A Comparison of Methodologies for Monitoring Slum Conditions within Millennium Development Goals:

The case study of Addis Ababa, Ethiopia

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A Comparison of Methodologies for Monitoring Slum Conditions within Millennium Development Goals:

The case study of Addis Ababa, Ethiopia

by

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Abstract

Slums of the world can be traced back for hundreds of years and remain a challenge for many nations of the world. Currently, the slum issue is identified in the global agenda seeking to provide a basis for intervention by linking it to the Millennium Declaration Goal 7- Target 11, which is to improve the lives of 100 million slum dwellers by 2020. Within this context, in 2003, UN-Habitat has formulated a new slum definition for the international usage and made a global inventory of slum population. Accordingly, the notion, magnitude and dimensions of slums are explored and significant level of information is gained.

Nevertheless, based on the national level commitments, local governments are making an effort to localize and attain the goal. However, the scarcity of relevant data coupled with lack of both human and financial resource for data collection and analysis has highly constrained the whole process of localizing MDG. As a result, the local level information is still limited and data collection and analysis mechanisms are not well developed. Thus, informed decision making in slum intervention and performance monitoring is hardly possible.

In this regard, the main drive of conducting the research arise from the need to strengthen the local level data collection and analysis mechanisms through exploration of methodologies that have been in practice in monitoring slum conditions. Accordingly, the focus of this research is the development of methodology through the integration of local knowledge and GIT for monitoring slum condition at local level and comparison of its result with that of UN-Habitat to support the development of policies and intervention programmes at a local level and the achievement of the MDG.

The research is carried out on the selected three sub-cities of Addis Ababa, Ethiopia. The identification and spatial analysis of slums is conducted mainly based on Rapid Urban Appraisal methods supported by Remote Sensing and GIS tools that have enabled to carry out both the visualization of the spatial distribution and quantification of slums and slum dwellers. Moreover, by comparing its result with the result of the statistical methodology employed by UN-Habitat in Addis Ababa, it was possible to identify both its strength and limitations. The comparison has demonstrated that the methodology developed in this research is found to be effective and applicable mainly considering the scarce resource in many developing cities.

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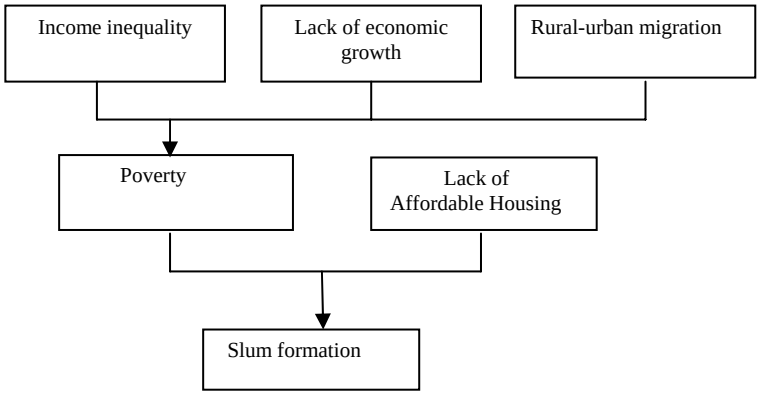
1. Description of the Research Topic

1.1. Background

Slums are becoming inevitable phenomenon of the urban fabric in the developing world. In the year 2001, it was estimated that one third of the world's urban population, nearly one billion people, live in slum areas. Six percent of the urban population in developed regions is slum dweller. Similarly, in developing regions and least developed countries, the figure goes up to forty-three and seventy eight percent respectively (UN-Habitat, 2003b).

Slum areas are characterized by mainly poor quality housing, lack of access to safe water and sanitation, overcrowded living environment and insecure tenure status. Slums are formed because of a number of forces (see Figure 1-1). Among these, rapid rural to urban migration, increasing urban poverty and income inequality and lack of affordable housing all contribute to the creation and proliferation of slums.

Figure 1-1: Conceptual Diagram for Slum Formation



(Source: UN-Habitat, 2003b)

As it is stated in the global report (2003b), every year the world's urban population is increasing by about 70 million people leading to a greater demand for provision of shelter, employment and urban services. However, most formal urban economies of developing countries are unable to meet these demands which eventually make the informal sector the main provider of housing and employment in the environment of slums contributing to the growing number of slum population. Current evidence has portrayed that slums do not accommodate all the urban poor, nor are all slum dwellers always poor (UN-Habitat, 2003b). However, in general terms, slums are the expression of poverty, inequality and social exclusion.

The complexity of the slum issue and the urgency to address it in an integrated manner has become a challenge to all the nations of the world. Today, the slum issue is identified in the global agenda seeking to provide a basis for intervention by linking it to the millennium declaration, which is "to improve the lives of 100 million slum dwellers by 2020". Ultimately, the declaration aims at attaining cities without slums (UN-Habitat, 2003b).

The goal of the millennium declaration calls for a vigorous implementation of urban planning and management policies designed to prevent the emergence of slum, along with slum upgrading and a

commitment on the part of government to reduce poverty (http://www.unhabitat.org/mediacentre/presskits.asp). As stated in the world development report 2000/2001, the international development goals are a good starting point. But in practice, these goals will have to be adapted modified depending on the context. The specific goals will have to emerge from a participatory process in which governments and civil society agree on priorities . Thus, the millennium development goal which is to improve the lives of 100 million slum dwellers should be localised by strengthening local level information through localised data collection and analysis methods.

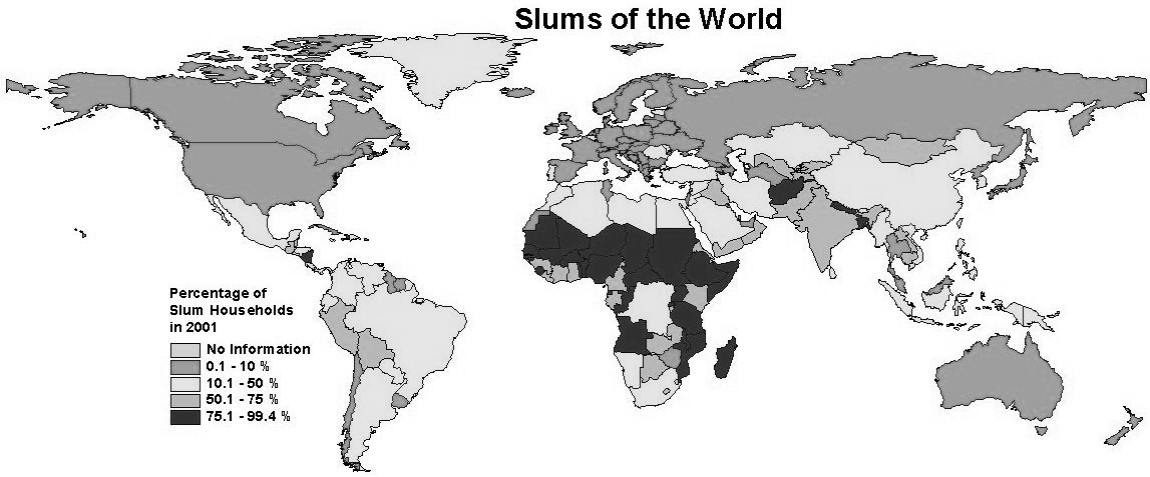
Accordingly, the main drive of conducting the research arises from the need to strengthen the local level data collection and analysis mechanisms through exploration of methodologies that have been in practice in monitoring slum conditions within the context of achieving the Millennium Development Goal 7 Target 11.

1.2. The level of information on slums and slum dwellers

1.2.1. International level

There is significant level of global information on the growing number of world's urban population living in slums. Based on the definition of slum, which was developed to improve measurements of the millennium development goal, information is extracted and international comparison is made mostly using Census Data, Demographic, and Health Surveys (DHS) that are regularly collected at national levels. According to the global report in the year 2001, over one million household records were scanned in order to reach to the estimation of urban population living in slums (see Figure 1-2) and almost all the data are derived, either directly or indirectly, from official statistical systems organized and financed by national governments.

Figure 1-2: Percentage of Slum Households in 2001



(Source: Turkstra and Raitheihuber, 2004)

Data collection and analysis on slums of selected cities has continued globally again in order to assess their current state for the appropriate implementation and monitoring of the millennium development goal. In the year 2003, Sample household survey was conducted on selected urban areas

or cities. For instance, having several components of urban inequity variables, household survey was conducted in Addis Ababa on 1510 households. The survey was conducted through a sampling strategy designed for selecting 54 kebeles[1] and 25-30 households with in each kebeles, which is less than one per cent of the total households in the city. Data was obtained on living conditions such as access to water and sanitation, solid waste disposal, building material, security of tenure, social capital and also on health and education (UN-Habitat-2004). Although the sources of data vary from country to country, according to UN-Habitat global reports, similar estimation procedure has been followed and significant level of information has been gained on a global scale.

1.2.2. Local level

Local or city level information in many developing countries is generally very limited. With few exceptions, in practice, national and city level data of developing countries are not very useful for analysis because they are mostly outdated, incomplete and they are rarely directed to policy concerns (http://www.unchs.org/programmes). In addition to these, the frequent long gaps (mostly 10 years) in the timing of census and other surveys, as well as delay in the data processing are major limitations. As a result, local level decision-making is highly at risk. “Poor data about implementation of policies and plans potentially inhibits the learning process of the responsible agencies and there by enhances the risk of failure of may be otherwise suitable measures” (Sliuzas 2004, p.7). In most cases, there is a high reliance on the global information. While the information on slums at a global level is worthwhile to visualize the world’s slum geography, in general terms, it is inadequate for formulating or modifying urban policies and for designing different intervention programs at local level because of the level of aggregation and geographic variability. Mostly, the term ‘slum’ is considered an easily understandable catchall but it disguises the fact that within the term a multitude of different settlements and communities lay (Garau p. & Sclar E.D., 2004) that have their own distinct characteristics.

Hence, it is important to recognize the importance of spatially identifying slums and appreciate variety of slums locally through high-resolution spatial information on where exactly the slums are and how they are distributed throughout the city, capturing all the spatial heterogeneity and the substantial variation. Detailed and high resolution spatial information of slums is an important tool in implementing different intervention programmes to improve the poor living condition of slum dwellers and also to alleviate poverty. It also helps to improve resource allocation by identifying where the neediest populations are located (Bigman, D. & H.Foback, 2001). Moreover, it contributes to transparency of public decision making, by raising awareness of poverty, igniting policy debates at local and national levels, and encouraging broader civil society participation in decision-making (Henninger, N. and M.Snel, 2002).

The choice of methodology for identification of poor living conditions is a crucial issue considering data availability, the physical and socio-economic heterogeneity of a specific local urban context.

1.3. Problem Statement

The formulation of appropriate policies and intervention programmes for the improvement of slum areas and the lives of slum dwellers at a local level requires defining, identifying and understanding slums not only on their commonalities but also on their diverse characteristics in terms of social,

[1] Kebeles are the lowest administrative units in the city of Addis Ababa

economical, cultural and physical condition in a local context. This in turn leads to the huge demand for accurate, timely and policy relevant data which requires the strengthening of local level data collection and analysis mechanisms.

In line with this, the main research problem focuses on the three interrelated elements which are:-

i. Lack of adequate and timely available data

In most developing cities, the availability of good quality data is very limited, baseline information is scarce, and still there is a high dependence on global average statistics which mostly leads to inappropriate interventions at a local level. As stated in Sliuzas (2004) "many policy and planning decisions made in many African countries are taken with out access to adequate data, which conceivably increases the risk of inappropriate measures being adopted". Moreover, the scope of national and international data collection and analysis systems, as well as reporting mechanisms are mostly limited to country or city level and the information is hardly disaggregated to a local level in small geographic areas.

ii. Lack of understanding the characteristics of slums

In line with the above stated data inadequacy, the lack of understanding of diverse characteristics of slums due to the geographic variability and socio-economic heterogeneity, contributes to the difficulty of getting correct picture of slums within cities. As a consequence, the information will again be inadequate for policy formulation and decision-making at local level. A number of policies enacted to 'improve slums' have failed simply because they attempted to operate from a generalized and poor understanding of the needs and priorities of slums and slum dwellers rather than examining the particular circumstance of each slum settlement (Garau & Sclar, 2004).

iii. Limitation of resource for data acquisition and analysis to come up with appropriate slum intervention

Abbott (2001) discussed the seriousness of the problem of poor quality spatial data in many developing cities and mentioned that building a comprehensive information system could be the best way for identification and understanding of slums but it needs a considerable mobilization of resource, time and by itself is a long-term goal. However, in most developing cities especially in many Sub-Saharan African countries, there is a very high resource constraint and yet the extent, urgency and complexity of the slum proliferation is highly pronounced which needs to be tackled with a localized holistic approach.

Therefore, the above mentioned three interrelated problems calls upon a search for appropriate localized methodology to be able to extract valuable information and support decision making to design appropriate intervention with a limited time and resource allocation for the improvement of slums and the lives of slum dwellers.

1.4. Brief Description of the Study Area

The research is carried out on slums of Addis Ababa, Ethiopia in three selected sub-cities. Addis Ababa is established before 116 years, in 1989. For many years, the city has developed without substantial guiding plan and authorisation of construction of dwellings. Moreover, most of the dwellings are built with low quality, traditional building material. At present the major part of the inner city areas are in a congested and deteriorated condition. Besides, main data sources like census and cadastral information systems are outdated and data collection and analysis systems are highly constrained by the lack of resource. In many instances, informed decision making on slum interventions is hardly possible.

1.5. Research Objective

The main research objective is to develop and test a methodology through the integration of local knowledge and GIT for identifying and describing slums and compare its result with that of UN-Habitat to come up with an appropriate methodology in order to support the development of policies and strategies for slum intervention in Addis Ababa, within the achievements of the Millennium Development Goal.

1.5.1. Sub-Objectives

1. To identify and describe key variables that define and characterize as well as differentiate slums in relation to UN-Habitat's working definition of slum in order to support the development of slum intervention programme
2. To test the methodology considering the present decentralised administrative levels in the city.
3. To compare the definition and results of slum information based on the tested methodology with the definition and results of UN-Habitat slum information produced in 2004 for Addis Ababa.

1.5.2. Research Questions

Questions for sub-objective 1

- How does UN-Habitat define slums?
- How are slums defined by local experts in Addis Ababa?
- Which key variables can be used to characterize slums in the local context?
- What are the key physical elements and socio-economic characteristics that differentiate slum settlements?

