES**

**THESIS FINAL SUBMISSION FOR DEFENSE**

**APPROVAL SHEET-I**

As members of Board examiners of the final MSc. Thesis open defense examination, we certify that we have read and evaluated the thesis prepared by **Seblewongel Geletaw** entitled “The Effectiveness of urban land use and it’s development in the case of Debrebirhan town, Amhara Regional state; Ethiopian,” and examined the candidate. We recommend that thesis be accepted as fulfilling the thesis requirement for the degree of masters of Science in urban development management.

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## **DECLARATION**

I, the undersigned, declare that this thesis prepared for the partial fulfillment of the requirements for degree of Master of science in urban development management entitled “The Effectiveness of urban land use and it’s development in the case of Debrebirhan town, Amhara Regional state; Ethiopia,” is my original work and has not been presented for a degree in any other university, and that all sources of material used for the thesis have been duly acknowledged.

SEBLEWONGEL GELETAW

Signature: \_\_\_\_\_

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**DEBRE BREHAN UNIVERSITY**

**COLLAGE OF SOCIAL SCIENCES AND HUMANITY**

**DEPARTMENT OF URBAN DEVELOPMENT MANGEMENT**

**ENDORSEMENT**

As Thesis Research advisor, I hereby certify that I have read and evaluated this thesis prepared, under my guidance, by Seblewongel Geletaw, entitled “The Effectiveness of urban land use and it’s development in the case of Debrebirhan town, Amhara Regional state; Ethiopia,” I recommended that it be submitted as fulfilling the thesis requirement for the degree of masters of science in urban development management.

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GETAMESAY TEFERA (PHD)

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Date: July, 2021

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## **ACRONYMS AND ABBREVIATION**

LUE	Land use efficiency
ULUE	Urban land use efficiency
NUPI	National Urban Planning Institute
CBD	Central business district
MOUDHC	Ministry of urban development housing construction
SP	Structure Plan
MoFA	Ministry of Federal Affairs

## ABSTRACT

*Urban land use plan is a tool to guide and manage the growth of cities in a planned manner. The soul of land use plan lies in the preparation and its implementation. By having this in consideration the main objective of this research is mainly targeted to assess and evaluate effectiveness of land use and its development efficiency by taking DEBRE-BIRHAN city as case study. This paper analyzed urban land use efficiency (ULUE) using structure plan data.*

*Besides this, qualitative data from secondary source were studied. Moreover, field observation was conducted. Research findings showed that a prevalence of urban land use in-efficiency. The problem of ULUE in the city could mainly attribute to strategically problem gap, prediction limitation. To improve land productivity, limit eviction and ensure sustainable urban growth the city should emphasis on improving ULUE. Therefore, controlling the population growth, biophysical and economic factors with its associated impacts on the natural environment requires the right policy packages by national and regional governments such as awareness creation, provision of family planning services, increasing productivity, working on the pushing factors of migration, controlling illegal settlements and use the right land use plan are some of the actions should be taken by the city administration. This study highlighted that a mere policy formulation is not enough to ensure efficient urban land use.*

***Key terms: - land use land development efficiency, structure plan implementation, land use efficiency problems, Debre-birhan***

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1 Background of the Study

Urban land use plan is a tool to guide and manage the growth of cities in a planned manner. The soul of land use plan lies in the preparation and its implementation. Of course, land is a finite resource for which the competition is intensifying because of rapid urbanization, growth of populations, and economic factors (Selcuk, 2019). In the last century there was a big change in world, one of which is a significant increase in the number of urban populations as compared to the population in the rural areas. In 1950, there was only 30% of the world population in urban areas, but in 2019 about 55.7% of the world population residing in urban areas. It means that more than half of the world population now lives in urban areas. Based on United Nation report by 2050, about 66% of the world population is projected to be in urban (UN, 2019). Increasing number of urban populations have a significantly related to increasing the number of megacities in the world. Within 2019 with 465 million populations which consisted of 50.9% urban population of the world (Swerts and Denis, 2019) and UN (2019) projected there will be 41 urban agglomerations or megacities in 2030.

Currently, all over the world in general and in developing countries in particular urban population and its demand for land for varies purpose is dramatically increasing every day. As a result of this rampant increase land use problems related with wrong land use decisions have been a main challenge for humankind. Housing and economic, genetically modified organisms, air pollution etc. are some outputs of land use problems (Denis, 2019).

Of course, the due urban development process in the developing land use planning has an impact on the efficiency of economic and social activities and also on the physical development of Debera-Berhan city Administration. As a result of this fact in several developing countries, urban land development and planning has led to concerns regarding the environmental sustainability of the urban centers. Emphasis is placed on residential land use. It is argued that the planning system, which is essentially a colonial legacy, does not adequately

respond to evolving changes in cultural, economic and social developments and hence, the spatial impact on residential land use (Selcuk Aydemir, 2019)

Urban land use efficiency in this regard refers to the utilization of land in a productive manner. It is basically how optimally a piece of land is used after conversion or after transferred to a third party (Huang et al., 2016). Land use efficiency in general refers to the function, which includes both the land use effect (a result) and consumed resources to achieve this effect (Auzins et al., 2013). According to Auzins et al., ULUE refers to both an indicator of an achievable goal and an indicator of consumable resources. In this study, it chiefly refers to urban land transferred for purposes such as residential, industrial and commercial purposes and whether it has been used for intended purposes according to the lease contract.

Urban land use efficiency can be affected by an institutional capacity to implement policies, rates of urbanization and economic growth. Hence, it can be operationalized using the density of built-up areas, degree of land hoarding or fencing in a city, the scope of land banking, urban sprawl, land fragmentation, etc. Land hoarding or fencing refers to vacant land or land unused for years (Németh and Langhorst, 2014). This includes plots held by private individuals/companies for speculation or future expansion, or by municipalities for future sale or development (land banking). Urban vacant land, according Németh and Langhorst (2014), is a common occurrence in most cities.

Land use efficiency analysis is done to evaluate the optimum use of land for various use types (Auzins et al., 2013). Because of this, it has been studied by different scholars focusing on issues such as agricultural productivity, farmland protection, land management, land use intensity, etc. (Auzins et al., 2013; Storch and Schmidt, 2008; Wei et al., 2018; Yang et al., 2017). For instance, Zitti et al. (2015) investigated ULUE of Southern Europe, particularly that of Greece. According to their findings, mixed land use, multiple-use buildings, vertical profile, etc. are some key variables associated with high LUE. Unsustainable urban growth, which creates land use inefficiencies, they argued, is a function of market forces, linked to weaknesses in policies and practices. Policies for sustainable land management should take local and regional factors into consideration, they advised. There are also studies on ULUE focused on urban and rural China (Wei et al., 2018; Yang et al., 2017). Ding (2001) studied Chinese ULUE from economic, mainly land market, perspective.

Increased international trade is leading to a situation in which land use and land governance are increasingly shaped not just by territorial factors but by the land requirements of flows at global, national and regional scales. Overall, there is an essential shift in land governance from territorial toward flow-centered arrangements at the global scale and even at the national scale. The flow-centered arrangements have been further shaped by the related measurement of land requirements and transfer flows. With the fact that economic globalization and market integration are increasingly accelerating, urban land use governance extending from the local scale to national and global scales through supply chains presents an essential significance to further solve urban land use issues.

Ethiopia is one of the few countries in Africa that has not made significant changes in its basic land use policy since the radical land reform of 1975, resulting in poor performance of agriculture despite of numerous initiatives and measures undertaken by the government. Currently the rapid growth of Debre Berhan cities has changed the urban land use, urban economy, urban land development also mentioned that rapid urban growth has a significant effect on various dimensions of cities, including, economic and housing.

Thus, this study will be conducted to analyze factors of dynamic evaluation on urban land use and land development efficiency, at Debre Brehan, North Shewa Zone Administrative town of Amhara Region, Ethiopia.

## **1.2 Statement of the Problem**

The land is an engine of economic development. Particularly, in countries where land is under state ownership, it has become a major driver of economic growth and a tool for macroeconomic stabilization (Lian et al., 2016; Rithmire, 2017). The contribution of land for economic development is substantial, mainly in developing countries. Studies showed that land and real estate assets account for 45%–75% of wealth in developing countries (Yusuf et al., 2009).

In Ethiopia, the land has been used as a policy instrument to attract domestic and foreign direct investment (FDI) (Lavers, 2012). In order to incentivize investment, land in urban, rural and peri-urban areas has been transferred to private and public companies. Precisely, Ethiopia's



urban land lease policy, according to the 2011 urban land lease proclamation, is formulated to attract both domestic and foreign direct investment. Investment attraction is chiefly to stimulate economic growth and reduce poverty. However, economic and social benefits from the land can only be realized if the land being transferred is used in an efficient and productive manner. Using land efficiently, according to Zitti et al. (2015) is vital for sustainable development from socioeconomic and ecological perspectives. Furthermore, understanding urban land use efficiency (ULUE) of a given area is essential to understand land productivity and land use sustainability (Zitti et al., 2015). To the contrary, urban land use inefficiency poses a serious challenge to sustainable urban development (Zhu et al., 2019). Therefore, understanding ULUE is vital to design appropriate land policies or fill gaps in existing ones.

In Ethiopia, rapid population growth and uneven spatial population distribution have been putting immense pressure on the natural resource base, leading to a gradual deterioration in both quantity and quality. According to Mamo (1995), Embaye (2000), and Tefera (2009), population growth leads further to unnecessary natural resource exploitation such as forest clearing both for farming and settlement purposes, short fallow periods, and land fragmentation which has a direct adverse effect on land use output. Ethiopian cities are growing in a low-density development pattern and the growth was not led by an urban plan. Such types of development have the potential to obstruct the growth of rapid and sustainable urbanization. It has an impact on the cost of infrastructure development and service delivery, supplying developed urban land for a different development purpose, the efficiency of mass transports within the city administration and its impacts extends beyond their administrative boundary. To sustain urban development and rapid urbanization, the supply of urban land must be sustainable and should be utilized in an efficient manner. To ensure this city might implement different land use regulations and planning tools. Thus, land use regulations and plans must be supported by appropriate density regulations and standards based on the level of development (capacity), environmental and socioeconomic within the city administration.

In Debre Berhan, the existence or the lack of land use efficiency gaps is not investigate in the study area to assessment of the processes and factors leading to population dynamics and the resultant land use efficiency becomes indispensable and timely to promote sustainable economic, social and ecological development in the study area in particular and the town

general. Such a study would also serve as a basis to influence development interventions and to population settlement changes and natural resources degradation and land management. Therefore, the main problems in cities of developing countries are proper utilization of society, population pressure that lead to activities of satisfying the basic needs, lack of balanced income collecting from improved property value for more investments, low resource base of institutions on infrastructure expansion, lack of priority to roads, the influence of poverty, corruption, uncooperative attitudes of the local people and concerned stakeholders, non-availability of information to the society about the benefits of infrastructure land use planning monitoring and evaluating processes.

### **1.3 Objectives of the Study**

#### **1.3.1 General Objective**

The main objective of this thesis is to assess dynamic evaluation on land use and land development efficiency in Debera Berhan town.

#### **1.3.2 Specific objective**

- To investigate the efficiency of land use and land development in the city.
- To evaluate the status of land use efficiency in the city
- To find out the main factors influencing land use efficiency.
- To indicate better mechanisms for land use.

### **1.4 Research Questions**

1. How much the land use is investigated among the land use and land development in the city?
2. How is the efficiency of the land use in the city?
3. What are the factors that affect the land use efficiency?
4. How to indicate better mechanisms for land use?

## **1.5 Scope of the study**

The Land use is the management of land to meet human needs. The category of settlement as a land use includes areas devoted to human residence, investment, and industry on Debre Berhan town. This thesis work mainly focuses on Debre Berhan town land use and land development efficiency. The thesis answer questions raised related to Debre Berhan town urban land use against land use categories and efficiency of the land development in the town.

## **1.6. Significance of the study**

The problems of inappropriate use of land and inefficient land value are common in Debre Berhan town. These challenges affect the growth of town and economic development. This thesis study will show how much the land use is appropriate and the efficiency of land development in the town over the population and economic aspects. This will be initial point for the town land managers and other researchers as a reference.