Question for sub-objective 2 & 3

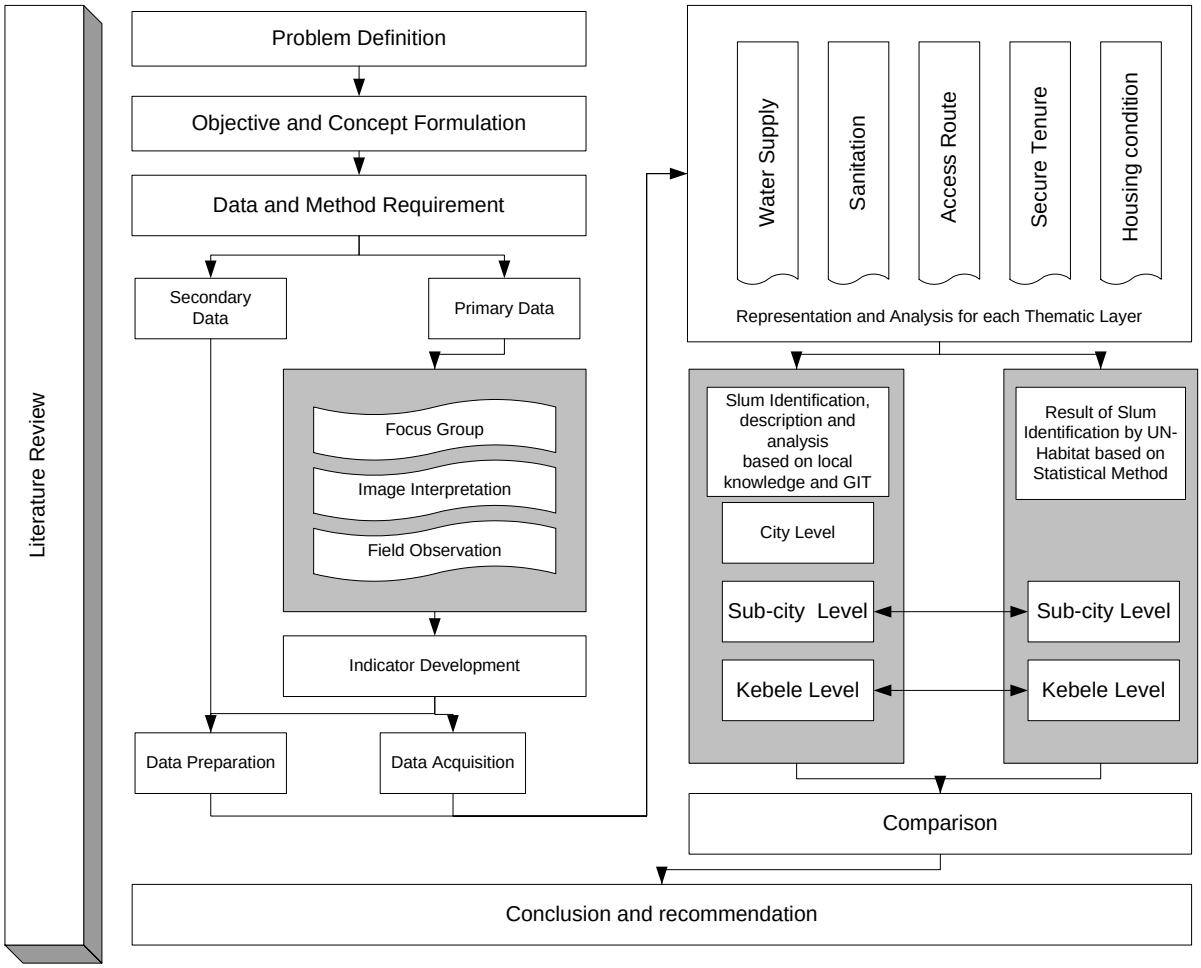
- Which methodology is used by UN-Habitat in 2004 to identify slums in Addis Ababa?
- What are the main strength and weakness of the application of this methodology?
- Can the result be used to support the development of policies and slum Intervention programmes?
- How can these limitations be minimized through the integration of local knowledge and GIT?
- What will be an alternative methodology to be designed based on the integration of GIT and local Knowledge considering the physical and socio economic condition of Addis Ababa?
- Can the result (the identification and its resolution) be used to support the development of policies and slum intervention programmes?
- What can be concluded from the comparison of the slum definition, the two methodologies and their results at different levels of aggregation?

1.6. Study Design

The research design of the thesis has two main parts. The major part covers the development of a methodology for data collection and analysis on slums to support decision making on slum interventions in Addis Ababa. The research process has considered the three administrative levels in

both data collection and analysis and also in the comparison stage. The combination different low cost techniques and data sources are the focus in the course of the research. The second part of the research is making a comparison. The comparison is made between the results of the developed methodology with that of UN-Habitat's in order to come up with an appropriate methodology at local level in the light of resource poor environments.

Figure 1-3: Study Design



1.6.1. Organisation of the Thesis

This chapter has presented the research topic together with the justification. It also includes problem statement, objectives, research questions and also research organisations.

Chapter Two: Provides literature review on slums. Description on how slums are defined locally and globally, methodologies that have been in practice for slum (poverty) identification and analysis are given. Furthermore, principles of the Rapid Urban Appraisal Techniques which are the main techniques employed in this research are also presented.

Chapter Three: Introduces the city Addis Ababa where the selected sub-cities and kebeles are found. It briefly describes the specific case study areas (sub-cities and kebeles). It gives a background history in view of land tenure and housing system, water supply, and sanitation. Accordingly, it presents the existing policies and strategies for slum improvement together with the organisation of newly established city administration structure. Furthermore, it describes level of information on slums.

Chapter Four: Describes the research method used for both data capture and preparation. It also discusses case study area selection criteria. Finally, it presents the limitation of the research.

Chapter Five: Deals with the analysis of the data with regard to slum definition, identification and characteristics description. It also presents the comparison of the results of local slum identification at various administrative levels.

Chapter Six: Deals with the comparison of results of the methodology developed in this research and the statistical methodology by UN-Habitat. Moreover, it includes the description of both strength and limitations of the two methods.

Chapter Seven: Provides conclusion and recommendation. It also consists of synthesis of the results for the development of methodology in respect with research objective, as well as sub-objectives.

2. Literature Review on Slums of Cities

2.1. Purpose of the chapter

The purpose of this chapter for the research is to provide conceptual background of slums, which usually are expressed simply by the term "slum" while they are in a wide diversity of built physical forms, depths and scales of deprivation (Garau p. & Sclar E.D., 2004). Essential elements of the research that are reviewed in this chapter are the definition and characteristics of slum, methodologies for identification and analysis of slums, and accordingly types of intervention that have been practiced to improve the condition. The interrelationship of these key elements, which is closely linked to the focus of the research, is also reviewed in such a way that how the captured information can be affected by the definition and the choice of method. Moreover, the review includes how the gained information affects the interventions.

2.2. Slum Definition

Since it first appeared in the 1820s, the word slum has been used to identify the poorest quality housing, and the most unsanitary conditions; a refuge for marginal activities including crime, 'vice' and drug abuse; a likely source for many epidemics that ravaged urban areas; a place apart from all that was decent (http://www.unhabitat.org/mediacentre/presskits.asp). UN-Habitat 2003a has stated a description to refer to the term slum based on the first urban forum paper "Cities with out slums" as…

"…a wide range of low income settlements and/or poor human living conditions"

And with a traditional meaning "…housing areas that were ones respectable even desirable, but which have deteriorated, as the original dwellers have moved to new and better areas of cities."

Has come to include also "…vast informal settlements that are quickly becoming the most visual expressions of urban poverty, having varied quality of settlements with limited access to water, electricity and sanitation"

Today, "the catchall term "slum" is loose and deprecatory. It has many connotations and meanings and is seldom used by the more sensitive, politically correct, and academically rigorous. But in developing countries, the word lacks the pejorative and divisive original connotation, and simply refers to a lower quality or informal housing." (http://www.unhabitat.org/mediacentre/presskits.asp).

2.2.1. Local Slum Definitions by Different Countries and Researchers

Even though slums show some commonalities throughout the world, they have diverse characteristics. Consequently, they are perceived and named in various ways. For instance, in French they are called bidonvilles, in Spanish barraca (Barcelona), solars or tugurios (Lima), in kiswahilli mabanda (Tanzania), and yet they all share the same miserable living conditions. Depending on local perceptions, description and definition of slums also vary from one locality to another. In the

following table a few definitions and description of slums (as produced for global report 2003b) are presented.

Local definitions by different countries

Table 2-1: Local Definitions of Slums by Different Countries

City	Official Definition	Unofficial definition
Nairobi, Kenya	None	Difficult areas which lack most basic services and infrastructure
Abidjan, Ivory coast	Informal Practice, which are infractions of urban regulations in the process of access to land	Den for highwaymen, drag addicts & the hang-outs of impoverished foreigners
Durban, South Africa	Previously Informal settlement degenerated to such an extent & needs to be rehabilitated	Bad area where unsociable activities occur
Metro Manila, Philippines	Buildings or areas that are deteriorated, hazardous, unsanitary or lacking in standard conveniences	Physically disorganised collection of shelters made of light and often visually unappealing materials where poor people reside, narrower than sewers and associated with bad smell
Moscow, Russia	Shabby and dilapidated buildings, Morally outdated and deteriorated buildings	*Baraks* are primitive houses built usually for construction workers for the period of construction.
Bogotá, Colombia	Urban settlements in which the occupation and development of the terrain occur with out any plan and without the corresponding permits and licenses officially required	Spontaneous settlements that do not fulfill the urban rules, and which concentrate migrants and poor populations

(Source: http://www.ucl.ac.uk/dpu-projects/Global_Report/world_map.htm)

Slum Definition on Different Study Documents

Researchers have also defined slums in different ways. Clinard in 1966 defined slums as inadequate housing, deficient facilities, overcrowding, and congestion generally characterize slums; although it involves much more than these elements. Sociologically it is a way of life, a sub-culture with a set of norms and values, which is reflected in poor sanitation and health practices, deviant behaviour, and characteristic attributes of apathy and social isolation.

Slum is a congested, unhygienic area or buildings that are public hazards (Sen, Hobson and Joshi, 2003). Turkstra and Deng in 2004 have also defined slums as residential areas with sub-standard living conditions are labelled as slums. These slum areas have, besides a poor living environment, also other distinct characteristics such as fast growth, hazardous location, limited provision of social facilities, insecure land tenure, poor and vulnerable to crime, diseases, social and environmental conflicts. In the work of Sen, Hobson et al (2003) slums are described as informal settlements in their context which are congested, have structures made of materials which are considered garbage, such as wood used for packing, plastic sheets, opened out metal tins, galvanized iron sheets, bamboo sheets, etc and often

lack the most basics of facilities for all its inhabitants. Other definitions are also provided in many policy documents; for example in the cities alliance action plan slums are described as neglected part of the cities where housing and living conditions are appallingly poor. Although the general concept of the definition meet the common view of what slum is, the various definitions and descriptions imply slum characteristics and perception varies depending on geographical, social and economical variability.

2.2.2. International working Definition of Slum by UN-Habitat

The global report UN-Habitat (2003b, p.11) discussed how complex and multidimensional slums are and stated "even though acceptable benchmarks are not easy to establish, measurement could be problematic and some of the characteristics of slums, such as access to physical services or density, can be clearly defined, such as social capital cannot, efforts are made to propose a more quantitative measurement of slum." in order to respond to goal 7 target 11, which is to improve the lives of 100 million slum dwellers. Hence, an expert group organized by UN-Habitat in the year 2002 defined slums as an area that combines to various extents, the following characteristics (restricted to physical and legal characteristic of the settlement, and excluding the more difficult social dimensions) for future international usage:

- Inadequate access to safe water
- Inadequate access to sanitation and other infrastructure
- Poor structural quality of housing
- Overcrowding
- Insecure tenure status (UN-Habitat, 2003b)

However, Abbott (2004, p.3) discussed the future implication of the definition on the improvement of slum and argued that "Although operational definition has been given to fulfil the whole purpose of implementing the MDG and also coming up to such comprehensive definition from diverse definition and characteristic of slum is highly appreciated, the approach has based upon a descriptive analysis of slum conditions and, as such, represents the most superficial level of analysis which means it is based up on the lowest denominator." And as such it misses the key component of the analysis, which should seek to explore differences between settlements." Thus, differences between slum settlements/areas has to be given due consideration and the linkage has to be demonstrated so that recognising the state of diversity in a slum settlements whether there is a need for intervention on a different approach or the same approach without affecting the inherent distinct characteristic of the settlement.

2.3. Slum Characteristics and Indicators

Local level description of slum Characteristics

Based on the case studies on different countries by UN-Habitat 2003, local level description of slum characteristics is shown in the following table (see Table 2-1). The description shows predominantly the physical characteristics, which is the apparent expression of all inherent slum character.

Table 2-2: Local level Description of Slum Characteristics

Slum Characteristics Local level description of	Key Slum Characteristics
Nairobi, Kenya	Poor sanitation Poor infrastructure
Abidjan, Ivory coast	Precarious housing construction material, shared yards, irregular and non-structured settlements
Durban, South Africa	Non permanent housing structures, access to sanitation only to informal pit toilet, access to water supply through communal tap or river
Metro Manila, Philippines	Buildings or areas that are deteriorated, hazardous, unsanitary or lacking in standard conveniences
Moscow, Russia	-status of buildings: Outdated buildings, dilapidated and shabby abandoned buildings
Bogotá, Colombia	Unplanned

(Source: http://www.ucl.ac.uk/dpu-projects/Global_Report/world_map.htm)

International level description of slum Characteristics

Based on the review of the definitions used by national and local governments, statistical offices, institutions involved in slum issues and public perceptions, 2003 global report described the slum characteristics as follows

- Lack of basic services: Lack of access to sanitation facilities and safe water sources is the most important feature, sometimes supplemented by absence of waste collection systems, electricity supply, surfaced roads and foot paths, street lighting and rain water drainage.
- Substandard housing, illegal, or inadequate building structures: Slums often built with non-permanent materials unsuitable for housing given local conditions of climate and location. Factors contributing to a structure being considered substandard are earthen floor, mud-and-wattle walls or straw of roofs. Various space and dwelling placement bylaws may also be extensively violated.
- Overcrowding and high density: Overcrowding is associated with a low space per person, high occupancy rates, cohabitation by different families and a high number of single-room.
- Unhealthy living conditions and hazardous locations: Unhealthy living conditions are the result of lack of basic services, with visible, open sewers, lack of pathways, uncontrolled dumping of waste, polluted environments, etc. Houses may be built on hazardous locations or land unsuitable for settlement, such as floodplains, proximity to industrial plants with toxic emissions or waste disposal sites, on areas subject to landslides.
- Insecure tenure; irregular or informal settlements: Lack of any formal document entitling the occupant with the right of the land or property.
- Poverty and social exclusion: This is not seen as an inherent characteristic of slums, but as a cause and largely as a consequence of slum condition.

- Minimum settlement size: Many slum definitions also require some minimum settlement size for an area to be considered slum, so that the slum constitutes a distinct precinct and is not a single dwelling.

However, (Abbott. 2004) has argued on the above stated characteristics and stated that do not describe all slums (in informal settlements) but only the ones related to slums in formally planned areas. He has pointed out that the above stated characteristics should have additional characteristics in order to address informal settlements:

- An absence of underlying pre-planned spatial structure (with particular reference to the absence of clearly defined public space for access and movement);
- Lack of social infrastructure (e.g. schools, clinics),
- Strong social networks and high-level of social capital, which are critical to the effective functioning of the settlement and influence the definition of public space;
- Lack of physical infrastructure services and spatial linkage to the formal city:
- An absence land-use/ cadastre definition and tenure at a settlement (as opposed to a household) level (Abbott, 2004)

Although slum characteristics, explained in the global report, at some points fails to cover the whole nature of informal settlement, it is not totally devoid of the expression of informal settlements as it is mentioned in Abbott's critique but it is rather implicit. Particularly lack of physical infrastructure is partly included in the global definition. Of course as Abbot, 2004 argued "…the linkage has to be demonstrated it can not be assumed…" Social characteristics, which are essential elements of a settlement and density, Vs open space, are also overlooked in the global definition. Hence, depending on the location (inner city or periphery) it is inevitable to notice and consider additional characters for measuring and monitoring slum conditions.

Slum Indicators

It has been repeatedly acknowledged that indicators are most effective in their ability to communicate complex information in a simple way (BRISTOL, 2003). Based on sustainable Seattle, 1995 McCall 2004 mentioned, indicators are sign posts, bits of information that highlight what is happening to a larger system. They are small windows that provide a single glimpse of picture, saving time, money and complexity. For assessing urban poverty (slums), and specially to identify policy interventions, it is desirable to have indicators collected at the lowest practical level of aggregation (http://www. Worldbank.com). A good indicator as discussed in DFID (2002) is one that is unambiguous in terms of identifying improvements, sensitive to changes, that it reflects changing policy circumstances and is cost effective.

As Henninger & Hammond (2000) mentioned, recently geo-referenced indicators have gained prominence for monitoring poverty, and discussed that essentially this indicator maps overlay social or poverty indicators over a geographic framework. Such spatially referenced indicators are based on household data as well as satellite images and Geographic Information Systems. These indicators can be important tools for geographic targeting of intervention scheme.

Having working definition for slum, indicators of slums and thresholds for defining slum has been established by UN-Habitat. It is stated that the developed indicators are provisional and subject to international field-testing for appropriateness, robustness and compliance with available sources, before reliable baseline global estimates of numbers of people living in slums obtained. It is also intended that local modifications of the indicators should be used. In the following table, (see Table 2-3) the slum characteristic description and their indicators are shown.

Table 2-3: Slum Indicators and Thresholds for Defining Slums

Characteristic	Indicator	Definition
Access to water	Inadequate drinking Water Supply (Adjusted MDG indicator 30)	A settlement has an inadequate water supply if less than 50% of households have an improved water supply o House connection o Access to public stand pipe o Rain water collection
Access to sanitation	Inadequate Sanitation (MDG indicator 31)	A settlement has inadequate sanitation if less than 50% of households have improved sanitation o Public Sewer o Septic Tank o Pour-flush latrine o Ventilated improved pit latrine
Structural Quality of housing	a. Location	Proportion of households residing on or near a hazardous site. The following locations should be considered o Housing in geologically hazardous zone o Housing on or under garbage mountains o Housing around high industrial pollution areas o Housing around other unprotected high risk zones (e.g. Railroads, airports, energy transmission lines)
	b. Permanency of structure	Proportion of households living in temporary and/or dilapidated structures o Quality of construction (e.g. materials used for wall, floor and roof) o Compliance with local building codes, standards and by lows
Overcrowding	Overcrowding	Proportion of households with more than two persons per room. The alternative is to set a minimum standard for floor area per person (e.g. 5 square meters)
Security of tenure	Security of tenure (MDG indicator 32)	o Proportion of house holds with formal title deeds to both land and residence o Proportion of house holds with formal title deeds to either one of land and residence o Proportion of house holds with enforceable agreements or any document as a proof of a tenure arrangement

(Source: UN-Habitat 2003b)

Although the developed indicators are essential for global comparison and for use as a starting point for later development, they can not necessarily describe local level situations for local level decision making. Thus, as it is also suggested in the global report, to be able to support local level decision, indicators should be adopted and modified based on locally developed guidelines for indicator selection (BRISTOL, 2003).

2.4. Methodologies for Slum Identification and Analysis

Methodological choices between qualitative and quantitative methods are a matter of determining which research method is best suited to capture and analyse for a ‘particular data slice’ (Gaber, 1993). In this, section methodologies used to identify (map) and analyse slums are reviewed based on qualitative and quantitative category. Respective methodologies are categorized according to their predominant qualitative or quantitative nature. Although literature found in this aspect mostly refer to poverty “… the principles are the same for the living conditions mapping (slums), because all these variables have a spatial component” (Turkstra & Deng, 2004).

Based on availability of data, Turkstra & Deng, 2004 have divided poverty (slum) mapping methodologies in to three different categories. Two of the methodologies, full data coverage (e.g. census) and household survey data (small area statistics); can be categorized as quantitative methodologies. One of the methodologies, combination of qualitative and secondary data, is categorized as qualitative methodology. Furthermore, in Davis 2003; five methodologies for mapping Poverty (slum) are discussed. Two of the methodologies, combination of qualitative information and secondary data, and extrapolation of participatory approaches, are categorized as qualitative methodologies. The rest three methodologies, small area estimation, multivariate weighted basic-needs index, direct measurement of household- survey data and direct measurement survey data, are categorized as quantitative methodologies. In the following section these methods are reviewed, giving emphasis to qualitative methodologies which are the main focus of the research.

2.4.1. Quantitative Methodologies for slum Identification and analysis

As it is described in Kumar (1987, p.1) quantitative methods tend to generate precise, quantitative data. “They have been developed and refined over the years by socials and behavioural researchers. These methods, which include cross-sectional and longitudinal sample surveys and censuses, and experiments, have contributed to significant advances of social science”. However, Gaber (1993) argued that the overdependence on quantitative research methodologies in the field of urban planning has lead planners to ask questions that can only be answered through quantitative research strategies. In his examples, he mentioned that planners can talk about demographics of a community using census tract analysis but they can not talk about street life or character. As a result, they may loose certain types of social and economic problems that would be better addressed through qualitative methods.

There are several methods in practice today though; major quantitative data collection and analysis methods are Bivariet and Cluster analysis, inferential statistics, and interval measures of relation ships, Pearson product moment correlation, and survey research.

2.4.1.1. Methodologies in practice for slum Identification (poverty mapping) and Analysis

Small Area estimation

Small area estimation is a statistical technique that combines survey and census data to estimate welfare or other indicators for disaggregated geographical unites. In case auxiliary data (such as old census data, social welfare records, municipal population registration, large surveys (DHS)) are available these can be related to data obtained through a specific designed household survey. By developing a model to identify the relationship between the survey and the auxiliary data more reliable estimates can be made and the possibilities to extrapolate to areas not covered by the household survey (Turkstra & Deng, 2004).

Multivariate weighted basic-needs index

Various basic needs are indices are used for disaggregated poverty mapping. They differ among themselves in terms of choice of variables and weighting schemes. Three are based on multivariate statistical techniques-principal components, factor analysis and ordinary least squares (Davis, 2003).

Principal component analysis: The principal component statistical technique reduces a given number of variables by extracting linear combinations that best describe the variables, transforming a number of variables in to in to one index.

Factor analysis: The primary purpose of factor analysis is to describe the relationships among many variables in terms of a few underlying but unobservable factors. Factor analysis is similar to principal components analysis in that both are attempts to approximate the covariance matrix. Factor analysis, however, is more elaborate. In factor analysis, sets of variables are grouped by their correlation; each group of variables represents a single underlying construct or factor. Although factor analysis does assist in identifying underlying factors represented by a set of variables, the method is subjective: the factors have to be interpreted to give them a meaning. This interpretation lies on previous knowledge and intuition about underlying relationships (Davis, 2003).

Direct Measurement of household Survey data

Survey data have served as a basis for a number of statistics-based-poverty-mapping exercises, though their sampling properties sometimes present difficult statistical challenges. Household – survey data are often clustered and aggregated to be of much help in constructing disaggregated poverty maps; this is the origin of development of small-area estimation strategies. Georeferenced household surveys have the potential to be re-aggregated into new units of analysis and thus help to create novel poverty maps (Davis, 2003).

Direct Measurement of census data

When a full recent census is available covering all the required indicators and the corresponding maps, there is no data problem and the program can focus on data analysis, mapping and follow-up (policy support). In case a reliable, recent census is available these data are very useful. Important is that the variables included in the Census are covering the data required for the specific needs of an urban inequity study of poverty study. In many cases income data might not be available (Turkstra & Deng, 2004).

As stated in (Kumar, 1987), although the problems of individual bias, validity and reliability of data, and erroneous inferences are not completely eliminated, they are greatly reduced in quantitative methodologies. As a result, findings based on these methods carry greater weight with decision makers. He also added, despite their accuracy and wide popularity, they have limitations and are time consuming. More over, the considerable human and material resource these studies require can be a serious constraint in the resource scarce settings of developing countries.

2.4.2. Qualitative Methodologies for Slum Identification and Analysis

Qualitative research attempts to understand behaviour and institutions by getting to know the persons involved and their values, rituals, symbols beliefs and emotions (Nachmias, 1992). As Gaber, 1993 described, although these methods are unable to give an accurate image, they provide a way of studying human events and activities in their natural settings having a contextual (holistic) approach. They examine social entities-slums, gangs, communities in their most complete form and provide the detailed description of the social setting under investigation.

There are several methods in practice today, however, major qualitative data collection and analysis methods are: field research and direct observation, focus group, in-depth interviews, participant observation and village meetings. In the following section field research, field observation and focus group are reviewed briefly, as they are also the focus of the research.

Field Research

Field researches are prototype of qualitative research, and are able to capture qualitative data because they take a holistic perspective and analysis process in the real life world (Nachmias, 1992).

Based on the work of Brymam & Hammersley (1992), Gaber (1993) also mentioned the most common understanding of the descriptive character in field research is the mapping out of a context for the understanding of subjects interpretations of what is going on and for the research to produce explanations which describe the social realm. The final common field research is its ability to capture the process of social life. Field research has become a more established methodology in sociology, it came to emphasise more participation in the lives of those studied in order to share and consequently better understand their subjective perspectives.

Direct observation

It involves intensive and systematic observation of a phenomenon or process in its natural setting. It is not, however, as elaborate a method as participant observation, which is used in ethnographic studies. In the study of social and economic phenomena, direct observation usually requires the interviewing of key informants as well (Kumar, 1987). The data can be recorded in many of the same ways as interviews (stenography, audio, and video) and through pictures, photos or drawings (http://lnweb18.worldbank.org/ESSD/sdvext.nsf/61ByDocName/ToolsandMethodsQualitative Research)

Focus Group

Focus groups are semi-structured group meetings during which participants contribute to the generation of data on specific questions of concern to communities, stakeholders, projects or policies (http://lnweb18.worldbank.org). In focus groups, participants discuss ideas, issues, insights, and experiences among themselves. Each member is free to comment, criticize, or elaborate on the views expressed by previous speakers. The role of the moderator is simply to stimulate discussion and keep it focused (Kumar, 1987). A series of focus groups on the same issue is a rapid way to collect comparative data from a variety of stakeholders. Focus group meetings are a relatively low-cost way to collect rather complex information and insight (http://lnweb18.worldbank.org). However, just like every other method, focus group requires planning, effort, and resources. Furthermore, like other research methods, making a realistic assessment of time and money issues at the beginning of a project is a good way to avoid problems later on (Morgan, 1993).

In terms of research methods, focus groups use more natural settings than some techniques, (surveys) and less natural settings than others (participant observation) (Morgan, 1993). Group size and the skill of the facilitator can determine the success or failure of a focus group meeting. Although it is possible to have as few as four or as many as twelve discussants, the seven to ten range is generally the most successful. The groups work best when the participants in each group are "homogenous". Homogeneity among group members means that they have common concerns. But it is the similarity of participants' orientation toward the issue at hand which allows for information to be shared freely and for deeper insight into the issue raised (http://lnweb18.worldbank.org).

Focus groups and other quantitative methods are appropriate tools to generate theories and explanations (Morgan, 1993). The information gathered and analyzed from discussions can be useful in project planning, implementation and evaluation, and focus groups have been used in Participatory Poverty Assessment work (http://lnweb18.worldbank.org).

2.4.2.1. Methodologies in Practice for Slum Identification (poverty mapping) and Analysis

Extrapolation of participatory approaches

Participatory assessments measure poverty in terms of local perceptions of poverty, which are identified and then extrapolated and quantified in order to construct regional poverty measures. Proponents argue that such a poverty measure is more comprehensive and represents the multidimensional nature of poverty and the processes that create can maintain it. With this indicator, poverty is defined locally in terms of perceptions of well being and how neighbouring informants rank this perception (Davis, 2003).

Combination of qualitative information and secondary data

In case there is no capability / resources available for a household survey and there is neither an up-to-date census, alternatives are required for an urban inequities study. A possibility is to use a combination of local expert knowledge, high-resolution images and local records. An additional layer is the boundaries of administrative areas (enumeration areas, neighbourhoods) with local available records. The combination of these data sets in a GIS can generate a wealth of information on urban inequities and can easily deal with the so-called modifiable area unit problem. The advantage that is locally generated and thus easier for institutional embedding (Turkstra & Deng, 2004). Rapid appraisal techniques, semi-structured group interviews and interviews with key informants, supplemented by secondary data are the main source of information for such methodology.

In this regard, the main concept of this methodology is adopted in this research and the main techniques used are Rapid Appraisal Techniques. Thus it would be worthwhile to review the main principles of Rapid Appraisal methods and their virtue as well as pitfalls.

2.4.2.2. Principles of Rapid Appraisal Techniques

Chambers in (www.fao.org) describes (RUA) RRA as a "fairly-quick and-fairly-clean" appraisal and as opposed to the fast and careless studies (he calls them “quick-and-dirty”) studies and the slow and excessively accurate approaches ("long-and-dirty"). The original idea behind RRA is to find some balance between getting appropriate survey results reasonably, accurately, and credibly (McCall, 2004). RRA (RUA) has been used as a method to understand communities own perceptions of their priority needs (Nio ong, Humphris, Annett & Rifkin, 1991). Some of the rational for using rapid and low cost methods is for economizing resources: especially for developing countries where resource is scarce; for relevance of information: in many instances especially when interpretive understanding a phenomena or a process is required; and timeliness of information: can be conducted quickly, thus ensuring that the findings and recommendations are available for decision making on time (Kumar,1987). In general terms, the opportunity given by RRA is, by avoiding lengthy methods, to save and budget time that the poor are let in, as individual or as families, to be learnt from and understood in more depth (Chambers, 1983).

Principles of Rapid Urban Appraisal as summarised by McCall, 2004

Optimising Trade-offs between performance and costs; between the speed and timeliness, and cost, of the survey and the amount and detail of data; between the breadth and depth of coverage; between accuracy and relevance, finding “appropriate degree of imprecision”.

Off-setting the biases of “development tourism”: minimising the biases of roadside and dry season visits, and of the education, language, political and gender (i.e. male) and project connections of the survey’s respondent.

System Thinking: not only a 'systematic' way of gathering data, but also the appraisal of the information, the analysis, etc., the thinking must be in process systems terms. RRA seeks causes, not just symptoms.

Seeking Diversity of direct information source: Women and men, children and adults and the old, rich and poor, etc. This implies using functional stratification in identifying sources. However, the ethical grounding of RRA/PRA means that is a particular focus on the more inarticulate members of rural society. Appreciating the value and legitimacy of **indigenous (technical & spatial) knowledge** of local people: vernacular, specialized, or social, indigenous knowledge.

Listening and learning directly from local "experts" ;Learning rapidly and progressively, so that there is increased understanding by all parties involved including the primary target group. [Effective Listening/ Learning imply a self-critical awareness and responsibility on the part of the RRA/PRA researcher.]

Facilitate local people to collect the knowledge for them. RRA should have a strong element of two-way awareness-raising, consciousness-forming with local people.

"Triangulation": cross-checking the information received using different research tools & methods, different research disciplines (NB. RRA teams are usually multi-disciplinary), as well as different informants, (also: different areas, different seasons, etc.) whilst approaching the same problem.

"Serendipity": listening and looking for new knowledge. RRA practitioners take the time and make the efforts to 'look and listen' with an open mind, in the right places, with the expectation of finding 'new' knowledge.

Table 2-4: Virtues and Pitfalls of RRA

RRA Features	VIRTUES	PITFALLS
Key informants	Unique sources	Might create or reinforce bias
Proxy indicators	Clear, Simple, Cheap, Valid	May be Misleading
Experienced Personnel	Accumulated Wisdom	Unavailable in remote areas, costly
Speed	Low budget, quick results	Superficiality-development is long-term
Inter disciplinary	Combine disciplinary expertise,	Disagreement on Findings
Inexpensive techniques	Local, low budget	Used too easily, undiscriminating
Flexible methods	Locally adopted	Impossible to replicate

(Source: McCall, 2004)

In general terms, as Gaber, 1993 mentioned "…all research methods suffer from one kind of inadequacy or another", these methods also have their own weaknesses and strength. In the following table (see Table 2-5) the weaknesses and strength of qualitative methods is summarized.

Table 2-5: Strength and Weakness of Qualitative Research

Strengths of Qualitative Research	Weaknesses of Qualitative Research
Depth and detail-may not get as much depth in a standardized questionnaire	Fewer people studied usually Less easily generalized as a result
Openness-can generate new theories and recognize phenomena ignored by most or all previous researchers and literature	Difficult to aggregate data and make systematic comparisons
Helps people see the world view of those studied--their categories, rather than imposing categories	Dependent upon researcher's personal attributes and skills
Attempts to avoid pre-judgments -goal is to try to capture what is happening; present people from their perspectives and views.	Participation in setting can always change the social situation/ not participating can always change the social situation as well

http://lnweb18.worldbank.org/ESSD/sdvext.nsf/61ByDocName/ToolsandMethodsQualitativeResearch

2.5. Comparing quantitative and qualitative Methodologies through their differences

To able to strengthen the development of theoretical base for the research, differences between qualitative and quantitative research methods is also reviewed as stated on Gaber, 1993.