## **1.7. Limitation of the study area**

The research is limited to land use efficiency and land development. In doing the research, the researcher faced the following problems of land use management. Some of the respondents especially land managers and town administration did not return the questionnaires as per the planned schedule. The other problems were reports and archival document had no sufficient information's related to a research topic.

## **1.8. Definition of operational term**

### **Urban Land use**

**Land use:** The term land use has been attempted to be defined differently from various perspectives by different scholars. Land use has seen as a product of interactions between a society's cultural background, skill and its physical needs in one hand and the natural potential of land on the other hand (Ram Kolakar, 1993).and Land use is also defined as men's activities on land, which are directly related to land. Land use is characterized by the arrangements, activities and inputs by people to produce change or maintain a certain land

cover type (Di Gregorio and Jansen, 1998). Land use defined in this way establishes a direct link between land cover and the actions of people in their environment. Land cover is the observed (bio) physical cover on the earth's surface (Deng and others, 2009). Land cover + Land utilization = Land use. According to FAO (2000) "Land use is the arrangements, activities and inputs that people undertake on a certain land cover type, According to this definitions land use reflects human activities such as the use of the land like industrial zones, residential zones, and agricultural fields etc. The above definitions establish a direct link between land use and the actions of people in the environment.

### **Urban Land development**

Land development is a process that involves changing or intensifying use of land to create buildings for settlement. Land development can be defined as "utilization a place or area consisting of surface of land and also the space above earth surface and below earth surface".

### **Urban land use efficiency**

The efficiency of urban land use is mainly concerned with how efficiently land within the built-up area has been used. A rate of urban boundary expansion (land consumption), which is faster than urban population growth means inefficient urban land use.

### **Urban land value**

Land values tend to be very high; this is the result of great competition to locate here. It is cheaper to build up than out. Also, there is a limited amount of open space available. New developments tend to focus on redeveloping existing areas rather than using the limited open space available.

## **1.9. Organization of the paper**

The document is organized in to four parts each of which are further section. The first part provides the introductory part which presents the background, definitions and objective. The second part continues with standards and norms for land use relation between population, investment, industrial, urbanization and land use efficiency in Ethiopia thereby providing

standards for the major components land uses of a structure. The document winds up with part three which method and budget.

## **CHAPTER TWO**

### **2 LITERATURE REVIEW**

In this chapter; papers related to this thesis were reviewed and presented as in seven sections. The review of literature, the study has appraised existing debates on population and economic; causes of land use efficiency and land development. It further incorporates issues like changes that mediate population as driver land use, investment, industrial practices, settlement, land use for population, and as agents of land use dynamics particularly focusing on Ethiopia.

#### **2.1. Theoretical Literatures on Urban Land Use and Land Development**

##### **2.1.1 Residential Theory**

Theory in respect of residential location asserts that the typical householder wants convenience, adequate space and a pleasing environment. Therefore, as well as the straight economic considerations applicable to industrial and commercial space we have the influence of a far more subjective factor. Personal preferences can be fickle and what may be desirable to one consumer may be undesirable to another. In addition, "fashion" can play a significant role. Before the advent of modern transportation facilities, "convenience dictated that residential locations were very much tied up with proximity to a workers place of employment". Today however, housing can be located almost anywhere within a large commuting zone, and the location, style and amenities are dependent on the workers personal "trade off" preferences along with willingness and ability to pay. As can be seen from the above, there are a large number of theories seeking to explain urban land use patterns and we have not even started to consider political factors, nor the more esoteric mathematical models. This serves only to indicate the complexity of the situation, and the fact that no one model is adequate.

Reviewing all the above it is usually the sector theory in combination with the multiple nuclei concept that provides the most meaningful "holistic" explanation of the land use patterns found in modern cities. That being said there is quite significant variations apparent which some of the other theories can help explain. One of the most important is to consider the

relative size of the city and its economic base. With a small rurally based economy the land use patterns are likely to tend towards the concentric ring theory. If a city is larger and more industrialized the sector theory is more likely to be applicable, and when the city becomes very large the sector theory in combination with the multiple nuclei concept is most likely to be dominant. (First published as a series of articles in the Property and Land Economy Institute of New Zealand Newsletter, May – August 1997 and based on an essay written for a masters subject in 1995)

### **2.1.2. Economic Base Theory**

This theory can help identify which particular industries are dominant in a city, and as a consequence, the factors above most likely to influence the direction of industrial growth.

### **2.1.3. Succession Theory**

All other theories assume that over time, urban growth will result in a "succession" of different land uses as the "highest and best use" changes. In this way, for example, commercial areas that are already constrained by other surrounding uses (in a ring or sector) will eventually expand only by the acquisition and redevelopment of neighboring uses, changing their character to that of the commercial property.

The theory of succession is also considered to apply to the residential property market and may occur in advance of acquisition pressure by other uses. For example, occupants of older but originally high-cost housing close to an expanding commercial area consider the prospect of modernizing and rebuilding their houses but often decide instead to sell. In doing so a filtering down process commences, in which high cost and medium cost houses of yesteryear gradually decline and are occupied by a succession of lower income owners and tenants until they are eventually converted into apartments or flats. Eventually these are demolished and replaced with commercial or industrial premises. The succession theory is therefore a useful overlay to the broader theories in explaining the transitional areas that often occur between land uses, but are not explained by other theories (First published as a series of articles in the Property and Land Economy Institute of New Zealand Newsletter, May – August 1997 and based on an essay written for a masters subject in 1995)

## **2.2 Urbanization and Urban land Use land Development Efficiency**

**Urbanization:** Andrea Emma Pravitasari (2015) Explained urbanization as a growth in the proportion of a country's population living in urban centers of a particular size. He also mentioned that urbanization synonymous with the increasing of population in cities or towns through migration from rural areas because of social and economic changes, or in other words, a transformation from a rural to urban-based societies.

Rapid urbanization causes disorganized and unplanned growth of the towns and cities. The pressure of an ever growing population becomes the burden on the limited civic amenities which are virtually collapsing; there is the need to balance present requirements of land against future needs. Prevention of agriculture land in the fringe area of expanding cities is a vital for preserving and maintaining open space and therefore environmental qualities (Farooq and Ahmad, 2008). Urban growth has resulted in the conversion of land for urban uses without any systematic development plan and without a corresponding investment in infrastructure. Poor land management has resulted in urban areas with inadequate service, infrastructure and corresponding lack of accessibility, that may prove very costly to resolve in future (Gupta and Sen, 2008). To prevent urban sprawl and leads to an improper development in any city on future, it is necessary to monitor the growth of city for sustainable urban development (Kumar et. al., 2007). It is important to study the and understand these trend of urban sprawl as it is one of the potential threats to sustainable development where urban planning with effective resource utilization and allocation of infrastructure initiatives are the key concerns and would help in effective land use planning in urban areas (Saravanan and Ilangovan, 2010).

All cities have an image. Infact, it would be truer to say that all cities have, and always have had, a number of images. The only consistent thing about cities is that they are always changing (Verma 2008). Urbanization is one of the dynamic and serious issues at present. Rapid urbanization results the unsystematic and unplanned growth of urban centers. The pressure of an ever growing population becomes a burden on the limited civic amenities which are nearly failing (Emtehani, M R. et al., 2012). Urbanization is a process through which the productive agricultural land, forests, surface water bodies and ground water prospects are being irretrievably lost. Growth of infrastructure has not kept pace with the growth of the population, resulting in disequilibrium in the level of development (Tali, J.A.



and Murthy, K. 2012). Urbanization involves much more than the mere increase in the number of people living and working in towns and cities. It is driven by a series of interrelated process of change such as economic, demographic, political, cultural, technological, environmental and social changes (Mulligan ,2013: you,2016)

### **2.2.1 Urban Residential land use and Land use land development Efficiency**

Residence is also an important contributor to human wellbeing, although it can be a means to create and perpetuate segregation. Where one lives determines accessibility to a host of services, amenities, education, jobs, and more. Housing accounts for approximately 4% to 7% of all the total land area in the United States, when including rural residential lots (Emrath, 2006). As such, it is an important contributor to the conversion of open space and agricultural land to developed uses. From 1980 to 2009, the number of residential buildings has steadily increased from 81.6 to 113.6 million units (EIA, 2012). Along with an increase in the number of residential buildings, the size of the residential buildings has markedly increased. For example, homes built since 1990 are 27% larger than those built in previous decades (EIA, 2012). However, the trends in housing are not unidirectional. Although the number and size of residences has steadily increased, the median lot size has steadily decreased. As an example, the median lot size in 2009 was 0.26 acres compared to 0.42 acres in 1991, a 38% decrease in land area (BOC, 1991, 2009). This indicates a gradual increase in housing density, perhaps an indication of the increasing demand for more traditional neighborhood developments. In fact, more evidence supports the idea that smart growth principles are becoming more popular. In nearly 75% of large metropolitan areas between 2000 to 2009, infill housing development (new housing in previously developed areas) grew as a share of all new housing (US Environmental Protection Agency, 2012b).

However, smaller lots may not actually indicate a smaller per capita footprint as homes are sheltering fewer people on average. Over several decades, the average number of people per household has steadily decreased since the 1940s although the average has markedly leveled off, potentially due to the economic down turn and the shift to multi-generational households (BOC, 2011). And though infill housing is becoming more prevalent, Greenfield home construction still accounts for the majority of all new homes on almost all cities (US Environmental Protection Agency, 2012b).

### **2.2.2. Urban Population growth and urban land use land development Efficiency**

Urban populations are increasing rapidly. In approximately 2007, for the first time in history, more people will live in urban than rural areas (United Nations, 2000b). In coming decades, urban populations are expected to double to 6 billion in the next 50 years, while rural populations remain constant (at 3 billion) or decline. Population growth affects urban areas in many ways, from infrastructure requirements and their environmental impacts, to new patterns of social interactions and changes in the regional economy (Bettencourt et al., 2007; Rosser, 1980). The issue of where urban growth occurs is important to understanding this growth and to predicting its broad influences. In the US, urban areas are growing (albeit not as rapidly as the global rates) and urban land area is expanding faster than urban population size, leading to a decline in average urban population density. (Julian D. Marshall Urban Studies, Vol. 44, No. 10, 1889–1904, September 2007)

### **2.2. 3 Urban Investment and Urban land use land development Efficiency**

The Ethiopian Investment Commission, in cooperation with the concerned Regional Government entities, facilitates and follows up the allocation of land for approved foreign investments. Investors who intend to invest in export-oriented projects are given priority to acquire land at reduced lease price( Fikadu and Associates Law Office 2021). Investment has been considered as an engine of growth and generates economic benefit. Since then major policy and institutional reforms have been established to promote investment in the country. More importantly , the urban land lease policy ignores the demand side of urban land management which economic growth. There is a market gap between the demand for basic services and the supply of those amenities by the town administration to keep pace with the expectation emanating from the scale of change the town under goes. More over urban land for investment has emerged as a key bottleneck. evidence revealed that many investors, who got discourages or cancelled their investment plan in Addis Ababa, attribute their attrition largely to the lack of access to industrial land(a survey report by the foreign investment advisory services,2001)

### **2.2.4 Urban Industrial and land use land development efficiency**

Land resources are not economically and efficiently used in China as local governments usually pursue the expansion of city scales and size of economy. Under this

condition, many industrial parks are built in China just as the showcase of government achievement but not necessarily for pure economic sense, which causes inefficient land use and waste of resources. LUE in most Chinese cities had shown a decline even in the eastern developed regions. However, economically efficient land use is highly important as it is a good way to relieve the serious conflict among population, environment, and space. Exploring the characteristics of the relationship between industrial agglomeration and LUE is of great significance for the efficient integration between urban land use system and economic externalities. Therefore, it is necessary to study whether industrial agglomerations in cities lead to efficient land use or rather produce negative diseconomy of land use.

The impacts of industrial agglomeration on LUE can be analyzed at three stages. First, when industries only concentrate in space but do not produce external economies of scale, the cost of total factor productivity may not be reduced but performs high because of the investment of land, labor and materials. Under this condition, LUE can be relatively low. Second, when returns to economic scale by industrial clustering effects can obviously reduce urban average production costs, urban areas would contribute more output values and less input values than rural and peri-urban areas. Resources, such as land, can be used efficiently at this stage. Third, the costs of production inputs, such as labor, land, and energy, will increase if an excessive agglomeration happens. This kind of aggregation is diseconomy and increases the total production cost, which may decrease the output efficiency of land.