Table 2-6 : Differences between Quantitative and Qualitative Field Researches

Quantitative	Qualitative
Positive in orientation, seeking objective facts about and causes of social phenomena with little or no reference to the subjective states of individuals	Phenomenological in orientation, seeking to understand human behaviour from the social own frame of reference
Obtrusive and controlled measurement	Naturalistic and uncontrolled observation
Objective	Subjective
Removed from the data: the "outsider" perspective	Close to the data: the "insiders" perspective
Verification oriented, inferential, conformity and hypothesis testing	Discovery-oriented, descriptive, exploratory, and inductive
Outcome oriented	process oriented
Reliable: 'hard' and replicable data	Valid, 'real',' rich' and 'deep' data
Generalisable and multiple case studies	Tends to be ungeneralizable; single case studies
Particularistic	Holistic
Assumes a stable reality	Assumes a dynamic reality

(Source: J.Gaber/ Landscape and urban Planning 26(1993) 117-148)

2.6. Conclusion

The review of the chapter on the interrelated elements of the research has demonstrated as to how perceptions and understanding of slums varies in different locations, at different administrative hierarchies (international, local) as well as by different researchers. Even though in all the descriptions commonalities of slums is observed, the review has demonstrated significant diversity of slums reflecting a wide variety of characteristics at different location in space or time. Thus to measure the extent of the problem on slum (poverty) and monitor improvements of slum conditions, indicators should be developed taking local context into consideration. "…the ultimate utility of any of set of indicators will depend on how expensive it is to collect and monitor information. It compliments local initiatives and tries to meet local demands…" (WBED, 2002 p.24). Hence, as part of the methodology indicator development depending on the locality plays an important role in relevant data capture and analysis. Different methodologies also have been in practice to identify and monitor slums (poverty).

Even though in principle, methodological choices are a matter of determining which research method is best suited to capture and analyse for a particular "data slice" (Gaber,1993), it also very much depends on level of resources it requires. In the light of this, the methodology which is going to be developed in this research has taken the above factors and components in to consideration particularly the concept proposed in the reviewed methodology "qualitative information and secondary data" is adopted. Moreover, the review has built and developed a framework to this thesis. All the above elements have strong relationship that the definition of slums in a certain locality, the respective indicators developed to measure it and the choice of methodology that captures the information including tools and techniques of identification can greatly influence the final result (identification, characteristics description and quantification) that determine the type of intervention to be designed.

3. Description of the city Addis Ababa

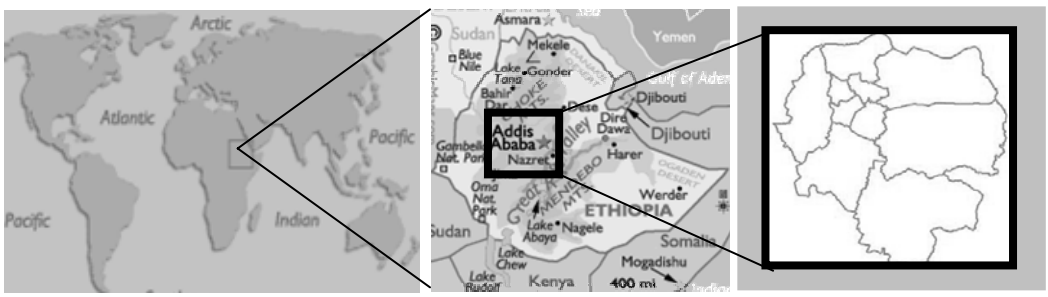
3.1. Overview of the location

Addis Ababa is a capital as well as the political and cultural centre of Ethiopia. It is also an official diplomatic capital of Africa headquarters of United Nations economic commission for Africa (ECA).Moreover it houses the head quarters of African Union (AU) since 1963.The city is founded in 1986 having 50,000 inhabitants of mostly military and their family (www.addisababacity.gov.et.). It has become the largest and populous city in Ethiopia. In 2004, the population size of the city is estimated to be around three million exceeding more than thirteen times than that of the second city (Dire-Dawa) (ORRAMP, 2002).

However, Addis Ababa is one of the least developed cities in Africa facing a major challenge of slum proliferation. Overcrowding and deterioration have become common places in the city because of uncontrolled population growth and severe housing shortage. Moreover, due to absence of adequate facilities and services of international standard, Addis Ababa's status as a diplomatic capital of Africa and home of African union is threatened (ORRAMP, 2002).

There is huge gap in living standard among the city dwellers with high heterogeneous way of living, plastic house against the wall of expensive villa, shanty settlement beside high standard recreation areas of the main city centre and the like are the visible disparities in built form, altogether creating a homogeneous picture for the city. As it is stated in ORAAMP, (2000) the high level of urban population growth coupled with a low level of income, rapid increase of housing price, and failed policies among others; have outstripped the capacity of the urban society to finance the construction of the minimum acceptable housing unit in the city. It is estimated that out of the total housing demand 50% is satisfied by the informal housing sector contributing to the growing number of slums in the city (ORAAMP, 2001).

Figure 3-1: Location of Addis Ababa



In general terms, severe housing shortage, dilapidated condition of existing houses, poorly serviced working and living environment and yet high social, economical and cultural mix are the clearly visible characteristics by which the city is expressed.

3.1.1. Physical Setting

The area of the city Addis Ababa is approximately 54,000 ha. The built up area covers 35,826ha (LDA, 2004) and gross population density is 55.5 persons per hectare. The altitude of the city varies from nearly 1500 to 2400m above sea level. There is high topography in the north and west, relatively flat in the southwest and southeast, which is cut by a deep gorge and rivers crossing the city from north south (ORRAMP, 2002).

Figure 3-2: Landsat Satellite Image, Addis Ababa and Surrounding Areas

(Source: Turkstra and Raitheihuber, 2004)

3.1.2. Historical background of the city

Housing and Tenure

Although very complex issue, it is important to briefly review land tenure system and housing development dating back to a few centuries. The issue is raised in this section not only to state some historical facts but also to give background as to how the present physical status of the city comes about. It is summarised as Gossaye.A. (2001 p.149-160) reviewed the tenure system in three different periods, the 1st is a period from 1907 to 1974 (monarchy), 2nd is a period from 1974 to 1991(socialist regime), 3rd is a period after 1991(Federal Government).

Period from 1907 to 1974: During this period, the land holding system was private. Individuals were entitled to have plots with no limit of size and shape, as it is mentioned in the study, the plot size could reach as large as 50 hectares. The nobilities and clergy were the main owners of the land excluding the middle and the low income from getting access to land. There was no guidance or control of the development, thus plot sub-division and construction of dwellings was unauthorised. “Large part of the city was built in this process bit by bit in a haphazard and fragmented way, each

neighbourhood being built with no coordination with others. The dwellings that were built in this manner were not up to the standard of that time". They were built with out a proper layout, social and physical infrastructure and also with cheaper construction material mostly mud and pole for rental purpose.

"Generally, the monopoly of urban land by few landlords and the lack of access to such resource by the majority, unregulated housing development, lack of efficient institutions and community participation, were just a few among the many firmly entrenched barriers to planned development and in solving shelter and environmental problems during these period."

Period from 1974 to 1991: In 1974, the socialist regime come to power and altered the private landholding system to public land owning system. In 1975, proclamation was issued stating the nationalising of land and also extra houses of individual ownership were also confiscated and altered in to public ownership. Moreover, the government had also a power to expropriate any urban land or house "for public purposes".

Even though, in this regime, there was a big determination to achieve equity by giving the poor access to land and housing in reverse with the previous regime, the centralised system coupled with lack of management capability could not allow achieving the intentions. As stated in Gossaye, A. 2001 "The inability of the city administration to develop and allocate plots quickly or in sufficient numbers to meet demand led to a serious housing deficient, particularly for the low income groups, which in turn led to further overcrowdings and the growth of slums".

Period after 1991: In this period the political power is changed and transition has been made from the command economy to market oriented economy. Proclamation was issued in 1993 changing the land holding system to lease holding system, maintaining public ownership of land. Accordingly, the city administration adopted a land lease and rent holding system and hold two separate regulations in 1994.The first regulation applies to all those who acquire land through the new lease system offering 73 square meter land for free especially for the low income group, 73-175 square meter by lottery and more than 175 by auction. Recently, individual plots are no more granted below 175 meter square instead housing cooperatives are encouraged to build apartments. Condominium law was being prepared to achieve efficient use of urban land and infrastructure. The second regulation applies for to all those who acquired land before the land lease holding policy proclaimed mainly to fix the rent of urban land possessions not covered under the lease holding regulations.

These land allocation system, be it on an individual or cooperatives basis, did not favour the poor. Starting from plan preparation period the proportion of plots prepared for low income group is very low. For instance, in Akaki (one of the ten sub-cities of Addis Ababa) detail study plan 4790 plots were prepared for different purposes including for residential purpose with 4039 plots for all income groups, however, among these only 274 plots were prepared for low-income groups with 73-105meter square land (WUDB, 2000). It is also unaffordable for the poor to participate in the lottery because the non-refundable entry fee was 250 birr (25€) and deposit 20% of the total construction cost of the dwelling. This was evident that middle and high-income groups are the ones who develop most expansion areas where as "…60% of the city population lives below poverty line…" The fact that the exclusion of the low income group from the landholding system throughout the years created a serious housing shortage and made evident the development of informal settlements and further deterioration of the existing housing stock.

Water Supply

Addis Ababa started getting piped water supply in the year 1901. At present, around 220,000-meter cube per day water come from all the reservoirs, a number of wells and springs. Although most of them are abandoned due to water quality deterioration, many springs were developed from the northern mountains (Entoto mountain) and many boreholes were dug to fulfil the increasing demand of the then expanding city. The document, AWSAA 2004, stated the water supply distribution coverage as 300 square kilometres out of 540 square kilometres (total area of the city) are served i.e. approximately 56% of the city area.

Sanitation

According to AWSAA 2004, the first and the oldest sanitation system date from the establishment of the city and is located in the old centre of the city. Main streets were provided with two lines of drains discharging to watercourses. This was the case of in the existing main roads in the city core (Churchill road, Meneliek and Entoto Avenue, Belay Zeleke and weatheral street north of the city hall and Fitawrari Habte Giorgis street up to little Akaki) and to the east along Haile Gebresilasseie road. These drainage lines are still used as combined sewers for collection and disposal of waste water and discharge untreated waste water directly in to the near by watercourses.

The first separate wastewater seem was carried out in the early seventies. It was designed for the collection and conveyance of wastewater to the Kality treatment plant. Most of the residents in the service area are already connected to the water supply network. This service area is the residential area of lideta in the west and east Bole, as well as the business and commercial districts of the city centre.

3.1.3. Administrative Structure

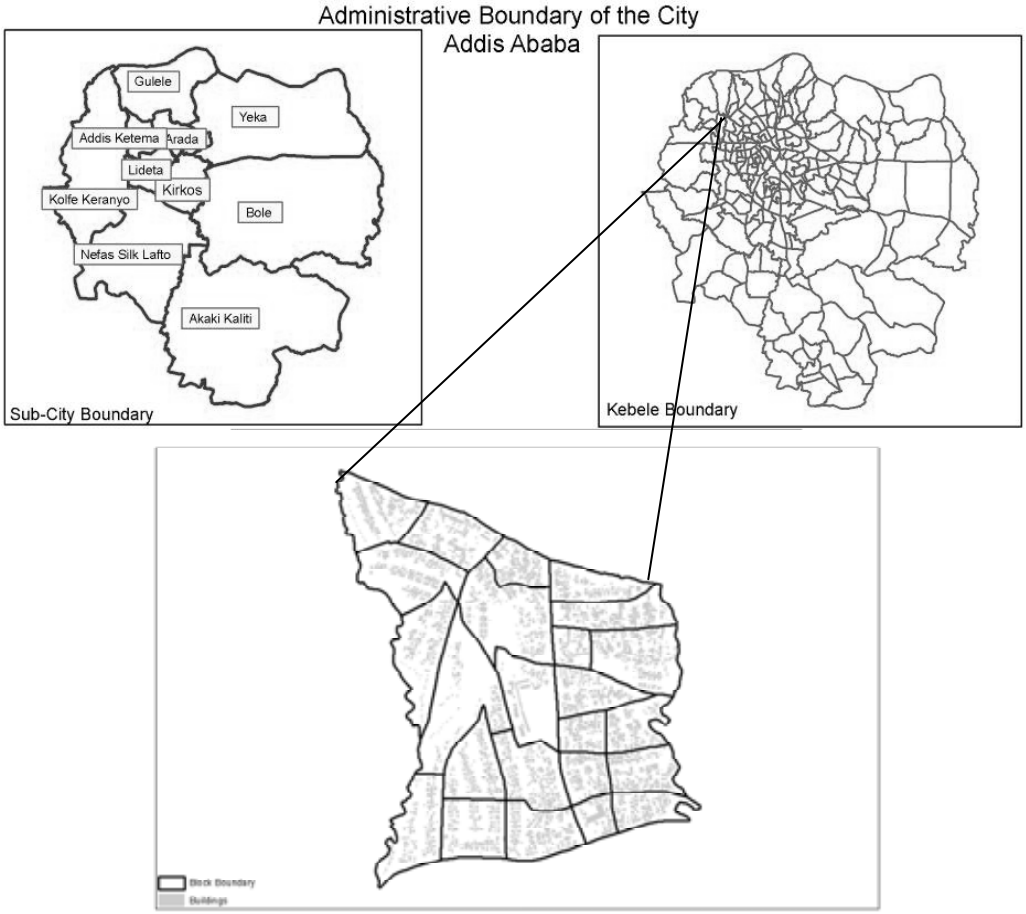
Addis Ababa is a self-governing chartered city with its own city council. The council, which is elected every five years, is accountable to both the city electoral and the Federal Government. Similar organizational set-up exists at the lower level of the city administration. (www.addisababacity.gov.et.).The administrative structure is divided into three hierarchical levels having 10 sub-cities at the intermediate and 203 kebeles at the lowest administrative level. Starting from early 2003, power decentralising was established aiming to bring the city administration closer to the people, “increasing public participation and responsiveness to local needs and priorities through promoting good governance” (www.addisababacity.gov.et.). Previously, before February 2003, there were four levels in the city administration hierarchy, which was city, zone, Woreda and Kebele level. However, power and authority were dominantly concentrated at city level. Most of the available data are not updated, and still follow the previous hierarchical structure. For instance, the cadastral registration map is represented in city, zone (6), woreda (28), kebele(347) and finally in block level of hierarchy. The estimated population size of each sub-cities and number of kebeles contained in them are stated as follows:

Table 3-1: Population Size and Number of Kebeles in Sub-cities

No	Name of sub-city	Number of kebeles in the sub-city	Estimated Population Size (2002)
1	Arada	17	303,810
2	Addis Ketema	21	320,389
3	Lideta	18	296,073
4	Kirkos	21	318,508
5	Bole	15	298,000
6	Nifas Silk-Lafto	18	304,550
7	Yeka	20	304,550
8	Akaki-Kaliti	13	182,502
9	Kolfe-Keranio	17	261,235
10	Gullele	21	333,998

(Source: http://www.addisababacity.gov)

Figure 3-3: Administrative Boundary Map at City, Sub-city and Keble level



3.1.4. Functions and Powers at each Administrative Hierarchy

Functions and Powers of the city Government relevant to the research topic:

- Issue and implement policies concerning the development of the city;
- Plan and implement economic and social development plans;
- Organise sub-cities and kebeles, demarked their borders, and allocate budgetary subsidy to them;
- Administer, lease, develop, sell and collect incomes from houses nationalised as per government ownership of urban lands and Extra Houses Proclamation No, 47/1975 and administered by the city government, and other houses which the city government has build or obtained in accordance with a low
- Expropriate in accordance with a low, a private property, or clear and takeover land possessions designated as an object of public interest after having paid commensurate compensation

Functions and Powers of the Sub-city relevant to the research topic:

- Administer the Kebeles under its jurisdiction.
- Approve the economic, social development and municipal plans of respective kebeles
- Allocate the budget set aside for the sub-city

Functions and Powers of the kebele relevant to the research topic:

A Kebele is a third administrative level at grass root community level and is a centre of development and direct popular participation as well as a station for community service.

- Be a centre of development and direct popular participation as well as a station for such service that may be delivered at that level
- Create conditions in which the respective residents avail of services in their vicinity as close as possible

(Source: Federal proclamation journal, 2002)

3.1.4.1. Role of each Administrative Level in Slum Interventions

Role of the city Government at city level in slum interventions:

At city level, different organisations are involved in different types of activity related with slum intervention. Strategy, local (neighbourhood) development and Preparation of manual for upgrading, renewal plans, and determination of dominant interventions are the main activities being performed at city level. In addition to these, housing development and land regularisation together with issuing title deed is being carried out at city level by establishing project offices. Moreover, budget is allocated by the city government at city level, for planning and implementing intervention programmes. For instance, the city government allocates budget (25% of the project cost) for neighbourhood development projects.