Although a large amount of literature focuses on industrial agglomeration and its influence mechanism, little attention has been paid on whether industrial agglomeration improves LUE in China. Moreover, the different impacts between detailed industrial sectors are 100%. This study then can make its contribution to the literature in three aspects. First, a theoretical framework is explored to analyze the impacts of industrial agglomeration on LUE based on the expanded Cobb–Douglas production function. Second, the impacts of detailed industries on LUE are estimated from a spatial perspective. Third, policy implications for effective land use are suggested Article (Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China; (W.H.); maenpu 2015 @ sina.com(E.M))

### **2.3. Land use efficiency and land use development in Ethiopia**

In Ethiopia, since 1993, urban land lease policy has been in place to facilitate land transfer for residential, commercial and industrial purposes. As a result, many cities, including Debre Brehan, have witnessed enormous boundary expansion mainly through farmland conversion. Over the past two decades, though Debre Brehan experience rapid spatial boundary expansion, very little is known about urban land use efficiency (ULUE) of the city. This thesis will analyze ULUE using remote sensing data. Emphasis will be given to the assessment of land use changes since 2003. Satellite imagery analysis will be done using ArcGIS software. Besides, quantitative and qualitative data from secondary sources will be studied.

Moreover, field observation will be conducted. Research findings show that in almost all expansion frontiers (Debre Brehan town) there is a prevalence of urban land use inefficiencies, i.e. pervasive practices of land holding and land use fragmentation. Urban sprawl is rampant with a significant part of the land transferred being left vacant or underutilized for years. The problem of ULUE in the city will be mainly attributed to institutional weaknesses, i.e. urban land lease policy gaps, particularly, in areas of lease policy implementation. To improve land productivity, limit eviction and ensure sustainable urban growth, the city should emphasize on improving ULUE. This study highlights that a mere policy formulation is not enough to ensure efficient urban land use. To achieve land lease policy goals, strengthening institutions, working towards improving institutional functionality, is what policy makers shall focus on.

## **CHAPTER THREE**

### **3. Materials and Methods**

Chapter three mainly present the research work flow by stating the methods to be used and area of the research.

#### **3.1. Research Approach**

The research conducted focusing on qualitative method concerned with documents; the basic tools are statutory materials, case reports, standard textbooks and reference books, parliamentary debates and government reports etc. Non-qualitative method concerned with social values, employing such methods shall generate empirical data to answer the research questions. The researchers make effort to collect knowledge and information from the first hand study or primary data related to the topic. The basic tools are interviews, questionnaire, systemic observation, published or unpublished materials, reports, and literature.

Concerning the research approaches the researcher employed both qualitative and non\_qualitative research approaches. Qualitative research is qualitative in nature, it does not depend on numbers, it based on hierarchy and authority for selecting and weighing materials, so that, the basics are selecting research problem, objectives, sources, bibliographic articles and database. Non- qualitative or empirical approach basic rules and requirements are; identifying the research problem, objectives, questions, defined and justified sample size, data collection methods and validity, appropriate data analysis methods. The decision to peruse a qualitative study depends on the basis of the research question/problem not on the basis of a researcher's skill or interest.

#### **3.2. Research Methodology**

The research conducted focusing on qualitative and quantitative data from secondary source to be used in the study area. In order to meet with the specific objectives of the study, the study employed descriptive.

### **3.2.1. Methods**

The Effectiveness of urban land use and its development in the focuses on the land use planning development, and management of public land. Models of land-use change and urban land development have become important tools for city planners, economists, ecologists, and resource managers (Agarwal et al. 2000; EPA, 2000; Klosterman, 1999; Wegener, 1994). This development was mainly driven by an increased availability and usability of multiple spatial datasets and tools for their processing. The Land Transformation Model (LTM) (Pijanowski et al. 2000) has been developed to simulate land-use in a variety of locations around the world. The LTM uses population growth, transportation factors, proximity, or density of important landscape features such as rivers, lakes, recreational sites, and high-quality vantage points as inputs to model land-use. The model relies on geographic information systems (GIS), artificial neural network (ANN) routines, remote sensing, and customized geospatial tools and can be used to help understand what factors are most important to land-use change. Information derived from a historical analysis of land-use change can be used to conduct forecasting studies. Land-use data from remote sensing is used for model inputs and calibration routines (Pijanowski et al. 2002).

A three-class classification system was designed with consideration of the land-use properties of the study area as urban/built-up, green spaces, and agricultural and wasteland areas. The widely used supervised classification method, maximum likelihood (Murai, 1996), was employed to detect the land-cover types. The maximum likelihood (ML) method, a common method in remote sensing owing to its robustness, was implemented to classify the images.

### **3.2.2. Standard and norms for Urban Land Use Classification in Ethiopia**

The standard for land use classification incorporates 7 major land uses. This section, therefore, provides the standard on the respective proposed proportion of the components of a structure plan out of the total land use.

The proposed percentage of the land uses is classified in to four categories based on the urban level classification of the urban centers in the country which in turn was classified on the basis of population size MWUD (2006). However, the proportion may vary depending on the nature of the city.

**Table3.1: Proposed Percentage of the Respective Land Uses (Indicative)**

No	Structure plan component				
		Small &	Large Towns	Cities	Metropolitan
1	Housing		50-60	40-50	40-45
2	Business and commerce/ Centers and market places	3-10	3-10	7-20	7-20
3	Services (Public facilities, cultural, archeological sites and special functions)	5-10	5-10	10-20	10-20
4	Green, recreation, sports and environmental sensitive areas	15-20	15-20	15-20	15-20
5	Administration	2-5	2-7	3-7	3-10
6	Manufacturing and storage	5-10	10-15	10-15	10-20
7	Infrastructure, utilities and	15-25	15-25	15-25	15-25

Source: MWUD (2006)

### 3.2.3. Compatibility of Land Uses

Needless to say, land uses in a structure plan ought to be proposed taking in to account compatibility of adjacent land uses or compatibility of different land uses which would be proposed close to each other. Table 3.2 tries to provide compatibility matrix produced based on major land use functions. Since the Table presents compatibility among the major land use functions, it would be necessary to consider compatibilities of sites to be reserved for different functions within the major land use function. For instance, under the major function associated with social services, there are functions such as educational institutions (primary school) and health institutions (hospital) which are not compatible.

Table3.2: Compatibility Matrix

Land Use	Residence	Commerc	Large-scale	Small-	Social	Cultural	Admini
Mixed	✓	✓	X	✓	✓	✓	✓
Center	✓	✓	X	✓	✓	✓	✓
Manufacturing	X	✓	✓	✓	X	X	X
Green Frame	X	✓	X	X	X	✓	X
Services	?	X	X	X	✓	✓	X
Transport Centers	X	✓	X	✓	X	X	?

Source; MOFA (2005)

N.B.

? Denotes partly compatible but to be decided depending on the specific situation

**X** denotes incompatibility of function

✓

Denotes compatibility

D



## CHAPTER FOUR

### 4. BACK GROUND OF THE STUDY AREA

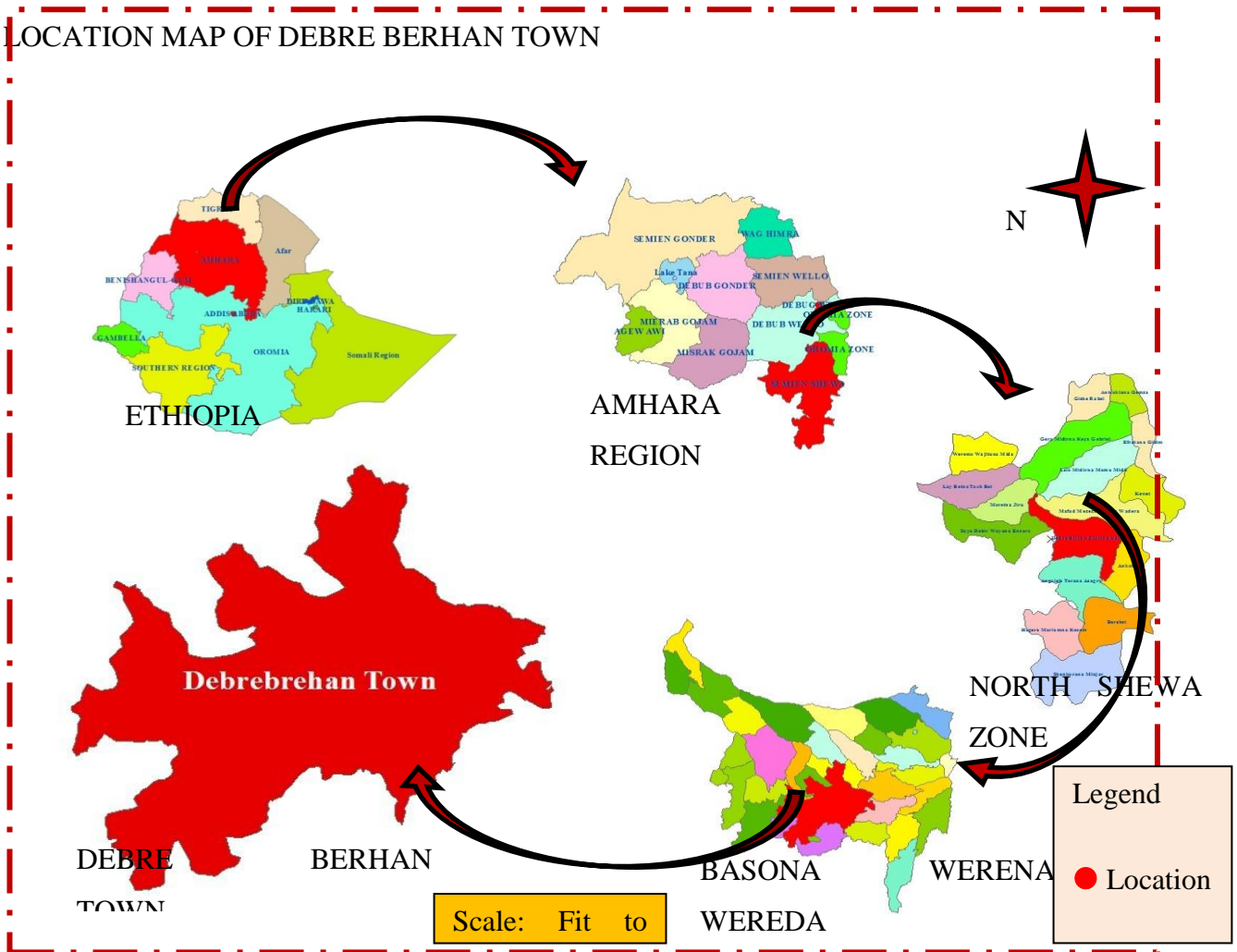
#### 4.1 Background

Debere-Berhan has a relative flat topography with varying slopes. Currently it has a total area of administration boundary of 18,081.95 hectares. The town boundaries are, at North, South and East Basona-Worena and at the West Angolela-Tera Worda. Debere-Berhan is serving as Social, Economic and political Centre of North Shoa Zone. Debre Berhan city is also having sister city from Europe, Blanc mesial or Blu-Mnil (France), which provide to have cultural linkages and providing the city an opportunity to get technical and financial assistance. Recently it has been an investment city which attracts many investors mean while investment in industry takes a lion share.

According to the 2007 National Population Census the city has a population of 65,231. The population density of the town is estimated to be **4162** persons per square km in urban part of the town in 2014. Major religions are Christian and Islam. Though with less number of followers of other Christian descendants are also found. Although in the rate slight increase was observed, the current population of the town **96,556** in 2014 is expected to grow at high rate than the national and regional urban growth rates and will reach around **459,493** by the year of 2040.

#### 4.2 Location of the Study Area

Debre -Birhan is found in North Shewa Zone of ANRS. It is astronomically located in an approximate geographical coordinates between  $9^{\circ}38'00''$  -  $9^{\circ}41'00''$  North Latitudes and  $39^{\circ}30'00''$  -  $39^{\circ}32'00''$  East Longitudes. In relative terms, it is situated at about 130 kms road distance from North East of Addis Ababa on the highway to Dessie and/or Mekelle, and at about 696kms from Bahir Dar (the regional capital). It is bounded by Basona Worana Wereda in the North, East and South directions; and by Angolela Tera Wereda in the West. The elevation of the town 2,750 up to 2,840 meters above sea level.



**Figure4. 1: Location map of Debre Berhan Town Administration.**

Source: Ethio GIS

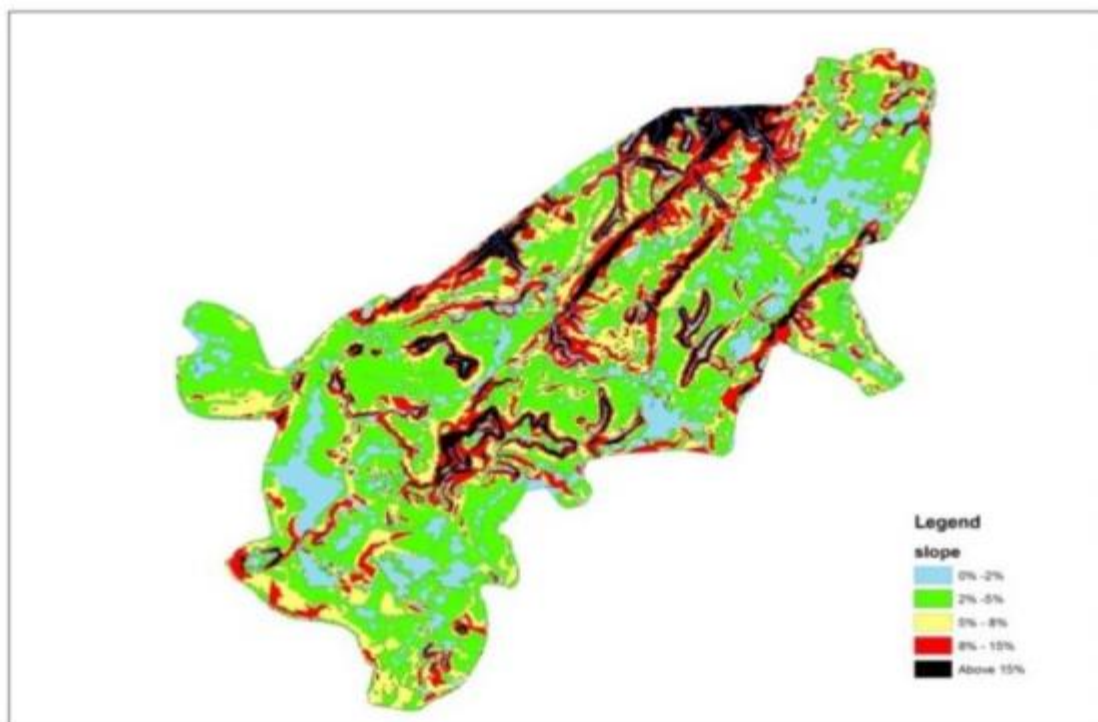
### 4.3 Topography

The inhabited nucleus and/or built-up area of Debere-Berhan begun around Selassie Church and extended along the main highway, the road to Jiru and Ankober on both sides. Its landscape, generally, characterized with up and downs in almost all parts though the elevation difference is not that much significant for most parts. The undulated landscape created near and inside the two streams (Beressa and Dalecha), some peaks and gorges brings

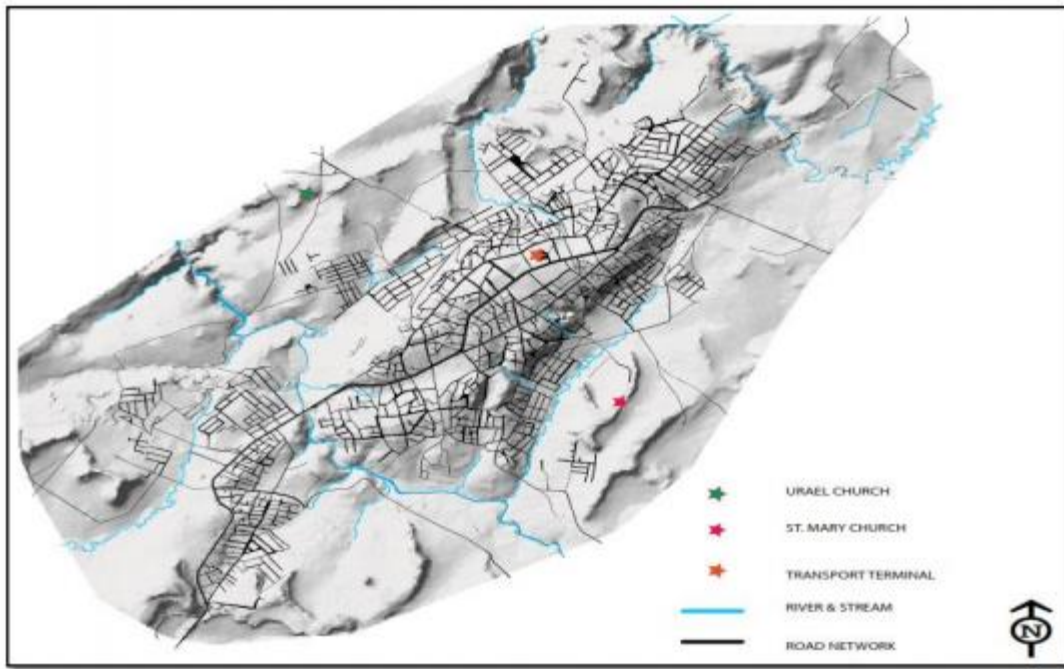
about some sort of steepness impacting smooth development, easy access and infrastructure development and cost.

The topographic feature of Debere-Berhan town is morphologically apart from volcanic and tectonic activities. There is no severe hazardous area found. The town has ups and downs in its topography and the area has steep slope and cold weather which begins from the base of the escarpment zones and extends to the west. The average altitude of built-able area is about 2750 up to 2840m above sea level. Generally, the topography classified as 85% flat, 10% sloppy and 4% mountainous.

On the contrary, the relatively flat plain landscape topography of Debere-Berhan has a lot to do with facilitating smooth promotions/development especially in the southern part. This could be manifested through its effect on preferable urban expansion areas, easy accessibility and transportation, possibilities of easy and less cost of construction (buildings and streets), comparative easy proximity for social and urban services/amenities and the like.



**Figure4. 2: Slope Analysis Map of Structural Plan in 2014.**



**Figure4.3: Terrain Analysis Map of built-up Area.**

Thus, resulted from the above slope and terrain analysis maps, 14.4% of the area is not suitable for development but it requires some civil engineering works that can be used for settlement and construction. This area can be used a lung for breathing and need to be covered by forest and recreation. The remaining all areas are considered as suitable for urban various developments.

#### **4.4 Climate**

With an elevation of 2,750 meter above sea level (m.a.s.l), Debere Birhan is classified under Dega agro-climatic zone. Such climatic zone is revealed by annual and monthly temperature of the town computed. With an average maximum temperature of 20.1°C and average minimum temperature of 6.5°C, the town has got mean annual temperature of 13.3°C, which undoubtedly falls in the temperature range of Dega climatic zone.

The intensity and duration of rainfall generally increases as altitude increases. Information on rainfall condition for an area is also very important as rain water resource is also the other crucial factor for different development activities. Debere-Berhan Town, with an annual rainfall of 965.25mm, has moderate annual rainfall amount the town gets its maximum

rainfall during the summer season. Generally, the rainfall and climatic condition of the area is suitable for living and agricultural productivity

## **4.5 Urban Planning History and Historical Development**

Before Debre Birhan took an urban settlement form, according to legends, the area was covered by grazing grass, thick forests and was used to a place for livestock staying. Even prior to name as Debre Eba, according to elders, there were three churches (Bete Eyesus, Bete Maryam and Bete Mesqel) in such place and hence this place became a home for local priests and clergy.

### **4.5.1. Establishment of Debere-Berhan Town**

According to previous studies, the anonymous chronicler of Emperor Zara Yaqob avowed that Debere-Berhan was founded by the Emperor himself as a capital for his empire in 1454. According to the web-page (Wikipedia, free encyclopedia), Debre Birhan is home to Trinity Church. In 1452, the king saw a light for 10 days (that may have been Halley's Comet) after he killed his son for converting to a non-Christian faith, and hence he built the church, where his son is buried nearby. In any case, it is emerged in connection with the appearance of Orthodox Church which was ordered and established by the Emperor in response to a miraculous light that was seen in the sky at the time. That is why, the emperor ordered a church to be built on the site, and later constructed an extensive palace in the nearby area for his stay which was destructed. Zara Yaqob spent 12 of the last 14 years of his life in Debere-Berhan.

The name of such capital (Seat of Emperor) was Debre-Eba. Its present name (that is Debere-Berhan) was said to be given to Debre -Eba during the reign of Zara Yaqob, and the reason behind such naming was derived in association with a light that had descended on it (near the present Debere-Berhan Sellassie Church). Debere-Berhan means 'Monastery of Light' and even still it is also named by such name in the churches.



Figure4.4 Debere-Berhan Sellassie Church



Figure4. 5 The Spot of Descended Light

On 1878, transferring of the capital of Shewa from leche to Debre Berhan was turning point of the town's history. The place, where Menilik palace was located is still known a Ghibbi associated with this the clergy of the Debre Berhan selasis church, who were living in this area transferred to another place-ques-ambo (Numpi, 1996). Other neighborhood also developed during Emperor Menelik such as; Tebase-sefer, Banda sefer around the current Municipal office, Lukandasefer around H/Mariam Mamo High School & Lichesefer around arsema church, etc though most of the settlement was established during emperor H/Selasse. During Emperor Menelik (1904), the community raises the question of either upgrading or renewal of the town.

The Municipality of Debre Birhan was established in December 1941. This was a year before Decree No.1 of 1942 (which was issued by the Imperial Ethiopian Government for the establishment of municipalities & townships). Immediately after its establishment it had served for the development of the town. The municipality had received the lands owned by the Baldaras in the south and the Hudad owned by the Ministry of Agriculture. Thus, it was this municipality that began to distribute lands for users and provide some urban services in the town.

#### **4.5.2 The First Master Plan of Debere-Berhan Town**

The 1972/3 Master Plan was the one that was prepared by the Municipalities Department of the then Ministry of Interior to guide the growth of the then Debere-Berhan. During that time, the only square of the town which was made by the Italians was renewed and renamed as Zara Yaqob Square (Adebabay) in this plan.

### 4.5.3 The Second Master Plan of Debere-Berhan Town

The second Master Plan was that of the 1996 Master Plan which was prepared by National Urban Planning Institute (NUPI) to guide its growth for 20 years (1994 to 2014). And hence, it was this master plan which guided its past development. Its time is already exhausted and at present, this Structure Plan preparation is underway to continue steering of its development for the coming 10 years (2014 to 2024).