Role of the city Government at Kebele level in slum interventions:

Project implementation is the main task at sub-city and kebele level. Accordingly prioritisation of upgrading areas and their plan preparation, making follow up on the neighbourhood development projects in respect with budget management and sometimes provision of technical assistance for activities undergoing at kebele level are the main activities being carried at sub-city level.

Role of the city Government at Sub-city level in slum interventions:

The actual implementation of slum intervention (upgrading) is being carried out at kebele level. Problem identification and resource mobilisation based on community participation for slum improvement (upgrading) is performed at kebele level. The upgrading work includes mainly improving the condition of internal access road, establishing communal water tap, improving the condition of existing communal toilet and constructing new.

3.1.5. Existing Policies, Strategies and Directives in Relation to Slum Interventions

In the year 2002, the level of urbanization in Ethiopia was 17%. However, this level is expected to reach 30.1% by the year 2020, as the urban areas are currently growing 6% per year (MOFED, 2004). So far, Ethiopia does not have a "national urbanization policy" to guide the development of its urban sectors. The existing economic strategy "Agricultural Development Led Industrialization" (ADLI) focuses on the promotion of both the rural and urban economic sectors. However, as the name implies, the emphasis is on the agricultural sector as the basis of industrialization, one of the factors accelerating the growth of urban centres of the country (ORRAMP, 2002). Similarly, according to MOFED, the effects of natural population growth and growing rural-urban migration have been felt in terms of poor urban management, lack of infrastructure, and inadequate service delivery, all of which are typical of urban poverty.

According to MOFED, there is an intention to design urban development policy to address Urban Poverty. Some of the ideas are as follows:

• Make sectoral urban policies poverty focused. Most policies already in place such as the land lease policy and housing strategy are not designed to cater for the needs of the urban poor.

• Design an urban development policy that is multi-sectoral in nature, addressing all facets of urban management and most of all urban poverty reduction.

• Amend urban land tenure policy so that land leases facilitate equitable, effective and efficient land distribution, providing the poor with security of tenure.

• Develop policy on urban sanitation with clear guidelines detailing the roles and responsibilities of households, communities, kebeles and municipalities.

To enhance urban development and management, Strategic actions are stated in the national poverty alleviation programme document. Accordingly, related strategic actions at a national level, city, sub-cities and kebele level are indicated as follows:

Table 3-2: Urban Development Strategy at National Level and Functions at City, Sub-city and Kebele L.

National level (Urban development and management strategy)	• Strengthening Urban Governance2, Formulate urban development policy Infrastructure Provision Upgrading the existing old & dilapidated houses and infrastructures with full participation of the beneficiaries Awareness creation and networking in community involvement with regard to the construction and management of neighbourhood level infrastructures, has to be promoted. Constructing and improving various infrastructures such as markets, roads, drainage, sewerage systems and sanitation projects that increase accessibility in low-income settlements. Formulate Housing Development Policy Conduct housing cooperative study with the view to promote the development of housing cooperatives. Improve housing affordability via introducing appropriate housing standards that consider local resource capacities and requirements. Land management Land acquisition criteria will be revised to improve access and affordability Urban environment - Avoid health hazard situations by improving the volume of clean water supply, -rehabilitate and construct new sewerage system and other sanitary facilities. -Design appropriate solid and liquid waste management systems. Specially develop policy on urban sanitation with clear guidelines detailing the roles and responsibilities of households, communities, kebeles and municipalities.
City level (2003/2004)-(2007/2008) Programme	To overcome housing shortage, To improve and change slum areas of the city To minimize unemployment, To strengthen construction industry and build local technical capacity, To redistribute wealth by constructing low cost houses and securing housing ownership for low-income group **Housing :**Construct 150,000-200,000 housing units (2004-2008) Improve slum areas by 50 %by 2008 (HDPO,2004) **Tenure:** Grant title deed for private house owners excluding expansion, urban renewal and strategic investment areas (source: focus group discussion) Proposed formalization of Informal settlements with certain parameters, the compliance with the structure plan being the major (WUDB,1999) Water Supply –strategy (2004-2010) Upgrading and rehabilitation of the existing water sources and existing water system in old built up areas, Expansion of the service to the new development areas Application of water demand management, Developing new surface water and ground water services, protection of surface ad ground water sources from pollution (AAWSA,2004) Sanitation strategy (2004-2010) Expansion of sewerage networks and the existing WW treatment plant and sewer lines Increasing the number of vacuum trucks Study and implementation of low-cost waste water disposal system(AAWSA,2004)
Sub-Cities	Implementation
Kebeles	Implementation

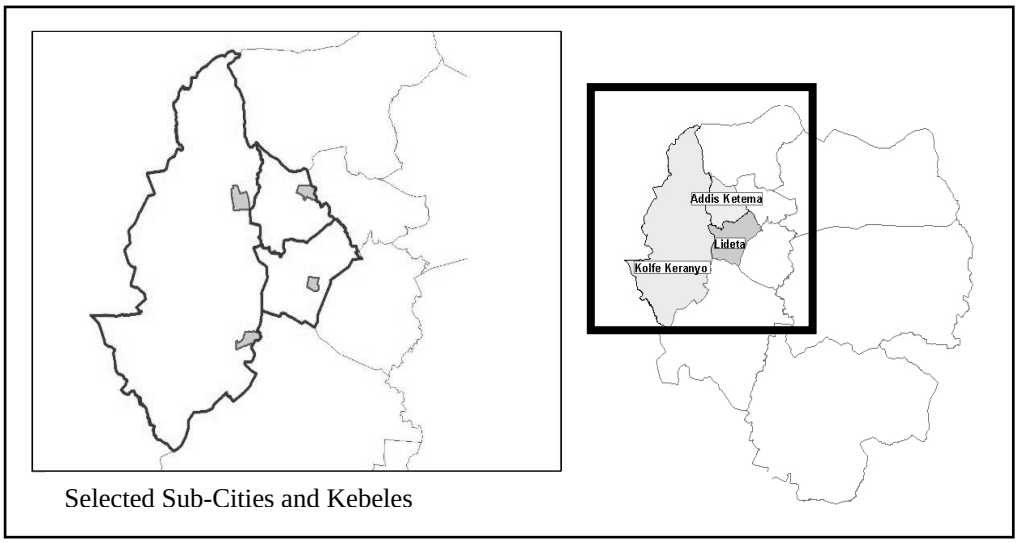
(Source: MOFED, 2002; HDPO, 2004; AWSSA, 2004; WUDB, 1999)

[2]The activities specified in the National level reflect the priorities of the national government and the actual implementation of these activities will be carried on at the local levels (City, Sub-city, and Kebele Levels).

3.1.6. Case Study Area Description

Brief description of the selected sub-cities and kebeles will be presented in this section, however, the criteria used to select the sub-cities and kebeles will be discussed in chapter four.

Figure 3-4: Illustration of Selected Sub-cities and Kebeles



Selected Sub-Cities and Kebeles

Brief description of selected Sub-cities

Table 3-3: Description of Selected Sub-cities

No	Name of sub-city	Number of kebeles in the sub-city	Sub-cities Area/ha	Population Size (2002)
1	Addis Ketema	21	738	320,389
2	Lideta	18	889	296,073
3	Kolfe-Keranyo	17	11738	261,235

(Source: http://www.addisababacity.gov)

Addis Ketema sub-city: Addis Ketema sub-city is located in the old city centre of Addis Ababa. The area is known for its highest commercial activity in the whole city. The biggest open market in Africa is found in this sub-city. According to the 2002 population size projection, there are 320,389 inhabitants in the sub-city with a gross density 434 per hectare. The intercity bus terminal is also found in this sub-city. As it is evident from the figure, it is one of the highly dense areas of the city.

Lideta Sub-city: Lideta sub-city is also found in the inner city. Residential use is the dominant use in the sub-city. Covering the wider part of the sub-city old air port area is also found there. There are 296,073 inhabitants in it with a gross density 333 inhabitants per hectare. Eighteen kebeles are administered under the sub city.

Kolfe Keranyo Sub-city: The major part of Kolfe Keranyo sub city is found in the expansion areas of the city. Residential use is the dominant land use in the area. Various housing development projects are implemented, mostly serving the middle and high-income residents of the city. There also exists informal housing development at the periphery of the sub-city. There are 261, 235 inhabitants in it with a gross density 22 inhabitants per hectare. Sixteen kebeles are administered under the sub-city.

Source: Richard Sliuzas, 2004

Brief description of selected Kebeles

Kebele 14 (Addis Ketema) is found in the inner city. It is located at the entrances of Merkato and the inter-city bus terminal. The kebele is bounded by a river in the south and crossed by two small rivers. According to the projections of the 1994 CSA census, the population of the kebele is estimated to be 24,000. The overall area of the kebele is around 30 ha and the gross population density 700 inhabitants per hectare.

Kebele 17 (lideta Sub-City) Kebele 17 is also found in the inner city. The land on which the kebele rests is a sloppy plane stretching from main east-west axis road in the north to Akaki River in the south. According to the projections of the 1994 CSA census, the population of the kebele is estimated at 14,700.

Kebele 11 (Kolfe Keranyo Sub-city) is located in the north western side of the city outside the ring road. The total area of the kebele is approximately 47 ha and gross population density is 436 inhabitants per hectare. Topographically, the elevation of the area is falling from 2462m from the east to 2403 towards west The number of people living in the kebele is estimated to be 20,507 according to the projections of CSA.

Kebele 01 (Kolfe Keranyo Sub-city) is located in the western part of the city. The kebele is bounded by the ring road in the north partly, and in south by a river. The number of people living in the kebele is estimated to be 12952 according to the projections of CSA.

3.2. Level of Information on Slums of Addis Ababa

3.2.1. Local Slum Information in Addis Ababa

The level of locally found information on slum and slum dwellers is very limited. An approximate percentage of slum[3] in the city is indicated in ORAAMP (2002), as 65% of housing stock in the city centre is slum. The estimation was based upon field observation. As it is commonly, known censuses and surveys are the main sources of information for such analysis. However, both data sources are out dated (1994 and 1996 respectively) and particularly the later is incomplete.

3.2.2. Information on Slums of Addis Ababa Produced by UN-Habitat

In the year 2001, taking slum definition as a composite index, UN-Habitat global report has shown the percentage of slum population in urban areas of Ethiopia as 99.4%, which also applies to Addis

[3] Slum – ORAAMP (2002) refers slums as poor hosing structures

Ababa. Similarly, in the year 2003 UN-Habitat global report, information on the household living conditions, environmental infrastructure, demographic and socio-economic indicators etc. was compiled based on a new estimation methodology proceeded in stage of slum indicators. For instance partly on the environmental infrastructure, it is indicted that availability of services is at the lowest level. Accordingly, the figure is shown as follows:

Only 32.3% of households have direct piped water connection

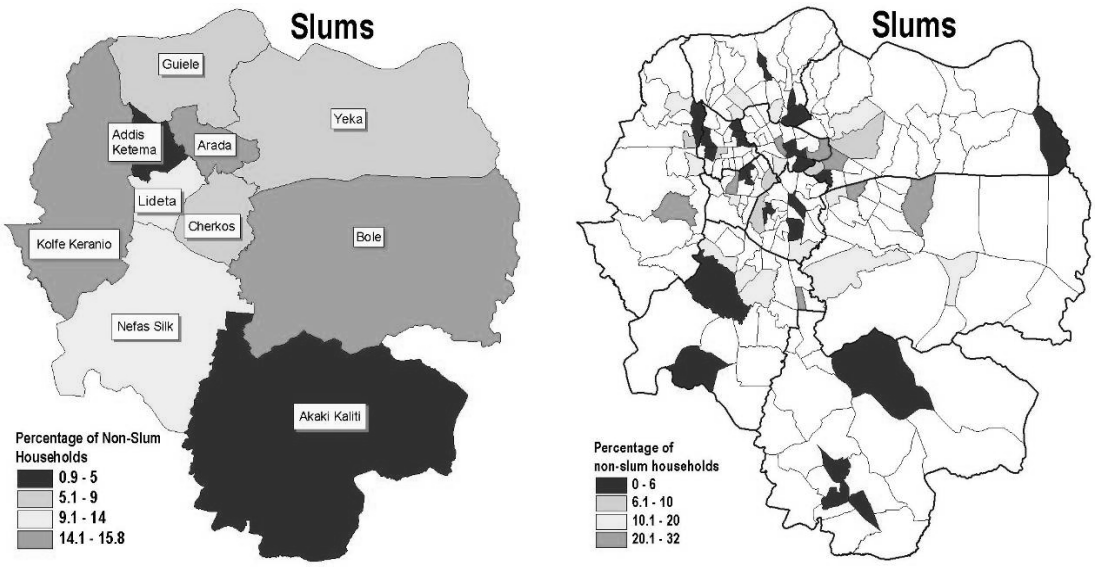
Almost none have sewerage line connection

Electricity power covers only 49.4%

Telephone connections are only for 15.7% households

Recently, UN-Habitat is analyzing the state of slum proliferation in Addis Ababa as it is done in other selected cities with the overall aim of meeting the Millennium Development Goal. The analysis is being done based on sample household survey that was conducted in 2003. Through the sampling design, data was collected on demographic, socio-economic and health conditions. The sample was designed to provide estimates of key variables for the ten sub-cities. Accordingly, 1,568 sample households were selected, aggregation was made at sub-city level and kebele level (only for kebeles where the sample was taken) slum population percentage was calculated.

Figure 3-5: Slums of Addis Ababa by UN-Habitat



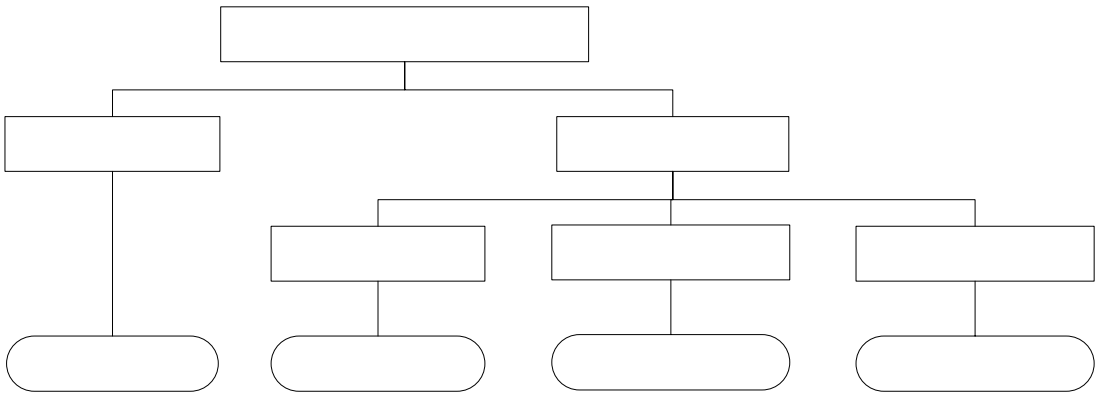
(Source: UN-Habitat 2004)

4. Data Collection Methods and Data Description

This chapter describes how different techniques and tools are employed to capture and prepare data on the basis of the concept of the methodology that was reviewed in chapter two. In view of the present administrative hierarchy of the city, which was also described in chapter three, the process of data capture is provided.

Data capture was carried out at three administrative levels. Based on the data types that are required to conduct the research, both primary and secondary data are collected. The methods that are used to collect both primary and secondary data are described in this chapter. Criteria used to select study areas both at sub-city and kebele level are presented. Procedures followed for primary and secondary data collections and preparations are included in this chapter.

Figure 4-1: Data Collection Methods



(Adopted from Sliuzas Lecture note)

As it is reflected in the objective of the research, the basis of the development of methodology is the combination of (Geographic Information Technology) GIT and local knowledge. Mainly rapid slum-appraisal methods are employed for data capturing, as they are preferable to develop systems that are cheap to build, easy to use, robust and flexible in their application (Sliuzas, 2004) considering the prevalent resource constraint in the city. Thus, the method is applied for identification, description and deeper interpretive understanding of the slum phenomena. The timeliness of the information is also another reason for choosing the method. Moreover, both qualitative and quantitative techniques are implemented in the data capturing processes. Based on the specified methods, local expert knowledge was elicited through discussion and sketch mapping at sub city and city level. Direct field observation and visual image interpretation were also employed in data capture. Data capture was conducted on three selected sub-cities considering the number of sub-cities (ten) and kebeles (203) in the city; it was not possible to study all within the given time frame of the research. Representative sub-cities and kebeles were selected and examined in the research.