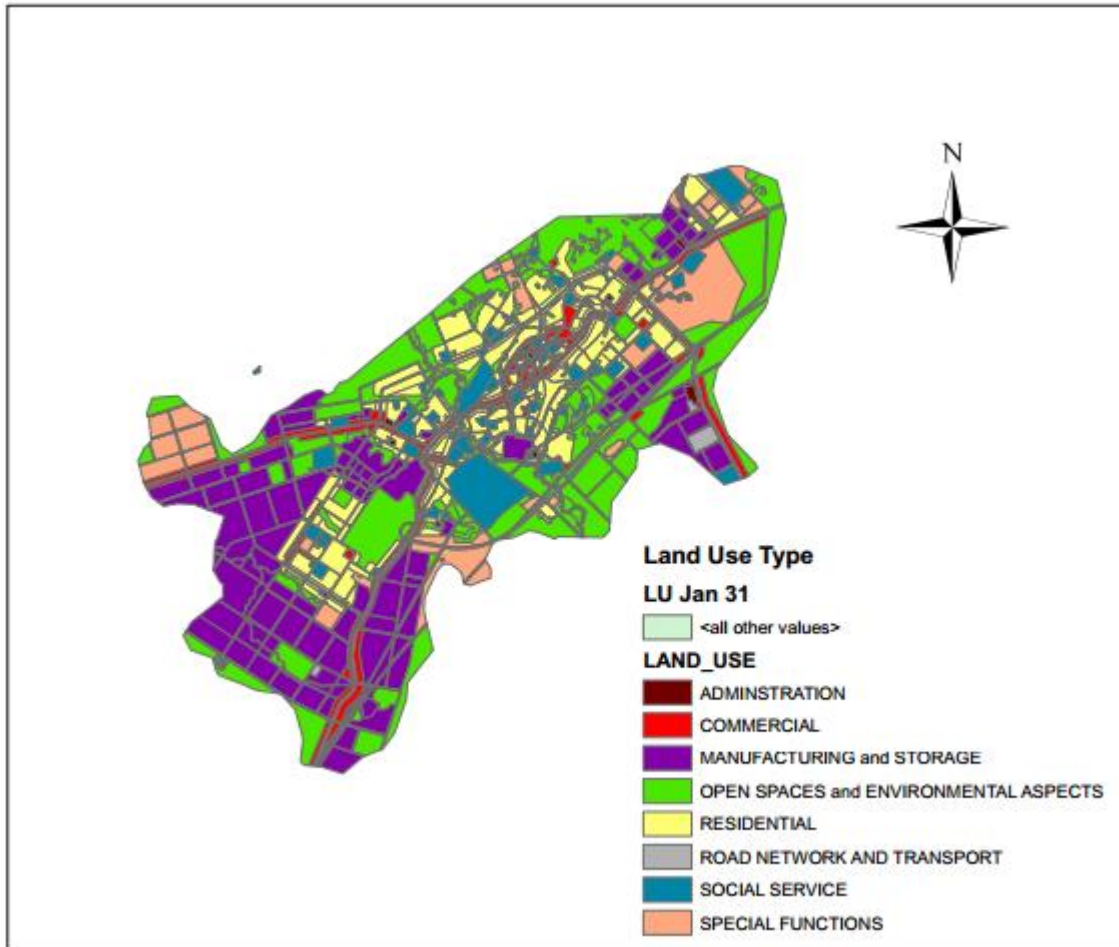


Figure4. 6: The 1996 Master Plan by NUPI.

### 4.5.4 The Third Structural Plan of Debere-Berhan Town

Currently the structural plan of the town where prepared and approved last year and at present time under implementation process. This Structure Plan was prepared by private company (Da-Ya Consulting Planners and Engineers plc.) based on sectoral studies (regional as well as urban level). The regional study was framed taking the a good proportion of Semen Shewa Zone. The urban level study was framed taking the then built-up area and twenty years expansion area. Based on such studies, both development land use framework proposal and road network proposal were designed for twenty years (1994-2014 G.C) planning period.





**Figure4. 7: The 2014 Structural Plan of Debere-Berhan Town by Da-Ya.**

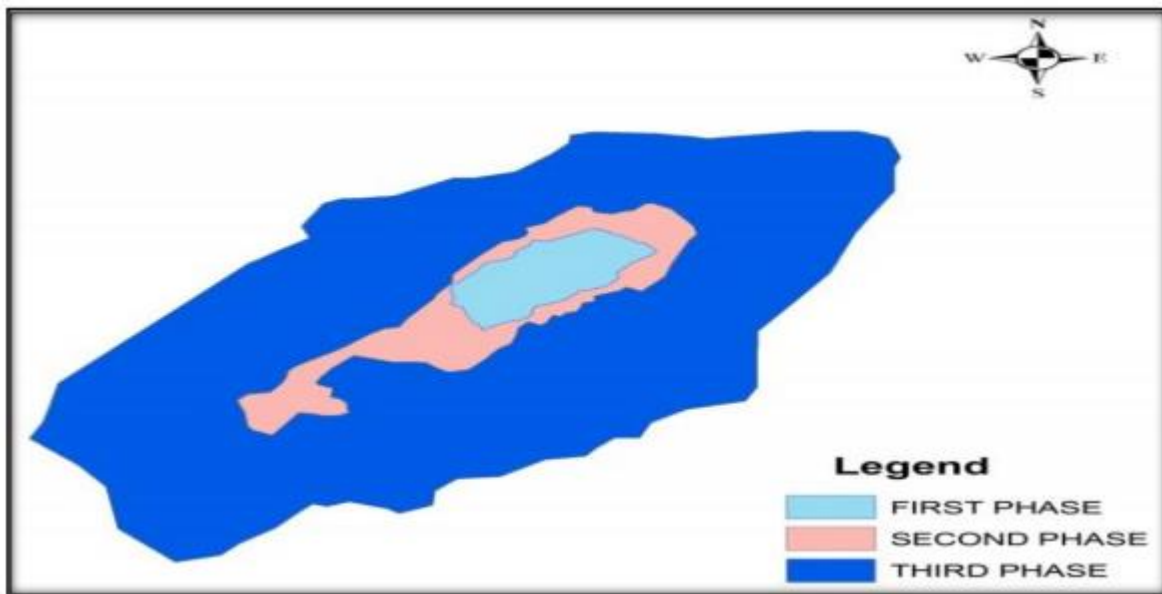
#### **4.6.5 Growth Trends/Evolution of Land Consumption of Debere-Berhan**

Evolution of land use shows when the town established and how and when it was expanded in different period of times. As mentioned above, the town was established in 1454 E.C. Therefore, this is the first phase of the evolution. Such first phase of settlement was bounded by sefers as follows: in North West, by Qes-Abma, in the South by the area where currently Blue Hotel is situated, in the East by Kullo-Beret, in North East by Lukand Sefer, and in West by Work Melkemia. The known hotels in the period of second phase include Kebede Hotel, Zara-Yakob Buna-Bet, and W/ro Atsede Buna-Bet. The growth trends and evolution phases are presented in Table 4.1 and Figure 4.8 as follows.



**Table4.1: Growth/Evolution Phases**

No	Evolution Phases Period in (E.C.)	Area coverage ( in ha)	Area Coverage (%)
1	First Phase 1454-1936	133	5%
2	Second Phase 1936-1941	251	9.40%
3	Third Phase 1941-2004	2289	85.60%
	Total	2673	100%



**Figure4.8: Growth Trend /Evolution Phases Map.**

## 4.6 Demography

Population size at different levels is the most important data for planning and implementation of urban development programs. The total number of population for Debere-Berhan Town was enumerated in the 1974 by National Sample Survey and in the past three consecutive Population and Housing Censuses. All of which entailed an alarmingly population growth and increase. The population sizes in 1984, 1994 and 2007 were 25, 635; 38, 717; and 65; 231, respectively. According to CSA (2014), the latest estimation of Debere-Berhan's population reached that of 96,556. Between 1984 and 1994 population size of the town grew at the average rate of 4.12% per annum, from 1994 to 2007 its rate declined to 4.01% per annum and from 2007 to 2014 population size of the town increases at the average rate of 5.6% per annum.

**Table4.2: Population Size, Distribution by Sex and Sex Ratio of Debere-Berhan**

Year	Male		Female		Total	Sex Ratio
	No	%	No	%		
1984	11,637	45.39	13,998	54.61	25,635	0.83
1994	17,918	46.28	20,799	53.72	38,717	0.86
2007	31,668	48.55	33,563	51.45	65,231	0.94
2014					96,556	

Source: CSA (1984), (1994), (2007), and (2014)

Currently population growth rate of the town is estimated to be 5.6%. When we see 2014 population density of the town it is estimated to be 41.62 person per square kilo meters in urban part of the town. The population of the city is increasing by two reasons. One of the major reason for this rapid growth of the city population is the rural urban migration of people in search of employment and better life. The second reason is the natural growth of the residence.

#### **4.7 Economy**

The economy of Debre-Birhan is based on employment income, business income and service income. Government employment dominates the labor market and micro and small economies dominate the business sector. Transport and large and small scale hotels and bars are dominant in the service sector. Land and human labor are the vital resources of Debre-Birhan.

Until 2013/14 about 274 investors have invested a total of Birr 7,859,831,140 and have created 21,133 job opportunities. Debre-Birhan owned business units and micro and small

enterprises. But the business capital and business income of the formal and informal business units is said to be weak. Business practices are traditional and changes due to efficiency, creativity, innovation and management are dormant.

Urban agriculture in rural parts of the town in 5 sub kebele agricultural activity used as major sources of income, for 1,621 male and 460 female 2,081 total households are registered in the activity. As the climate is suitable for mixed agriculture, they grown crops and rearing animal at subsistence level. The total agricultural land is about 3945.875 hectare, and out of it 3,615 hectares used for seasonal rain water harvesting and the rest 330 .85 hectare used by irrigation.

Tourism is the commercial organizations and operations of holidays and visits to places of interest. The attraction of tourism in Ethiopia had been increasing from year to year. In Ethiopia, modern tourism activity was started not more than 49 years ago. Since 1989, the government introduced reforms in the tourism sector and Ethiopia was opened tourist from all parts of the world. The tourism sector becomes one of the beneficiaries of the economic sector. Being located on the high land, Deber-Berhan town and its surrounding is part of cultural and tourist site. The presence of this tourist attraction has story influence on socio economic development of Deber Birhan town and its surrounding

## CHAPTER FIVE

### 5. RESULTS AND DISCUSSIONS

#### 5.1 Results on Land use Classification Compatibility Efficiency in Debere-Berhan Town

In Debere-Berhan town the structural plan is not considered the future population growth, expansion of investment and land compatibility of the town. The consequence of unstudied structure plan result in inefficient of land use for residential, investment manufacturing and commercial, when we see residential land use in Debere-Berhan population growth is increasing time to time because of pulling factor peoples migrate from the surrounding rural area because of the growth of industry in Debere-Berhan town this results in efficiency of residential land and to indicates low ULUE in the town.

When we see manufacturing land use it is inefficient because of good weather condition, nearest to the capital city and rich of under-ground water investors come to Debere-Berhan to construct different light and heavy industry but manufacturing land use is not enough and mixing residential and manufacturing land use as a result of these people live surrounding to manufacturing affected by sound pollution, environmental pollution and water pollution.

**Table5. 1: Land use classification for the year 2012-2024 Developed by Dye Consultant on SP of the town**

No	Types of Land Use		Description	Land Demand (in	%age
1	Residential	Existing	Pure and Mixed	901 (Total)	15.8
		Demand/Backlog			
		Projected DD			
		Displaced (Road)			
		Displaced (Expansion)			
Displaced (LDP Sites)					

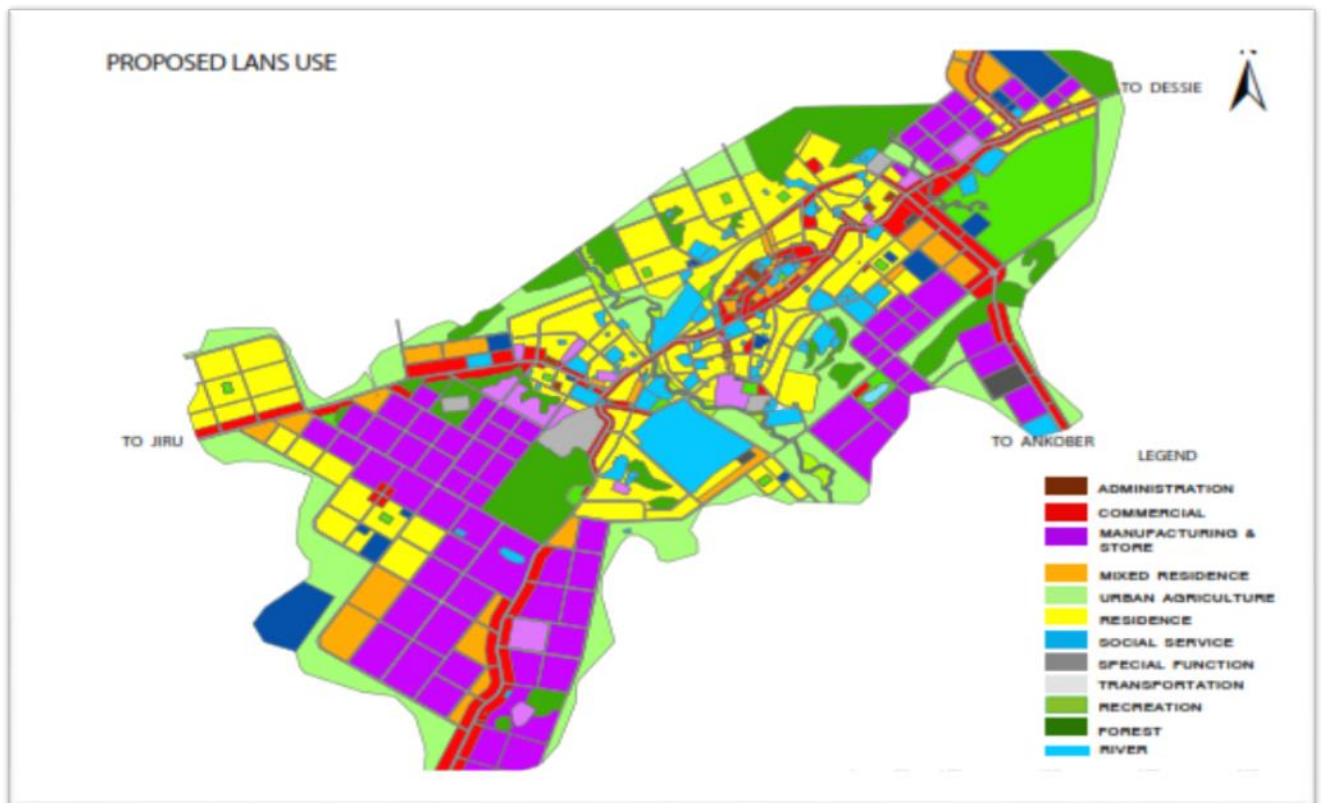
		20% contingency (Manual, 2012) for road			
2	Commerce , Trade and Administrati on	Commerce and Trade	General market, Tertiary	338	6.3
		Administration	Markets, Shops and Restaurants, Financial Institutions, Zonal and	18.7	
		S. Total	Wereda sectoral offices, and Municipal and kebele Administrations	356.7	
3	Social Services		Education, Health Care, Worship, Cemetery, etc	445	7.8
4	Manufacturing and Storage		Light to Heavy Industries, MSE, Warehouses	1,381.6	24.18
5	Road and Transport		PAS, SAS, CS and Terminals	483	8.46
6	Open Area and Environmental Aspect	Recreation	Play Ground, Stadium, Athletics Field	32.6	28.5
		Formal Green	Public Park, Open area along the rivers, Green	15.9	
		Urban Agriculture	Horticulture, Floriculture, Grazing, Animal Rearing	1152.6	
		Forest		330.3	
		Buffer	High Tension Line (HTL), River Sides	96.1	
		S. Total		1627.5	
7	Special Function	Water Body	River, Pond (11.1 + 5.5)	16.6	8.8
		Reserved	10 % of expansion area	322	
		Military and Prison Camp,	Military and Prison Camp,	10.9	
		Conservation Area	Water Field	166.3	
		S. Total		515.8	
		Disposal Site	Outside of the boundary	-1.0	

Total		5,711	100
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Source: Da ConsultingPlc.2014

The table above shows that how the proportion of the proposed land used is close or far from the new Urban Plans Strategy (2006 EC). The building category includes all parcel areas of residential lots, Commerce and Administration compounds, Service lots, Manufacturing and Storage yards, and military and prison camp (i.e. 750.8 Ha + 356.7Ha + 445 Ha + 1,381.2Ha + 12.4Ha= 2946 Ha). The Road and related constitutes terminals, PAS, SAS, CS and Local Road which is equal to 20% of the total land reserved for building (i.e. 483Ha + [20% \* 2946] = 1072Ha). The remaining is the open areas. As it has been seen there are some levels of variations most probably happen because the area covered by this planning exercise is higher than from what is required, the other one could be due to this excess area, more land beyond the standard is left to open area where the road density is very low.

**Figure 4.9: Proposed land use**



**Table5. 2: Compatibility Matrix for the land use efficiency**

Land Use	Residence	Commerce	Large-scale Industries	Small-scale Industries	Social Services	Cultural Center	Admini stratio n
Mixed	✓	✓	X	✓	✓	✓	✓
Center	✓	✓	X	✓	✓	✓	✓
Manufact. & Storage	X	✓	✓	✓	X	X	X
Green Frame	X	✓	X	X	X	✓	X
Services	?	X	X	X	✓	✓	X
Transport Centers	X	✓	X	✓	X	X	?

N.B.

✓

notes compatibility

? Denotes partly compatible but to be decided depending on the specific situation

X denotes incompatibility of functions

D

### 5.1.1 Results on Land use Efficiency in Debere-Berhan Town

Based on the table 5.3 below the dominant land use in the study area is urban residence which accounts 63.16% of the total land use. Green area and utilities is the second larger land use in the area which accounts for about 39.53 % followed by industry 17.54% and social service constitute about 13.95%.The rest land uses have been occupied by commerce, manufacturing andstorage, reserved area, and administration.

**Table 5. 3: Land Use distribution.**

No	Leasable Type	Land use type	Proportion in %	Area in hac.	Proportion in % from leas. Land
1	Leasable land	Residence	36	3139.20	63.16%
		Commerce	7	610.40	12.28%
		Industry	10	872.00	17.54%

		Services	4	348.80	7.02%
		Sub Total	57	4970.40	100.00%
2	Non Leasable land	Services	6	523.20	13.95%
		Administration	3	261.60	6.98%
		Green areas	17	1482.40	39.53%
		Utilities	17	1482.40	39.53%
		Sub Total	43	3749.60	100.00%
		Total	100	8720.00	

### 5.1.2 Total Land Area Used

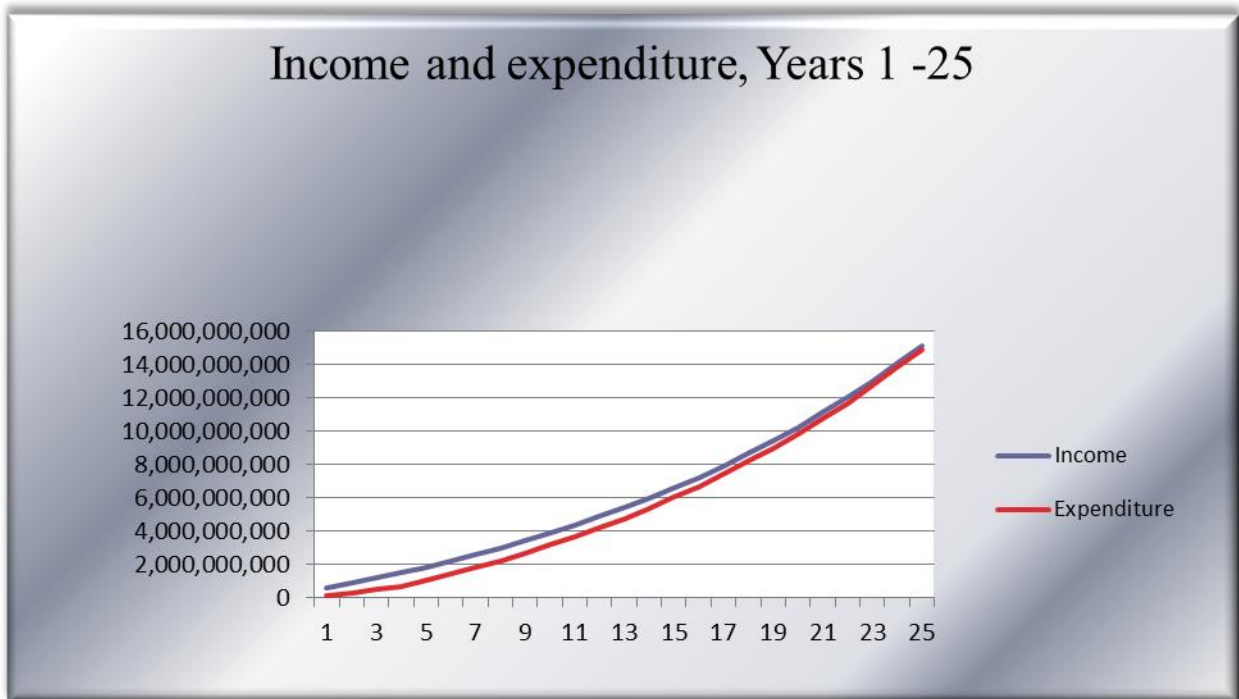
Based on the current data total built up area projected on 2040 will be 11040ha. Out of this area 8720 ha is expansion area to be developed on the following years. Number of 1km by 1km blocks is 88. The brief calculation is describe below

- ✓ Total City Area 2040 = Population at 2040/Density = 459,493/41.62= 11040ha
- ✓ Expansion Area 2040 = Total City Area 2040-Built Up Area=9566-2320= 8720ha
- ✓ Total number of macro blocks /1kmx1km/= Expansion Area /100= 8720ha/100ha = 88 Macro Blocks
- ✓ Total length of arterial grid road is 229km.
- ✓ From total length of arterial roads 22.5km is main roads which connect the city from neighbor towns.
- ✓ Expansion Constraint is equal to 1645ha
  - ❖ Forestry = 638913.86 m<sup>2</sup>
  - ❖ Irrigation = 1087545.97 m<sup>2</sup>
  - ❖ Dam = 47958.93 m<sup>2</sup>
  - ❖ Ground Water Table = 1797101.52 m<sup>2</sup>
  - ❖ Gorge = 9637005.95 m<sup>2</sup>
  - ❖ River Buffers = 3241859.63 m<sup>2</sup>



## 5.2 Revenue and Expenditure Concerning the Area to Be Developed

On the implementation phase of urban expansion program there will be expenditure due to demand and necessity of infrastructure followed by population settlement. In order to facilitate thus needs the income of the budget have to define. The next 25 years of budget surplus/deficit is showed on the picture below.



**Figure4.10: Income and Expenditure chart for the next 25 years**

Average land prices from land pricing sheet 875birr If the city is to be granted for the first 1 years. The excel sheet that have the detail calculation shown on the table below

**Table5.4: Income and Expenditure Variables for calculation.**

Ethiopia Urban Expansion Initiative: Income and Expenditure	
ENTER ONLY THE RED NUMBERS: THE REST WILL CALCULATE AUTOMATICALLY	
VARIABLES	
Basic data	
1. Total no of blocks	88
2. Annual population growth rate	6.00%

3. Dev. cost/Ha tarred arterial	1,800,000
4. Dev. cost/Ha gravel arterial	1,000,000
5. Compensation/Ha	170,000
6. Total length of arterial grid (KM)	229
Financial variables	
7. Asphalt starts (no of years after Yr 1)	5
8. Percentage down payment	20.00%
9. Percentage paying early	10%
10. Average number of years for early payment	5
11. Discount for early payment	5%
Grants	
12. Comp for arterial roads (yes=1, No=0)	1
13. Compensation for land for blocks (years)	0
14. Grant payment for infrastructure (years)	1
Alternative land pricing	
Breakeven price/sq m	300
Average land prices from land pricing sheet	875
Set land price for estimating purposes at	875

### 5.2.1 Revenue

According to 2018 debere-Berhan city revenue office the main income for the city municipal comes from leasable land which is 36% residential, 7% and 10% for commercial and industry respectively that makes the total income per block 15.08 billion.

### 5.2.2 Expenditure

The major expenditure is for construction of arterial roads and the compensation for the farmer who own the land for farming. The compensation cost for displaced owner of the property requires 16.52 birr per meter square which is approximately 170,000 per hectare. Additionally, requirement of capacity development to implement this expansion plan is one of budget debit. For the next 25 years the cost requirement will be 14.9billion birr. In order to balance the revenue and the expenditure and to prevent the upcoming deficit there need to be other fund programs.

**Table5.5: Income and Expenditure for the next 25 years.**

Description	After 5 years	After 10 years	After 25 years
Income	1,856,504,548	3,881,517,900	15,088,566,264
Expenditure	1,056,988,727	3,180,148,873	1,4911,949,389
Difference	799,515,821	701,369,027	176,616,874

### **5. 3 Discussion on the Effectiveness and Efficiency of Land Use and Land Development**

Although some of the issues obtained from the result were discussed in the result and analysis part here the discussion focused on the study obtained from both the spatial and socio economic of the study area. The rapid urbanization and industrialization witnessed during recent years along with incompatible land use allocation in the Town and some of the external and internal factors contributed for the short falls of the land use planning approaches have been observed. Almost all of the functional industries implemented in the town were random and violating the structure plan of the town. Most of the factories are implemented where the development plan has been proposed for green area, commercial, residential and reserved areas.