Selection of sub-cities as case study area

The selected case study areas include three sub-cities that are situated in the north-western part of the city covering most of the inner city and partly the fringe area. The selection is generally influenced by the availability of secondary data (satellite image), which covers mainly the north-western part of the city. However, the deteriorating old part of the inner city and relatively new part of the city at the fringe areas are represented. According to UN-Habitat 2004, the selected sub-cites also represent relatively higher, moderate and lower percentage of slum. The following table indicates a general overview of the selection of sub-cities.

Table 4-1:Sub-city Selection Matrix

	Criteria	Addis Ketema	Lideta	Kolfe-Keranyo
1	Data availability (Quick bird – Image)	Yes	Yes	Yes
2	Representative location	CBD	CBD	Expansion
3	Estimated relative % of slum households[4] (UN-Habitat-2004)	High (94-97%)	Low (79-81%)	Moderate (90-93%)

Selection of Kebeles as case study area

There are 56 kebeles under the selected three sub-cities (see Table 4-2). Among the 56 kebeles, fourteen have been surveyed by UN-Habitat in 2003. Considering the time limitation, for this research only four kebeles are selected from the specified sub-cities.

Table 4-2: Case Study Kebele Selection Matrix

Criteria	Kebele 14 Addis Ketema Sub-city	[5]Kebele 17 Lideta Sub-city	Kebele 11 Kolfe Keranyo Sub-city	Kebele 01 Kolfe Keranyo Sub-city
Surveyed by UN-Habitat in 2003	yes	yes	yes	no
With similar slum proportion of sub-cities by UN-Habitat (Representative kebeles)	Higher	Lower	Moderate	Not surveyed by UN-Habitat
Surveyed by the city government in 2004	yes	yes	yes	no
Distinct character noted during focus group discussion at sub-city level	yes	no	yes	yes
location	Inner city	Inner city	Expansion Area	Expansion Area
Social Segregation	No	No	No	Yes

[4] This figure was changed later (after the selection & field work of the case study areas) on the latest version of the internal report of UN-Habitat-2004 as Addis Ketema (95-99.1), Lideta (86.1-90.9), Kolfe Keranyo (85.2-86)

The selected Kebeles have some common characteristics and also their own distinct characters. As Sliuzas (2004, p.121) mentioned, not only common characteristics but also different features "… in case settlements provide possible avenues for exploring differences in their physical structure and also possible behaviour or responses of stakeholder." Thus to capture information on the divers nature of slums kebeles with distinct character are selected. In (Table 4-2), for each kebele, the selection criteria are presented. The data captured from this level is utilized to compare with the data capture of other administrative levels on the level of detail and to give overview of socio-economic condition in those kebeles.

4.1. Primary Data description and Capturing Methods

Rapid Slum Appraisal methods are chosen to be applied for primary data collection. The reason is dual for choosing these methods. Primarily, it is because of the potential of the methods to deliver information with modest investment of time and resource considering the presence of high resource constraint in the city. The other reason is the heterogeneity of the city in terms of physical, and socio-economic character which needs an in depth and detail study to be able to capture all the necessary information including the inherent characteristics of individual slum settlements that enable to intervene accordingly.

4.1.1. Primary Data Capturing Methods

As the main objective of the research is to define, identify and describe slums based on local knowledge and GIT, participating local experts and key informants in-group discussions was the focus of the research in the data capturing process. Thus, experts of various government organizations and key informants have participated and discussed on slum issues based up on open-ended questions.

All methods chosen for primary data capture were applied in all sub-cities but not in all kebeles mainly due to time shortage. For instance, focus group discussion was not possible for some of the organisations and kebeles. Thus, in the following table methods applied for three sub-cities and four kebeles are shown in (see Table 4-3).

Table 4-3: Methods of primary data collection

Administrative Hierarchy	Focus group discussion	Field observation	Visual Image interpretation
City Level	Yes (Not all)	No	No
Sub-city level	Yes	Yes	Yes
Kebele level	Yes (Not all)	Yes	Included

Consequently, each method and its application at the specified administrative levels are discussed in the following sub-section.

4.1.1.1. Field Observation

"To be able to gain a richer understanding of a phenomena in its natural setting and to reveal social and economic conditions, problems, and behaviour pattern that the informant may be unaware of or

[5] Kebele 17 was also excluded from the statistical analysis of UN-Habitat 2004 after the selection of kebeles & field work of the research

may be adequately describe" (Kumar 1987, p.23) field observation is employed as one the effective rapid and economical method. The data capturing was conducted on the basis of local knowledge, delineated slum areas and base map of the area (1: 6000 scale topographic map, 1994 and 1: 15000 scale QuickBird Image, 2002). It was essential to conduct direct field observation for three different purposes and with different groups.

First – To understand and describe the physical condition and characteristics of the slum areas; to cross validate delineation of the poor areas by the experts and the interpreted image on selected areas. In this respect, the key task was taking remarks and pictures of the physical condition and characteristics of the areas.

Second - To identify areas of inadequate water supply with the help of field technicians from water and sewerage authority. As the existing water supply map does not indicate the layout of the water pipe to individual housing units, it was not possible to get the spatial information from the secondary data. Thus, field technicians were chosen for their richer knowledge of areas with no water supply service provision. As the technicians were unable to read the image, field observation was chosen as a means of data capture for this variable.

However, the data capturing process was found to be difficult and to get comprehensive information was not possible. Except for the expansion area (Kolfe Keranyo), where there are larger settlements lacking water, in many places of the inner city (Lideta and Addis Ketema) there are many patches of areas without access to water supply. Thus, it was not possible to cover each one of them and as they might easily be missed out because of time constraint and data capture interruption as the technicians were on duty during data capture. Therefore, through the discussion with both city level and branch office experts, the option was to capture the data through non-spatial secondary data source which is the customer list related to the address (wereda, kebele and house number).

Third- To identify and describe specific problem areas with the help of kebele level Neighbourhood Development Committee on selected kebeles. Problem areas were indicated through direct field observation and data on poor housing condition, sanitation and poor access route condition was captured. .

The data capturing process with representatives of local people (Neighbourhood Development Committee) was very detailed and efficient. As the area, coverage is manageable and they are well aware of the spatial distribution of the problem areas.

4.1.1.2. Visual Image Interpretation

The interpretation was performed on the main base data of the research, the [6]QuickBird image of 2002 with the scale of 1:15,000. Air photo with the scale of (1:10,000) taken from the same year as that of the quick bird image was used for clarification. The purpose of performing visual image interpretation in the process of the data capture is to support the slum identification that was carried out through local knowledge and to fill up the missing detail. Irregular settlement patterns as well as a group of small size buildings lacking open space are the physical characteristics of slum that are

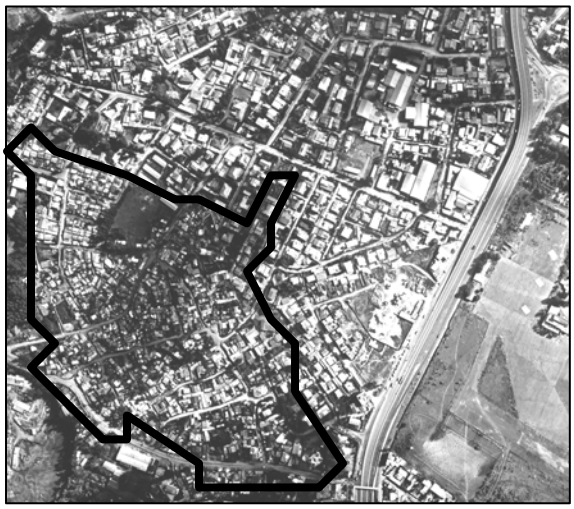
[6] Initially the image was in the power point format in different pieces. It was georeferenced and prepared in to mosaic

detected from the image. Thus, size and pattern are the two elements of visual image interpretation that were chosen as a key for image interpretation and information extraction.

Size and pattern are chosen because irregularity and density are key manifestations of poor living conditions in the built environment of Addis Ababa. As stated in the beginning of chapter three, Addis Ababa has been growing spontaneously without any significant guiding plan and standard for many years. Especially, during the period (1907-1974), plots have been sub-divided, small size and low standard dwellings have been constructed (Gossaye, A. 2001) specifically in the present inner city areas. Moreover, keeping the same trend, densification in the inner city and unplanned development in the periphery have continued. Thus, based on these two elements of visual image interpretation, irregularity and a group of small size buildings lacking open space are identified. The information captured through this method makes a significant contribution for identification of problem areas and supports the identification conducted through local knowledge.

Pattern: referring to the spatial arrangement of regularly spaced houses, settlements with irregular building pattern are identified. Here also, settlements that are unplanned and have irregular building pattern can be clearly differentiated from the planned settlements.

Size: A group of small sized dwellings in a settlement without open space were identified relative to other settlements with bigger buildings in the surrounding. As it can be seen from the photo, areas with bigger size dwellings can be differentiated from areas with small size dwellings.



4.1.1.3. Focus Group

Several sessions of focus group discussions were held with different groups at city, sub-city and kebele levels. Similar type of open-ended questions (checklists) were developed and used at city, sub-city and kebele administrative level. The mainframe work of the questions was kept the same but adjustments were made as required based on the function and responsibility of the concerned organization. The questionnaire (checklist) has three main sections (see Appendix A).

The focus on the first section of the questionnaire is defining slums, describing and prioritising slum characteristics in the local

Source: Richard

context. Discussions and responses on these issues are essential to develop conceptual base for identification, characterisation and analysis of slums in the local context. Moreover, applicability of slum definition by UN-Habitat is also explored.

The focus of the second section was on the development of components for the selected slum characteristics. Each category of variable (slum characteristic) has its own components as an indicator of slums in the local context. Discussions and responses of this section have provided a base upon which slum identification was conducted in the form of participatory sketch mapping. The identification process was supplemented by QuickBird image and other secondary data sources.

The third section explored existing interventions, problem identification in relation with lack of information, policy support or financial and human capacity.

Table 4-4: Focus Group Discussions at Three Administrative levels

Organization	Focus group discussion	Administrative
Policy study and planning commission	(29-09-04 , Six Participants)	City Level
Land Development Agency	(24-09-04, Four Participants)	
Land Administration Authority	(02-10-04, Eight Participants)	
Housing Development Project Office	(5-10-04, Four Participants)	
Water and Sewerage Authority	No	
Central, Western and southern Branch offices of Water and Sewerage Authority	No	Sub-City level
Kolfe Keranyo Sub-city	(6-10-04, Six Participants)	
Lideta Sub-city	4-10-04Four Participants	
Addis Ketema Sub-city	26-09-04 Six Participants	
Kebele 17 (Lideta sub-city)	7-10-04 Four Participants	Kebele level
Kebele 14 (Addis Ketema sub-city)	8-10-04 Three participants	
Kebele 01 (Kolfe Keranyo sub-city)	14-10-04 Five Participants	

Selection of organizations and experts working in respective organisations

Several of organisations and administrative offices are selected at various administrative levels. The basis for selecting the respective organisation is the global working definition of slum. The organisations are selected in such a way that their function is directly related to one or two indicators of slum in the global working definition. Consequently, activities performed in these organisations can influence slum interventions one-way or the other.

Even though different actors are involved in slum intervention, one of the main actors is the government. Abbott 2003 mentioned that “In an upgrading project there are two major groups of actors, the local authority, and the community to be upgraded. There are then other actors who may have an interest (surrounding communities, utility companies, professionals, NGOs)”. hhtp://www.sciencedirect.org. According to (MOFED, 2002) the government provides mechanisms

that will create favourable conditions and environment needed for the implementation of intervention programmes (upgrading) and for other actors to participate in these programmes. Especially local government can mobilise the local resources for the success of the programmes. As it is discussed in the previous chapter this is evident that the government is taking the initiative in improvement of slum areas.

Thus, the research has focused on the government organisations. The targets groups (participants) for the focus group discussion were experts who are mainly involved in municipal works such as urban planning, urban management, land administration, housing development and water supply. The majority of the group members at city and sub-city level were urban planners by profession but a few numbers of economists, sociologists and demographers have also participated. The following table shows the relationship between slum indicators and organisations and also the type of profession and expertise chosen in each organisation.

Table 4-5: Focus Group Discussion Participant Selection Criteria at City and Sub-city Level

Administrative level	Categories of Variables	Organization	Experts
City Level	Water Supply and Sewerage	Water and Sewerage Authority	Technical Experts with long years Experience/engineers/
	Housing condition	Housing project office	Experts with long years Experience /urban planners and surveyors/
	Tenure	Land Administration Authority	Experts with long years Experience /urban planners and surveyors/
	General (based on the definition)	Land Development Agency	Experts with long years Experience /urban planners and surveyors/
	General (based on the definition)	Policy Study and Plan Commission	Technical Experts with different discipline
Sub-City Level	All variable except water and sewerage	Sub-city Administration office	with long years Experience /urban planners and surveyors/
	Water Supply and Sewerage	Central[7], west and east branch Water and sewerage branch offices	Technical Experts with long years experience as well as Key informants (with long years Experience) who actually execute the work of maintenance and laying out the infrastructure.

Procedures followed for focus group formation at city and sub-city level

Different organisations and administrative offices were contacted in order to get comprehensive information and confirm the present functions and responsibilities of each organisation. Primarily the city manager's office was contacted and information on the present function and responsibility of the selected organizations at each administrative level was gathered. The next step was to contact the selected organization administration managers to get permission and to choose experts with longer year experience and with good knowledge of the city to participate in the group discussions. Hence, four city level and three sub-cities level focus group discussions were conducted with a total number of 22 and 16 experts respectively (see Table 4-4). Three Kebele level discussions were also conducted with total number 12 participants (see Table 4-6).

[7] Water and Sewerage Branch offices represent lower hierarchy of Administration, still the organization does not follow the present administration Hierarchy

Procedures for primary data capturing at Kebele level and formation of focus group

As kebeles are at the lowest level of administrative hierarchies, they have an important role in assessing development projects and implementing intervention programmes, especially upgrading. Under each kebeles, there is a Neighbourhood Development Committee, which has an important role in raising local funds, mobilizing and organising the communities and prioritising the needs of the community. Fund raising from NGOs plus mobilisation of resources with the collaboration of the local people is performed by the committee. Thus, it was found essential to examine a few kebeles in order to create connection to the grass root level and test the level of data capture. Kebele neighbourhood development committee was contacted through the sub-city local development office. In three of the four selected Kebele level discussions were conducted with total number 12 participants (see Table 4-6). Local people with different educational background were involved at the kebele level focus group discussion as members of the neighbourhood development committee. Two other branches at lower hierarchies are also created to facilitate the work.

Table 4-6: Focus Group Discussion Participant Selection at Kebele Level

Administrative level	Categories of Variables	Organization	Experts	Key informants
Kebele Level	All	Kebele Administration, Local development committee	Experts (if applicable)	Key informants who actually participate in the work of identifying, prioritizing and implementing intervention programmes (Neighbourhood Development Committee)

Data capturing process (delineation of problem areas) based on focus group

Problem areas are delineated by the experts at city and sub-city level based on the identified variables and their components as well as respective task of each organisation. As discussed before the delineation is performed on the base image (QuickBird image) which was overlaid with the sub-city boundary. The process was conducted in such a way that in each sub-city, areas with high percentage of slum households are primarily identified, on the contrary, areas with low percentage of slum households are also identified and the rest was left as an intermediate part. The reason of following such procedure is slums are distributed through out the city with varying percentages and there is no clear distinction between slum area and non- slum area as such in the city. Thus, three classes were created based on the percentage of poor households with in the delineation. Threshold was set by experts for classification of the delineated areas through the estimation of ratio of poor households with in a specific delineation. Accordingly range for low percentage of households is estimated (5-20%) and for high (75-95%) and also the moderate class have the in between ratio.