#### **5.3.1 Residential Land Use Level**

Residential activities consist of pure and mixed activities. In the mixed use small business and manufacturing activities that do not cause nuisance and pollution to residents can be located with residential zone.

The average residential plot area takes in to consideration the regional state policy and the housing typology. The area coverage of residential activities has become 15.8 percent of the total area of the expected growth boundary. However, the proportion varies following the potential and dominant role of the urban center which is the industry.

Land is allocated in suitable areas dominantly in the area where sub-centers are proposed, along the collector road specially the mixed one, with or proximity to services, less natural and man-made constraints, etc.

Hence, by considering the projected housing demand, a back log (existing effective demand), households to be displaced by various reasons and households remain as renters and the existing housing stock; a total of 901 Ha of land is allocated. In the planning period 25 percent of the housing unit demanders are expected to leave in the condominium house. This condominium houses is better to be built dominantly in the area where slums are happened or most of the houses are kebele houses because the majority dwellers shall be re-accommodated in the same localities to keep their social and economic web in the neighborhood where they have good attachment, the other reason is for economical usage of land by increasing density, using existing infrastructure, above all to increase the image or the esthetical value of the obsolete settlements. The remain condominium areas are encouraged to be built as far as possible in and around sub-centers to use the land around there economically because the land value will be definitely increases because of population and services cluster. The other housing units will be building in the plot size of 150m<sup>2</sup> and 200m<sup>2</sup> based on the bylaws of the Debere-Berhan Town administration. With regard to mixed use, the MoUDHC Structure Plan preparation standard (2010) says Residential activities consist of pure and mixed activities. In the mixed use small business and manufacturing activities that do not cause nuisance to residents can be located within predominantly residential areas. In light of this, potential areas are identified and marked by a single line. The space enclosed in this line can potentially be requested for such purpose. Thus, the municipality upon request of mixed use in residential area can permit based on the following “compatibility matrix for use zoning” table taken from the Ministry manual.

### **5.3.2 Business, Commercial Center and Market Places**

The total area proposed for business, commercial centers and market places is 338 Ha which account for 5.92%. One major CBD is proposed having various activities such as administration, service, transport, communication and dominantly commercial activity and the other two sub- centers which constitute Level Two or Tertiary Market each. One is proposed around the new stadium area considering the potential growth direction to northern part of the town and the effect of the road under construction to link Debere-Berhan town with Semera which is believed to be the gate for Sea port through Ankober town. The other one is the other tips of the town to south direction to the outlet of Addis Ababa which is

believed to be most industries will be situated in the planning period holding quite good number of employees, where these employees need services, housing units and other facilities.

Most of the lands along the arterial and sub arterial streets with the width of about 50m in the existing settlement area and 100m in the expansion are also reserved to this sector because these locations economic return is relatively higher and obviously attract business sectors which are able to use the land in the efficient manner as to the municipal standard. Part of the land occupied by METEC along the main road is proposed to be used as mixed area (Residence + Commerce) to make the neighborhood in front it economically vibrant which is now totally dormant and declining in all aspects. The municipality need to discuss with respective officials how this areas need to be developed as to the proposal by the company itself for mutual benefits.

The existing CBD area covers the area where the existing major markets(Level Two or Tertiary Market), cluster of financial institutions, the municipality, the police station, health and other worship places exists. The major market found in the CBD has an area of 6.7Ha which is almost equal to the standards. As recommended in the other report the municipality needs to furnish the required facilities for better and efficient utilization of the area.

Livestock Market: The other one is the live stock market which is relocated to some distance away from the existing location towards the west close to the new proposed slaughter house. The existing location is along the sub arterial road which is in the center of the town and very close to the worship place. The relocation site is done by using the criteria developed for selection of the location that includes in area where road reaches to enable transport livestock's, closer to the slaughter house, it should be in the periphery, following the flow directions of cattle, equines, shoats, etc and it should not be located near schools, health services, worship places and residential areas. An area of 1.7 Ha is reserved.

### **5.3.3 Services: Public Facilities**

#### **Educational Services**

The available primary first cycle schools (1-4) are eighteen (both Private and Government) in the town while the required number in the projected growth boundary is only 8 which shows the presence of extra ten schools indicating under-utilization of resources. Thus, simply in order to meet the catchment requirement for the planning period one additional first cycle school for the expansion area is recommended. The same is true in the case of primary second cycle (5-8), in which there are sixteen while the required number are only six which shows the presence of ten schools indicating under-utilization of resources. Thus, simply in order to meet the catchment requirement for the planning period in the expansion area one additional second cycle primary school (5-8) is recommended.

There are now four secondary schools (9-10) which are enough but simply in order to meet the catchment requirement for the planning period in the expansion area and taking in to account the service demand in per urban areas one additional secondary school is proposed. Similarly, there is one preparatory schools (11-12) in the town and the projected number is also one (2,759/3000) and hence one additional preparatory school is recommended in the sub- centers located to Addis Ababa outlet taking into consideration the future town growth orientation. The same is also for TVET, and one is recommended to the other sub center around the outlet of Ankober.

### **Health services**

In the town there are three health centers currently which provides services to the whole population in the town. Therefore, additional three health centers are proposed in different area considering fair service spatial distribution. Regarding higher lever health service, in the town there is one Referral Hospital which needs to be rebuilding its structures and improve itself for better and quality service delivery where it is now. Hence, this suggests that there is no need of other hospital to propose in the planning period.

### **Postal service**

It is decided the existing zonal departmental level post office where it is situated because it qualifies the parameters which must fulfill. The proposed postal office is located at the urban center along major roads with an area of 0.26Ha

### **Fire Brigade**

Firefighting brigade is the one facility badly needed to the welfare of the community. So far, the town does not have this institution. The town like Debere-Berhan expected to have two stations in the planning period. Therefore, one (0.48Ha) in each two sub centers is chosen considering the location criteria that have to fulfill.

### **Cemetery and Worshipping area**

All religious institutions are demanding additional area for cemetery. The current religious cemeteries for some religions are occupying large areas of land associated with inefficient and unplanned burial services. Due to location and proximity reasons, additional cemetery areas are proposed for respective religions in one area can be also considered as a municipal cemetery (The land is allocated for Orthodox, Protestant, Catholic, Muslim and others with 0.3Ha each. The municipality is expected to administer and regulate the way it will be used.

The area is selected by considering the following parameters. They are: It should be 100m far from residential areas; it should be 20m far from major roads, far from water sources, public amenities, Abattoir service, etc. With regard to the Orthodox cemetery, traditionally this facility is attached with the church, therefore a church place is also proposed bearing in mind the ANRS Regulation No 15/2006 EC.

### **Slaughter-house**

In this regard, This Structure Plan has relocated the abattoir with the rationale discussed in the analysis part to the area where anew cattle market is proposed. The land allocated to this facility is 2.5Ha.

### **Waste Disposal**

With regard to liquid waste disposal site, even though its location becoming in the center, because of high relocation cost it is found irrational to relocate from the existing site. If it operates as per the design and recommendation it will never have significant negative effect. Concerning the solid waste disposal sites with the findings and recommendations mentioned in the analysis part, a two disposal sites are selected for land fill, one is found out of the existing boundary and the other is just at the outskirts of the town which has the area of almost 1Ha each. All parameters for selection of the site are well considered.

### **5.3.4 Manufacturing and Storage**

The major proportion the land is allocated to industries looking at the potential growing industrialization and the road which is going to be connected to Samara Town in Afar Regional State. The selections of sites for manufacturing and storages are highly depending on the following considerations. Like, favorable topographic conditions such as leveled and stable soil, availability of sufficient land not only for the present requirement but also for the future expansion, Wind direction, the distance from water bodies, availability of transport network, etc.

Thus, a total area of 1381.6Ha is proposed. Most of the non-pollutant storage and light and medium industries are expected to be built in the Northern and North-Eastern part of industry zone because of the presence of Dry Port nearby. Heavy industries and/or pollutant industries must be located to the industry zone proposed to South-Western Part of the town. Since these areas attract associated business, land for related commerce, trade and required services nearby in the sub centers are allocated. Road with sufficient width to accommodate the expected traffic volume and transport facilities are also proposed. In the mixed zone municipality is advised to give lots for garage and fuel stations where compatible for adjacent activities.

### **5.3.5 Administration Areas in the Town**

The town does not have much shortage of land for administration. However, the land which is now being used by the municipality is converted to business and the site already chosen by the municipality to construct new standardized building is reserved to Municipality office. The other administrative office sites are proposed at three sites, two of them are in each two sub centers and the other one in Kebele 06(Chole) with an area of 0.48Ha.

### **5.3.6. Open Spaces, Greenery and Recreation**

This section refers to green areas, parks, gardens, forest areas, urban agriculture, and conservation areas. The town is bounded by greens and forest especially on the top of the mountain which enclose the town. To keep the micro climate, a forest area is proposed. Buffers are also projected as per the standard along the river and the high tension line and beside cemetery and water body.



## Stadium

In this planning period, new stadium area is not proposed but it is recommended that to upgrade the existing one and make complete the construction work. The area reserved to this facility is 11.6 Ha expecting to fulfill the necessary sport facilities.

## Play Field and Youth Center

Currently there are three play fields which accommodate a total area of 12.5 Ha. It is a common fact that this figure cannot support the growing demand of play fields due to increment number of the youth. Hence, it is proposed other fourteen playgrounds which accommodate 0.8 Ha each.

There are four youth center at different places. Four more are proposed at various localities where it is believed to be center for kebele dwellers and where land availability and topography permits. As much as possible attempts are done to distribute per kebele. However, because of proximity one to the other, one is provided in the kebele 09 which can serve kebele 03 and part of kebele 04. The youth center provide in kebele 02 is also very close to kebele 01 settlement, therefore, it is not justifiable to provide for kebele 01 separately. An area of 1.2 Ha is allocated to each site. Thus, the municipality need to work with all stake holders to build the facility as earliest time as possible.

## Parks and Urban Forest

Trees in urban areas are very important in regulating temperature and providing shade as well as protecting the environment. Green areas in street medians, along streets, pedestrian lanes, Public parks in the core part of the town, wood lands, buffer zones, and on preservation areas, etc. are proposed.

With regard to Public Park, two sites are reserved in the central part of the town where there is no any open space now. Other public parks need to be also reserved in other segments of the town specially where the neighborhood is decayed and potentially renewed in the coming ten years. The proposed public parks are in two LDP sites, the first one is reserved in the compound of the existing Telecommunication. Almost 50 percent of the compound is idle and too large and decided to be taken and used as a public park. The other

one is proposed in another LDP sites in kebele 05. The total area they cover is 0.83Ha. A total area of 15.9Ha is proposed for about twelve places where land is available and where the topography encourages doing so. Moreover, forests areas are proposed along the river, on the mountains area which is not suitable for urban agriculture, and it is suggested along stream with plantation in order to protect soil erosion and environmental pollution.

### Urban Agriculture

Urban agriculture is the area used for agricultural farming and animal rearing such as horticulture, field cropping, livestock fattening and rearing and other activities in urban areas. In this town the existing area for urban agriculture is allocated in the various parts of the expansion area. For this purpose 1152.6 Ha of land is proposed. Hence, the municipality needs to regulate this area and allocate a land for the types of agricultural activities which produce the highest return.

### Buffer

30m wide buffer is reserved along the HTL and from 5m to 15m width space of each side of the river are left. Those areas allocated for buffer should not be used for other activities other than buffer. Buffer zones will mostly be covered with plants and may be used for recreation but with specific studies particularly under the HTL.

### Special Function

With regard to reserve area, the manual says that while ensuring the present needs are satisfactorily met, it is essential to reserve adequate land to effectively meet future demands. At least 10% of the expansion area should be reserved for unforeseen developments. On this bases, about 322Ha is reserved for this purpose. The others grouped under special function are military and prison; hence the already occupied land by these institutions is reserved as it is. Water body is also categorized in this group. Water wells and their surrounding areas should not be allowed for the development of residential, industrial and other polluting activities. However, water source potential and its buffer can be used only for agricultural, forest and other non-polluting activities. Care should be taken in selecting the type of plants that will not tend to reduce the capacity of water.