4.1.2. Primary Data type, description and preparation

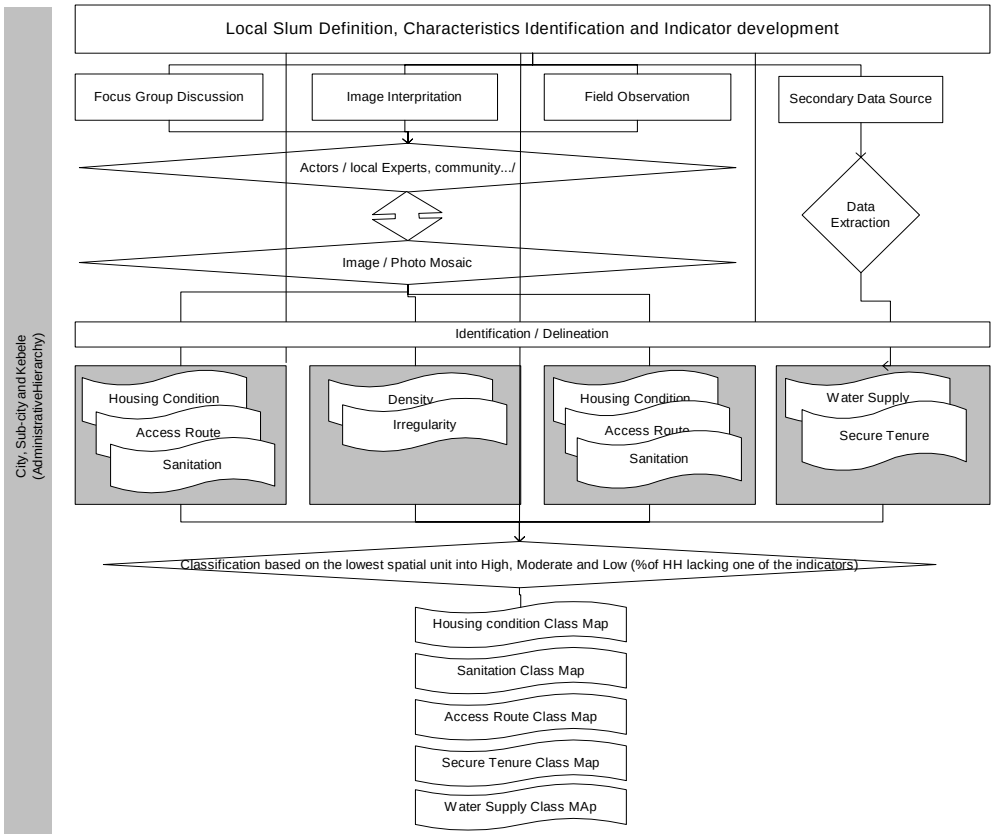
As it is described above primary data is collected through three methods, focus group, field observation and image interpretation. The following table shows the data types and description in relation with methods used for data capture.

Table 4-7: Data Type in relation with Methods of Data Capture

Method	Data Type	Description
Field Observation	Spatial data	Identified problem areas(with poor housing, sanitation and access route) at kebele level, Identified problem areas lacking water supply
	Non Spatial	Pictures, descriptive information of the areas
Image interpretation	Spatial Data	-Identified unplanned areas (irregular pattern) -Identified dense areas (congested small size buildings)
Focus Group	Spatial Data	-Identified areas with inadequate access to sanitation -Identified areas lacking proper internal and external access -Identified areas with poor housing condition
	Non Spatial	-Description of slum areas -Description of slum characteristics

Based on the image, the identified categories of variables are delineated through the mentioned three methods. All are digitised and classified according to the initial classification based on focus group. Overview of primary data preparation is shown on (see Figure 4-2) and the procedure followed is also shown schematically (see Appendix B).

Figure 4-2: Process Model for Primary Data Preparation



Primary data preparation

As shown above after the data capture (delineation) based on the identified & prioritized variables, each one of them are digitized as a thematic layer. Then on the digitized layer, administrative boundaries that are kebele and block (smallest spatial unit) are overlaid.

As the main concern of the research is on residential areas that are extracted from the delineated areas based existing land use plan and cadastral map (see Appendix C). After extraction, the information on the remaining delineated residential areas, the information is transferred to block through population estimation and household computation in each block as well as in each delineated area in a block, which is the lowest spatial unit (see Appendix C).

Then after getting, the number of households in each block as well as in each delineated area, ratio is again computed for each block. Blocks that are fully under the delineation take automatically the initial class but for blocks that are partially delineated which are not regularly encountered, the information is transformed based on the proportion of households in the delineated area out of the total number of households in the block.

The final step is visualisation through mapping based the lowest spatial unit block. The purpose of transferring all information in to blocks is to be able to read the information in the same spatial unit for all variables. Moreover, it is useful to compare the spatial variation through uniform spatial unit, as some of the delineations are more than kebele while others are less than block (see Appendix B). The reason the lowest spatial unit is selected is to make sure the inclusion of the smallest delineation other wise if the next spatial unit (kebele) is taken they will be lost because they take the smallest proportion.

Household Survey by UN-Habitat

Household survey data on the three sub-cities and fourteen kebeles (surveyed, recoded and prepared by UN-Habitat) was aggregated to kebele and sub-city level for latter (in chapter six) comparison of the results of the two methodologies.

4.2. Secondary Data Collection and Preparation

It was necessary to engage secondary data collection, to supplement the primary data capturing process as well as the spatial analysis. It is also essential to capture information "covering different areas, which may result in greater scope and depth than is possible with a single primary data research object" (Nachmias, 1996). Thus, the required secondary data are collected form different government organisations. Policy and programme documents, local research documents, journals and variety of spatial data are collected.

4.2.1. Secondary Spatial Data

In this research a number of secondary spatial data are used as a base for primary data collection and as supplementary data for the slum situation analysis. Though old and incomplete, the research demanded the use of some of existing data for which primary data collection is not possible within the short fieldwork period. As stated in the research problem, most relevant data sources are outdated. The ones that are recently made are mostly incomplete and the format either in Auto cad or hard copy. It was also difficult to get the data dictionary as to how the present data sources are prepared. The only timely available document, which is until now not in use by the municipality, is aerial photo taken in the year 2002. There is also a problem of harmonising the data sets as different organisation use their own version of data. In the following sections (Table 4-8 and Table 4-9) show the existing data sources used in the research.

4.2.1.1. Secondary spatial data type and description

Table 4-8: Secondary Data Type and Description

Data Set (required)	Data source	Organisation and Year of production
Strategic investment areas	Strategic investment areas (Auto cad Format)	Addis Ababa Master Plan Revision Project, 2002
Existing Residential map	Existing land use (Auto cad format)	Addis Ababa Master Plan Revision Project, 2002
Housing Ownership Map, Building Use (dominantly Residential)	Cadastral Map (coverage)	Addis Ababa Information centre, 1996
Aerial Photo Mosaic	Arial Photo (hard Copy)	Ethiopian Mapping Agency, 2002
Quick Bird Image Mosaic	Quick bird image (power point format)	UN-Habitat, 2002
Water supply, tenure security, sanitation, housing durability maps	Urban Inequity Survey data and analysis results	UN-Habitat, 2003

4.2.1.2. Secondary Non-spatial Data type and Description

Relevant non-spatial secondary data were also collected. Apart from the documents planned to be collected, participants of the focus group suggested some of the documents. Based on that, the following non-spatial secondary data are collected.

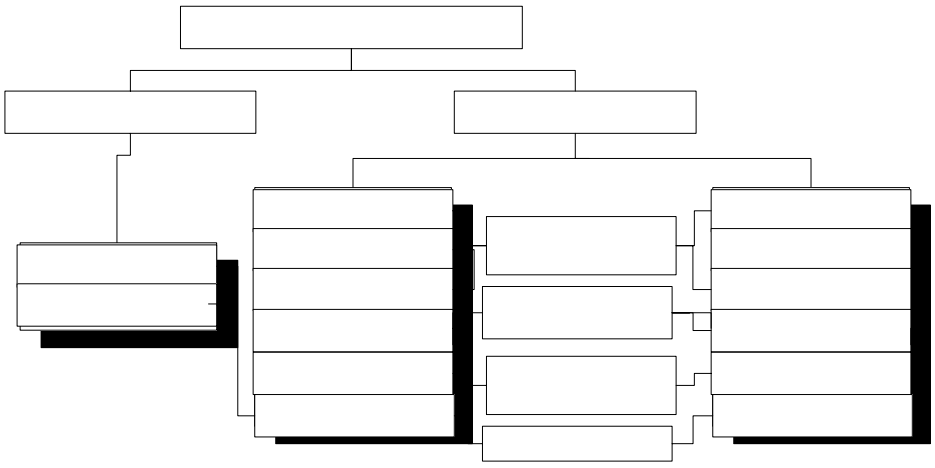
Table 4-9: Non-spatial Data Description

Non-spatial Secondary data	Source-organisation
Proclamation Journals	Addis Ababa City government
Policy, Directives and programmes mostly related with intervention	Water and Sewerage authority, Land Administration authority, Land Development agency, Housing Project office
Projected population size	Policy study and planning commission
Recent related studies	Policy study and planning commission library
Recent surveys at kebel level	Sub-city administration offices
Water supply customer number	Water and sewerage Authority (collected by Wolday (MSc student))

4.2.2. Secondary data preparation

As secondary data are related to data prepared by others for different purposes, it is required to adapt them to the research requirement. The data sets required to conduct the research are prepared out of various data sources (see Table 4-8 and Table 4-9) Some of the data preparations were pre-fieldwork tasks. Accordingly, the main base data, quick bird image, was prepared before fieldwork time. Overlaying it with case study administrative boundaries, it was used as a base data for slum identification during the focus group discussions. Most existing data sources are found in Auto cad format. Changing the format and make some spatial adjustments were needed. There are also important data sources found in hard copy for instance the aerial photo 2002 is in hard copy, so in order to use some of them, scanning and georeferencing was the primary step taken.

Figure 4-3: Secondary Data Preparation



As the main data sources like census and cadastral information are outdated, to compensate the gaps and estimate the present for instance population projection is used for population size estimation. Moreover, as the focus of the research is on the dwellings in the city, existing residential land use is used to extract residential areas for household estimation. The outline of these secondary data preparation is shown in (Appendix C).

In addition to this, the information on some of the variables (slum characteristics) is captured directly from secondary data sources. One of the reasons for choosing secondary data sources for the data capture of the specific variables is their definition or description by the experts, which is directly referred to secondary data. For instance, one of the descriptions of tenure insecurity is in terms of households that are found in the strategic investment areas. Thus, instead of delineating those areas, it is much preferable to use the secondary data directly that is shows the exact boundary of strategic investment areas are insecure. Thus based on the process flow in (Appendix D) data on access to water supply and tenure insecurity is prepared.

Brief description of secondary data preparation process

Residential land use extraction: In the year 2002, in Addis Ababa, the Master Plan Revision Project Office (ORAAMP) has collected existing land use based on direct field observation. For the research, the land use is differentiated based on predominant function. Using this data set together with the cadastral information to exclude dominant non-residential uses, predominantly residential areas are extracted. As mentioned above because of the focus of the research, residential areas have to be extracted for quantification of households with in the delineated areas (see Appendix C).

Population Estimation: According to the document that was collected from Policy Study and Planning Commission, population has been projected for 2002 and for 2003 based on 1994 census. Accordingly, the projection in 2002 shows, the total population of the city is 2,923,615 (see Table 3-1). Moreover, the projection is shown at sub-city level and at both new and old kebele levels. In this study, population is disaggregated from old kebeles to block level based on the proportion of residential built up area with in a block (see Appendix C) for process model. The fact that the size of new kebeles in both population and area wise is greater; the population projection on old kebeles is chosen to be disaggregated to the block level.

Water supply data extraction: As discussed in the data capturing process, information on water supply is extracted from secondary data sources. The main source of information is the customer list which is found in excel format and it comprises address of the customer following the old administrative hierarchy (wereda, old kebele, house no). To be used as one of the data set, primarily the data format is changed and the address is updated. Then domestic customers are differentiated including communal water taps and joined with cadastre to get the information spatially. Then finally, taking the old kebele as spatial unit, the proportion of customers connected to piped water in each old kebele is computed and mapped. Thus, as the old kebeles cover much smaller area than the new kebele, it is chosen to map the information on water supply coverage. The classification of kebeles as high (>50%), low (<24) and moderate is the in between coverage, is done based on the mean of the three sub-cities (24%) together with the threshold set by UN-Habitat (50%).

Tenure insecurity: Information is extracted from secondary data that are the structure plan and cadastre map. As shown on the process diagram attached in the Appendix D, the main source of information is the structure plan together with the cadastre information. From the structure plan, which

was originally in auto cad format, strategic investment areas and green zone are extracted. Later on, by this households with in this boundary are selected and quantified together with kebele houses that are extracted from the cadastre map. The reason the cadastre used is there is no major change in the kebele houses since the cadastral registration. There is no increase in number because the houses are originally confiscated from the private house owner, after computing the counts of insecure households in each block, using the same threshold and range as the other variables tenure insecurity is mapped based on the smallest spatial unit blocks.

4.3. Problems and limitations of data collection

Time was identified as one of the major limiting factors in carrying out detailed and wider coverage spatial and non-spatial information extraction for identification and description of slum areas. In addition to the limitation of time, the extreme heterogeneous nature of the city contributes to the difficulty in capturing the necessary data. However, important data and information are tried to be collected within the available time.

The city government of Addis Ababa has made its latest institutional restructuring recently, changing functions and responsibilities of some of previous organizations, which caused a slight alteration in the selection of organization for focus group formation. According to the new structure land development agency and the newly formed housing project office were included and the former housing agency was excluded. The water and sewerage authority doesn't follow the present decentralized hierarchical structure as anticipated but rather the required information had to be extracted at three branch offices based on the location of the kebeles that are selected as the case study area.

Focus group discussion: Although most of the experts were willing to give information and actively participate on the discussions, coordinating and forming the group was very difficult because of the nature of municipal work which is service giving. In one organization namely water and sewerage authority, forming the group for the discussion was not possible. The option was then, make informal interview on individual bases with the branch managers and technicians.

Identifying Slums on Quick bird image: The resolution of the image that was used for delineation of slum areas was in 1:15,000 scales, thus making detailed identification was difficult. Identification of the slum areas at the higher administrative level (city level) was more generalized than the lower level Identification because the knowledge of individual problem areas was better at sub-city level. In general, getting detailed information was difficult as it is envisaged. The option was to use the air photos and available 1:6000 scaled topographic map of 1994, which they used to work with, as a support for clarification. Moreover, because of the heterogeneous character of the city, there is no clear distinction between poor and relatively rich areas. Thus, not all areas in the delineation of the problem areas are poor. And also not all areas are rich. This resulted in difficulties on estimating the number of households and making a threshold for classification.

5. Monitoring Slums In Addis Ababa

The main concern of this chapter is on the description and analysis of the results that are captured through rapid appraisal methods and secondary data. The same as data capture, analysis of the captured data is performed mainly, following the guiding principles of RUA that is reviewed in chapter two. To provide background information for the subsequent analysis, primarily, the focus group discussions are reviewed. Subsequently, results that are captured on various administrative levels are compared and on the basis of the result of the comparison, each variable is analysed based on sub-city level data in relation with the method of data capture.

5.1. Review of Focus Group Discussions

5.1.1. Slum definition in Addis Ababa

Official Definition of slum

There is no officially agreed and established definition of slum for the city of Addis Ababa. Nonetheless, in three focus group discussions held at city level, it was mentioned that an equivalent description for slums is stated in the year 2002 housing component study document, which defined slums as an "old and dilapidated housing areas".

According to the group discussions, in view the current development programme of the city government which is housing development, slums are explained and defined as rotting and decaying urban areas. The word has also started to appear in certain directives and regulations of the municipal work procedures and it is used in official meetings and reports. However, considering the implication on the people who reside in those areas in most of the discussion groups, experts have expressed their views of refusing to accept the definition. Apart from this, it was also mentioned that areas with many (kebele houses)[8] are directly referred as slum.