## **5.4 Problem Identification and Suitability Analysis land use on implementation of structure plan**

### **1. Prediction limitations**

Most proposed land uses are running out in the first half of the structure plan period. This indicates that there is unpredictable growth in demand of land use. Even though most factors that leads to such demand were stated in the study of the structure plan, it failed to forecast an approximated Quantity of growth and hence failed to propose proportional size of land use which is sufficient to the intended period. Originally proposed residential land use was completed at the third and the fourth years and now, industrial, social service, administration proposed land uses are nearly complete.

### **2. Strategic gaps**

The structure plan proposed 25% vertical and 75% horizontal development as a strategy. The vertical development strategy is helpful to bring compact city development which enables to utilize land resource, achieve efficient administration and provision of infrastructure and utility. But in reality, the vertical development cannot be afforded and implemented by the town administration. This situation widens the gap between the proposed land use and the existing demand.

### **3. Spatial planning gaps**

#### **a. Land use incompatibility**

**Neglecting Existing situation:** this is a serious issue which is frequently faced during the SP implementation. There are several areas proposed for a certain land use without considering, the existing land use, built structures and challenges during implementation. This seems to be caused by overlooking the existing situation or lack of detailed ground survey and rational decision concerning implementation society's cultural background, skill and its physical needs in one hand and the natural potential of land on the other hand (Ram Kolakar, 1993).and Land use is also defined as men's activities on land, which are directly related to land. Land use is characterized by the arrangements, activities and inputs by people to produce change or maintain a certain land cover type (Di Gregorio and Jansen, 1998). Land

use defined in this way establishes a direct link between land cover and the actions of people in their environment. Land cover is the observed (bio) physical cover on the earth's surface (Deng and others, 2009). Land cover + Land utilization = Land use. According to FAO (2000) "Land use is the arrangements, activities and inputs that people undertake on a certain land cover type, According to this definitions land use reflects human activities such as the use of the land like industrial zones, residential zones, and agricultural fields etc. The above definitions establish a direct link between land use and the actions of people in the environment.

Some cases:

**-Abattoir proposed near Holy Water (tsebel):** the structure plan document explained that the new abattoir is proposed to avoid incompatibility with the residential area in the case of the existing abattoir. However it faced incompatibility issue too with unseen nearby holy water (tsebel) which is located in the downstream.

**-Residence and industry, the case of Dashen beer factory:** the factory was there before the SP preparation but a wide mixed area is proposed in the middle of the industrial land uses without considering the prevailing wind direction. Due to the high demand of residential land, it is parceled for residence (row houses). In this way residents are condemned to live with the odor from the beer factory. Even if this problem is partly plan implementation gap, along with the administrative one, there may also be a solution in the plan amendment and it is essential to consider such cases. This is to remind that at least such incompatibility problems should not be repeated in the revision.

**-Leaser factory:** even if an administrative measure is taken now, it was the worst issue of land use incompatibility.

**-Structure plan roads proposed over existing significant structures:** several cases of such kind were faced during the five years period. Some of these cases are:

1. In kebele 01 near Argaw loge, 12m SP road right of way shifted about 7m into a good performance existing row houses

2. Kebele 07 around aluminum factory, SP road shifted to existing structures of new industrial buildings. (Solved, but the revision should see these cases intensively)

-There were more similar cases faced in the structure plan implementation.

## **b. Geo-referencing**

### **i. Ground control points (GCP)**

GCP errors have been the major impediments in plan implementation. Plan preparation, Road and other infrastructure construction projects have been challenged and delayed frequently. Worst GCP shifting problems faced in kebele 08, 07, 09 in a wider range, and other individual GCPs. Moreover, the GCP incompatibility between those set by Daya consultant (or plan institute) and cadaster office was among the worst cases which led to suspension of any development activity until temporary solution was given.

## **4. Drafting and production gaps**

### **a. Coding error**

Coding error seems pretty simple error, but erroneous coding suspends a project for several months or even years since no one dare to correct errors of approved urban plans other than the authorized body.

### **Some cases with such errors:**

1. The block where Ayu hospital is located, is a commercial land use and coded as R-2 (which stands for mixed)

2. Tebase Medhanialem School is coded as S-41 (which stands for Orthodox Church)

### **b. Land use and building height map shifting**

The land use and building height maps of the structure plan are different. This is because the building height map is labeled on the earlier draft of the land use map.

**The case of Liche area:** along the 42m proposed road to Liche, nothing is compatible among the land use and Building height maps. Every land use shifts 80m from its corresponding building height.

There was also several building height incompatibility with the land use such as “no height” in land uses which require construction and unaffordable heights as well.

## **CHAPTER SIX**

### **6. CONCLUSION AND RECOMMENDATION**

In the land use planning of the study area, even though the preparation of the plan has the lion shares, some of the external and internal factors contributed for the short falls of the planning approaches have been observed. Very fast rate of urbanization is exacerbating social, economic, and environmental problems already found in many urban centers of developing countries including Ethiopia. The adverse impacts of urbanization on the project town will be severe particularly in the residential areas of low-income groups, and on the rivers crossing the town. Therefore, comprehensive urban planning in general and, urban environment planning and management in particular is inevitable

The other factor that contributes to the incompatible land uses in the town were wrongly implemented land uses resulted by lack of skill capacity, commitment, personal interest and enforcement from the highly authorized body. In addition, lack of institutional, financial, implementation tools and limited capacity of the town administration aggravated the issues in the project area. Almost all of the functional industries implemented in the town were random and violating the structure plan of the town. Most of the factories are implemented where the development plan has been proposed for green area, commercial, residential and reserved areas.

## 6.1 conclusions

Land use and land development efficiency assessments generally involve the use of detailed spatial biophysical and GIS analytic techniques. The method used in this study was analysis of remotely sensed (captured) images with GIS, integrated with descriptive socio- economic analysis of DPSIR model indicators. These enabled the researcher to characterize land use and land development efficiency in the study area.

So, as long as the main industry zone is following this area, there is high flow of man power, employee and other type of workers, which will make the huge expansion to be occurring following this area, including many additional factors on land use development. The rapid expansion of urban areas due to population growth and economic growth increases deplete for natural resources and causes changes in land use, especially in in the center. Therefore, the serious problems associated with rapid development such as additional infrastructure, informal settlements, pollution, destruction of ecological structure and lack of natural resources have been carefully studied with remote sensing and GIS technologies for a fast-growing of town. The categories used for the classification of land use and the change of land development in the city of Debere Berhan would be built areas, plantations, water bodies, agricultural land and pastures.

The total area proposed for business, commercial centers and market places is 338 Ha which account for 5.92%. One major CBD is proposed having various activities such as administration, service, transport, communication and dominantly commercial activity and the other two sub- centers which constitute Level Two or Tertiary Market each.

slope and terrain analysis map of Debere Berhan city shows that, only 14.4% of the area is not suitable for development but it requires some civil engineering works that can be used for settlement and construction.

The existing CBD area covers the area where the existing major markets(Level Two or Tertiary Market), cluster of financial institutions, the municipality, the police station, health and other worship places exists.



Most of the lands along the arterial and sub arterial streets with the width of about 50m in the existing settlement area and 100m in the expansion are also reserved to this sector because these locations economic return is relatively higher and obviously attract business sectors which are able to use the land in the efficient manner as to the municipal standard

Debere-Berhan has high potential of economic, demographic, service and social interaction. Also, being located around the center of the country, make the urbanization of the area dramatically grow fast. The area is currently using the land as commercial, residential, service, industry and known node for station.

Therefore, the main problems in cities of Debere Berhan are improper utilization of society, population pressure that lead to activities of satisfying the basic needs, lack of balanced income collecting from improved property value for more investments, low resource base of institutions on infrastructure expansion, lack of priority to roads, the influence of poverty, corruption, uncooperative attitudes of the local people and concerned stakeholders, non-availability of information to the society about the benefits of infrastructure land use planning monitoring and evaluating processes.

There is a lack of economic incentives for producers and marketing difficulties caused by public interference; There is insufficient adaptation of recommendations to the large agro-ecological variability over time and deficiencies in proven technology, extension, input distribution, and credit; Inefficiencies arise from institutional weaknesses, particularly over-emphasis of the public sector and central decision making; there is a need to promote privatizing and local initiatives; Ownership of natural resources is over-centralized and traditional structures are breaking down with consequent difficulties in the form of insecurity in individual use of fallow lands; open access to grasslands; and inability to protect and manage public forests and parks. Development strategies are inappropriate and land use planning is lacking. Poor land management and residential problem with weak governance system makes the development behind the required status as compared to its historical perspective Therefore, strong and effective land and residential law is important for the management of land use land development.

The biggest impacts of rapid urbanization and population growth on land development inefficiencies are requiring immediate attention. This document assesses land use/land development efficiency (LULDE) in the city of Debre Berhan.

In general, the ineffective land use planning and implementation resulted by the factors that in turn results unhealthy natural environment in the town via various development activities such abattoirs, industries, housing, quarrying activities, etc. In addition the effectiveness of the plan implementation were also affected by factors like lack commitment of officials, shortage of implementation tools, skilled man power, and community awareness. Basis to influence development interventions and to population settlement changes and natural resources degradation and land management.

## 6.2 Recommendation

In line with the findings of the evaluation of land use land development efficiency respect to selective land development issues the following recommendations are presented: This study clearly demonstrates the following policy implications: Changes in land use and land cover affect land-based ecosystems and biodiversity unless proper conservation measures are taken by stakeholders.

Changes in land use and land cover affect soil quality and soil intactness (the ability of soils to withstand erosion), have effects on water quality in rivers, lakes, and increase the risk of flooding. Therefore, climate change adaptation measures should be taken.

There has been insufficient government attention to land degradation.

-Land use and land development inefficiency of the city is affected by rapid population growth resulted from natural increase and migrations; therefore, working on this area with the concerned body is very important to improve the overall spatial planning and urban planning challenges. As you all know planning is for the people. So, knowing the approximate number of people living in urban areas is very important.

-controlling the population growth and its associated impacts on the natural environment requires the right policy packages by national and regional governments such as awareness creation, provision of family planning services, increasing productivity, working on the pushing factors of migration and controlling illegal settlements are some of the actions taken by the city administration.

-The city administration should develop strong and effective land and residential law for the management of land use and land development.

-The city administration officials and other concerned body should follow up the development of land uses and enforce the developers to run according to the norms, principles, rules and regulation of the recommended plan.

-Relocate incompatibly and unsuitably implemented land uses, based on the analytical results.

-The city administration has to use the unsuitable area for lung breathing and need to be cover by forest and use some of the portion of the land recreation.

- Debere Berhan city Administration officials and workers should apply appropriate land use policy, rules and regulation with a better land use and development plan and implementation program with strong commitment.
- It's important organizes land use and land development effective organization to identify the weakness of land Use efficiency and to solves, and overcome the problems.
- The acceleration of industrialization needs to give attentive follow the master plan and land development not to guide by investors interest.
- The structural master plan of the city has to revise and consider the future growth of the city.
- Since the underground water resources are crucial resources of the city for economic as well as social developments. Should Improve understanding of the complex dynamic processes underlying land use and land development efficiency will allow more reliable projections and more realistic scenarios of the future changes.
- Further research has to be done to deeply find out land use and land development inefficiency

## **REFERENCE**

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## Annex

### Annex1, Check list for land use land development information

No	Topic	Sub topic	Methodology for data collection
1	General description of the project	<input type="checkbox"/> Location of city <input type="checkbox"/> Historical background <input type="checkbox"/> Settlement evolution <input type="checkbox"/> Topography -Slope <input type="checkbox"/> Vegetation coverage <input type="checkbox"/> Climatic condition ( temperature, etc)	Debre birhan urban expansion plan Updating base map through field observation
2	Existing Land use analysis of town	1.Land use land development characteristics	Flid Observation and structure plan implementation
3	Land management system of the town	Application of technologies like GIS ,in proposed Land use	Land use categories on structure plan use

Annex 2 institutional relevant in land governance

Institutional mapping

institution	level	Major responsibility	scope
Ministry of urban housing and construction	federal	<ul style="list-style-type: none"> <li>• develop standards</li> </ul>	Serves the whole nation that need service in urban land administration and use
Municipalities	Urban /town	<ul style="list-style-type: none"> <li>• immovable property valuation</li> <li>• managing leaseholds</li> <li>• managing old possessions</li> <li>• monitoring and control illegal settlement</li> <li>• provide other municipal level service</li> </ul>	Serves urban/town dwellers