Local Definition of slum:

During the discussions, it was also commonly agreed that there is no local, widely known definition for slum. In one of city and sub-city level discussions, reflecting the socio-economic characteristics of

specific slum areas, some of the slum areas are named as *"DC sefer"* to imply prostitution is widely observed; also *"Gesho sefer"* and *"kochi sefer"* to express the majority of the residents as a very low-income petty-traders.

Reflections on UN-Habitat' slum definition by local experts

During data capture, awareness level of local experts on UN-Habitat's slum definition has been explored, the majority were not aware of the definition. Moreover, through the discussion on each of the indicators, it was possible to know, that all slum characteristics in the UN-Habitat's definition are

[8] Kebele houses are dwellings that were confiscated from the private house owners during the socialist regime and administered by government at kebele administration level

also shared by slums of Addis Ababa one way or the other. However, among the variables some can not describe slums individually in addition, there are other specific slum characteristics that can affect the type of intervention determinately but not encompassed in the definition of UN-Habitat's considering Addis Ababa's context.

5.1.2. Slum Characteristics and Development of Slum Indicators

In this section, characteristics of slums in the city are described based on the focus group discussion conducted at all administrative levels. Most of the slum characteristics are frequently mentioned in many of discussion groups.

Table 5-1: Slum Characteristics Category and Indicators of Slums

Slum Characteristics category	Slum Characteristics (indicators)	description
Physical Infrastructure and spatial development	Poor Sanitation	Lack of toilet facility, Storm water, Lack of drainage systems, accumulation of dry waste
	Inadequate access to water supply	Inadequate access to private piped water supply, Communal water tap
	Lack of open space (High Density)	Lack of open space (high density), kitchen space
	Inadequate Access Route	inadequate external access, inadequate internal access-(narrow roads Inaccessible for vehicle, Blocked roads, poor condition of road)
	Overcrowdings	Overcrowdings, severe housing shortage
	Poor Housing condition	Dilapidated housing condition- aged houses, low-quality building material lack of maintenance
	Unplanned (irregular)	Unplanned- irregular pattern and group of small size dwellings
Social service	Inadequate social service provision	Lack of affordable kindergarten and primary school in the near by location Lack of affordable health centres
Socio-economic	-Tenure insecurity	Housing ownership type (Kebele houses-sub tenants) Land tenure insecurity (Private houses with out a title deed) Incompliance with the Structure Plan proposal (strategic investment areas, renewal areas)
	Socio-economic	- Economic characteristics Low income, Unemployment, Prostitution, Juvenile delinquency -Social health problem, Rural behaviour (to imply backwardness in the way of living)
Environmental	Hazardous location	Risk of flood, Steep slope, land slide

As it is shown in (Table 5-1) the characteristics (indicators) mentioned by the groups are categorised into four. Poor sanitation, inadequate access to water supply, lack of open space (high density), inadequate access route, overcrowdings, poor housing condition and unplanned (irregular)

development are categorised in to one group as physical Infrastructure and spatial development. Similarly, the rest of characteristics (indicators) are grouped in to social service, socio- economic and environment categories. The review of slum characteristics described in the focus group has provided the following explanations.

Poor Sanitation: is one of the characteristics that is frequently mentioned and described as the main indicator of slums of Addis Ababa. It has been expressed in a number of ways as lack of toilet facility for a household as well as for a group of households, use of partially demolished and unclean communal pit latrine, use of communal toilet with many households, lack of drainage system for both liquid waste and storm water, and accumulation of uncollected solid waste.

Inadequate Access to Water Supply: Most slums also do lack adequate water supply. Inadequate water supply is described in terms of lack of direct connection to water tap both to dwelling and to yard. Although the majority of the residents use communal water tap and share water tap connected to yard, they are not considered as an adequate water supply because in the former there is a question of convenience and dependability while in the latter there is a question of, affordability and security and sense of ownership. Although the problem persists in such areas, in the case of Addis Ababa, in newly developed areas where high and medium income groups live, there is lack of access to adequate water supply.

Lack of Open Space (Density): Congested environment is also one of the characteristics of slum. This characteristics is mostly observed in the inner city areas, where by domestic activities like cooking, washing, eating, drying etc. are spill out in to streets and also various type of social gatherings are performed on the street. Provision of communal toilet is constantly hampered by the lack of open space in those areas.

Inadequate Access Route: is also one of the characteristics that is frequently mentioned as the main indicator of slums of Addis Ababa. It is described in terms of both inadequate external and internal access route where by roads are very narrow and sometimes blocked and inaccessible especially by vehicle. Moreover, there are also some areas without direct access routes to individual plots simply connected one plot after another. This problem persists inner city areas because many of the settlements have unplanned, and irregular building development pattern. There is also discontinuation of internal roads because of slope and river crossings. Poor road condition, which is prevalent in newly developed areas, is also included in this category.

Source: Addis ketema Sub-city

Overcrowding: Overcrowding is one of the slum characteristics, which is common in the inner city areas. More than two and three households stay in a single dilapidated house due to severe housing shortage and in migration.

Source: Addis ketema Sub-city

Poor Housing Condition: poor housing condition is one of the prevalent characteristics of slums in the city. It is described in terms of dilapidated housing condition because of age, lack of maintenance and use of low -quality building material. According to the focus group, most houses in the city are older than 40 years.

Source: Richard Sliuzas, 2004

Unplanned (irregular) settlement: Spontaneous and unplanned development in many of the settlements in the city is also mentioned as slum characteristics.

Inadequate social service provision: Many of slum areas are also known for inadequate social service provision. Even if there are health or education facilities in the vicinity, they mostly are unaffordable for the slum dwellers. Government health centres that are affordable for many of the residents have uneven distribution as a consequence either the residents have to travel long distances or they have to get affordable but sub-standard services from the nearby dispensaries.

Source: Addis Ketema Sub-city

Poor socio-economic condition: poor socio-economic conditions are central problems in slums. These conditions are mainly the causes of the slum formation. The general description given by the groups are low income, unemployment, Juvenile delinquency, health problem, rural behaviour (to imply back wardness in the way of living) and insecure tenure.

Insecure tenure: As it is stated above, insecure tenure is one of the causes for slum formation and proliferation. According to the focus group, tenure insecurity can be described by insecure housing ownership (living in a kebele house) especially as the sub-tenant. It also concerns, dwellings that are incompliance with the structure plan proposal especially those are within strategic investment areas and green zone, and dwellings with in this boundary the present urban renewal scheme. Even though tenure insecurity is one of the main causes of slum formation and proliferation, it can not be considered as a slum indicator individually because there are dwellings and settlements without a title deed and not sharing other slum characteristics.

Hazardous Locations and high risk of environmental degradation: River banks are the main slum development areas, as there are many major and minor rivers in the city. Hence, hazardous locations include flood prone settlements along river banks or on steep slopes where there is a risk of erosion. High risk of environmental degradation is also included in this category where there is sewerage overflow and uncontrolled solid and liquid waste areas.

Slum Characteristics Prioritization

The slum characteristics described above are prioritised by the focus groups at all administrative levels. The purpose of prioritisation of slum characters is to identify variables that can commonly define and characterise slums in Addis Ababa. Further, based on the first three prioritised characteristics slum areas are delineated by the experts. Accordingly, twelve types of prioritisation are demonstrated (see Appendix F). The result shows inadequate access to sanitation and poor housing condition are ranked in first or second order alternatively in all groups. The third variable is inadequate access. This indicates that in areas where there is poor housing condition predominantly there is also poor sanitation and vice versa. There fore, slums in Addis Ababa can be identified either in one or in two together with rest of the variables based on their rank order.

5.1.3. Ongoing slum interventions and major constraints

Water Supply

At city level for both slum and non-slum areas with no access to improved water, especially for the western part of the city (Kolfe Keranyo sub-city), there is a plan to construct a new dam starting from the current Ethiopian fiscal year (2004-2005). The duration of construction time is estimated to be two years. Laying out the network is also planned to be done, parallel with the construction of the dam. In addition to this, a borehole at different places and one spring water is identified to provide the residents with water at least for a very basic need. For the inner city or other fringe area low-income dwellers, communal water taps are provided with the minimal and constant rate (.05 euro cents per m3) of payment in accordance with the community and the kebele administration request. Apart from this, the authority does not have a plan to supply water specifically favouring the urban poor. The plan focuses in providing water for the newly redeveloped areas in accordance with the city government's new strategy (urban renewal). According to the experts from the authority, one of the discouraging factors of providing a new system for the poor areas is the intended intervention type, the authority do not want to invest on areas that are going to be redeveloped.

Constraints

According to the city level water and sewerage authority experts, the imbalance of water demand and supply is one of the major problems the authority is trying to improve. However, to make a significant improvement there is a need of huge resource mobilization, which is scarce. For instance, part of Kolfe Keranyo sub-city has no water supply at all due to lack of water source in the vicinity. To improve the situation the only option planned is to invest on a dam construction which requires a huge amount of resources.

Considering the situation in the inner city, especially in Addis ketema sub-city, the unplanned nature of the settlements, high density and the issue of tenure makes the attempt too difficult and complex. More over, the capacity of most of the residents is minimal; they cannot afford to pay for the extension of new network lines as well as for the instalment of the water meter. For instance, including the cost of material and service charge a customer should pay at minimum 50-60 euro, which is unaffordable for most of the people who live in those areas.

Sanitation

Although in an ad hoc basis, new communal toilets are being constructed; rehabilitation of existing communal toilets like empting and cleaning of the existing latrines and maintenance of the superstructure is also being carried out. Moreover, new construction and maintenance of sewerage

networks and preparation of protected temporary solid waste dumping areas are among the activities undergoing to improve the existing poor sanitation. Together with these, periodical waste removing is being implemented. The neighbourhood development committee at kebele level mainly undertakes these activities.

Constraints

As it is discussed with the kebele NDC[9], even if there is an attempt to minimize the misery of the residents in this respect, there is still no significant improvement. The solutions couldn't cope with the present deep rooted problem which is being aggravated because of several reasons. Lack of space, sloppiness of the site and irregularity of the settlements pattern are some of the encountered problems which needs long term action plan and appropriate resource allocation. Moreover, the rivers are still used as solid and liquid waste dumping areas.

Tenure Security

To make the private house owners secured in the sense of enabling them to modify, maintain and sell the houses, title deeds are being prepared at city level. According to land administration experts, among the private households without a title deed in the city, 120,000-130,000 title deeds are prepared. The preparation of the title deed covers the intermediate zone of the city excluding the fringe areas, the inner city and strategic investment areas.

It was also discussed that for kebele house renters living in the inner city or strategic investment areas, as it is designated by the structure plan, the only way securing the tenure is by demolishing the present housing structure and change it to a new low cost apartments so that in the long run the residents become the owners of the houses at different location.

Constraints

According to the group discussions, the main problem mentioned is the lack of updated information. The cadastral information differs very much from the reality because of the 10 years gap. There is informal claim of land. Information collected for the preparation of the title deeds from kebele administration sometimes is not correct and unreliable so every time survey has to be made whenever doubt arises. The reason that the expansion areas are excluded is also related with lack of updated information.

Housing Condition

The housing agency is engaged currently with its huge plan of demolishing the government kebele houses and relocating the people to a near by locations in low-cost multi-storey buildings. According to the experts, this strategy is expected to solve the severe housing shortage and condition in the city. It is planned that to enable the dwellers to become the owner of the houses in the long run. As it is envisaged in the plan (HDPO, 2004), at least 50 % of the slum areas will be changed in five years. Seven hundred housing units at the expansion area named "Gergi" are already constructed and 10,000 low cost housing units have started to be constructed last year in different areas of all sub-cities. There is a plan to construct 17,000 housing units this year. In doing so, the city government has envisaged to minimize unemployment and activate the economy. Both the construction work and compensation relocation are managed at city level. The demolishing task is being undertaken at the sub-city and kebele levels.

[9] NDC-Neighbourhood Development Committee

Constraints

According to the experts, financial and human resource constraint is found to be a major limiting factor for the intended projects. Regulatory problems are also making the process of relocation very complex. The process also takes longer time and there is lack of temporary place for the relocated people. The material supply for the construction couldn't cope with the scale of the project. Moreover, there is lack of skilled manpower both in the technical and administrative sector to be able to manage the projects. Above all, there is a question of affordability, especially the initial cost of getting the apartments, for many of the low-income residents who at present live in kebele houses.

5.2. Slum Situation analysis

As described in chapter four, both primary and secondary data are required to undertake the research. In this section, the slum definition as defined by local experts is presented. Comparative analysis is made on the method application at the three administrative levels in the city. Moreover, the prepared data is analysed in respect with the identified slum characteristics and method of data capture. In the following chapter, the result of the slum situation analysis is compared with the results of slum situation analysis by UN-Habitat for Addis Ababa.

5.2.1. Slum Definition in Addis Ababa by Experts

In chapter two on the part of literature review, the international working definition of slum by UN-Habitat is reviewed. Despite the fact that the global definition is of great value in defining on the basis of certain common physical attributes, it is too generalised for the working definition (Abbot, 2004) to be used for slum intervention at a local level. Moreover, as an indicator, as the component of the definition should be adopted and modified based on locally developed guidelines for indicator selection (BRISTOL, 2003).Thus, in this research slums are defined at a local level with the experts of different organisation at different administrative level considering Addis Ababa's physical and socioeconomic condition.

The basis for defining slum at local level is the argument in the literature review and focus group discussions. Although all the variables in the global definition shared also by the slums of Addis, the fact that the distinct and inherent character of slums remain the core element to be intervened for the sustainable improvement of the lives of slum dwellers.

According to UN-Habitat 2003a, the newly formulated slum definition is described based upon five key indicators which are access to improved water, access to improved sanitation, sufficient living area, and structural quality/durability of dwellings and security of tenure. The definition is formulated in such a way that it can reflect the conditions that commonly characterize slums in the world. However, slums are multidimensional with diverse characteristics that "each slum neighbourhood must be examined in the light of its own sub-culture. In each case, the particular subculture will be the dominant influence on the life pattern of the respective slum inhabitants, shaping their lives through the pressures of environmental and family backgrounds, cultural tradition, and major life concerns." (Clinard 1966, p.17). In addition, as Abbot (2004 p.3) in his argument mentioned, "the definition is based upon a descriptive analysis of slum conditions and …it misses a key component of the analysis, which should seek to explore differences between settlements". Thus, based on the above argument it is required to define slums locally.

According to the focus groups as well as confirmed with field observation, inadequate access to sanitation and poor housing condition goes parallel. In areas where there is poor housing condition there is also poor sanitation and vice versa. Therefore, slums in Addis Ababa can be identified either by one or two including the rest of the variable for measuring the intensity. Despite the fact that the international working definition of slum serves as a starting point or a base, slums need to be defined at local level in their own context in order to act according to the needs and priorities of that specific locality.

Hence, slum is defined as a settlement or a household that reflects a combination of the above mentioned poor physical, social, economical, environmental and demographic characteristics of slums.

5.2.2. Application of Methods and Comparative Analysis of their Results

In view of functions, powers and the role played at each administrative levels, adjustments were made on the discussion guide during field work. However, the basic framework has been kept the same. Accordingly, at city level, more focus have been given for the first and the last discussion subjects that enable to make theoretical and conceptual base to define, identify and describe slum characteristics in the local context. Exploration of existing interventions in relation with data availability and policy support was also conducted at this level. Moreover, for testing the methodology, prioritization and delineation of slum characteristics was also performed.

Similarly, at sub-city level, also all discussion subjects were raised and discussed. However, given the limited number of experts as well as the function, power and role at this level, it was essential to focus on specific part of the discussion guide. Description, prioritization, delineation of slum characteristics was performed. Moreover, exploration of constraints in planning as well as implementing slum interventions with regard to data requirement and supporting policy or strategy are conducted at this level.

Accordingly, at both administrative levels, among various slum characteristics mentioned during the discussion, Housing condition, Inadequate Access Route and Access to Adequate Sanitation were prioritised (see Appendix F) and delineation of these characteristics was conducted. The delineation has been classified into three, for instance settlements with poor housing condition and settlements with good housing condition were delineated by the experts leaving the rest as an intermediate. To support the quantification, on the basis of local knowledge, threshold formulation has been made, accordingly, experts has made an estimation of ranges of poor households in settlements that are categorized as high (both for poor condition and high number) from (75-95%) and (5-20%) for low poor condition and low number.

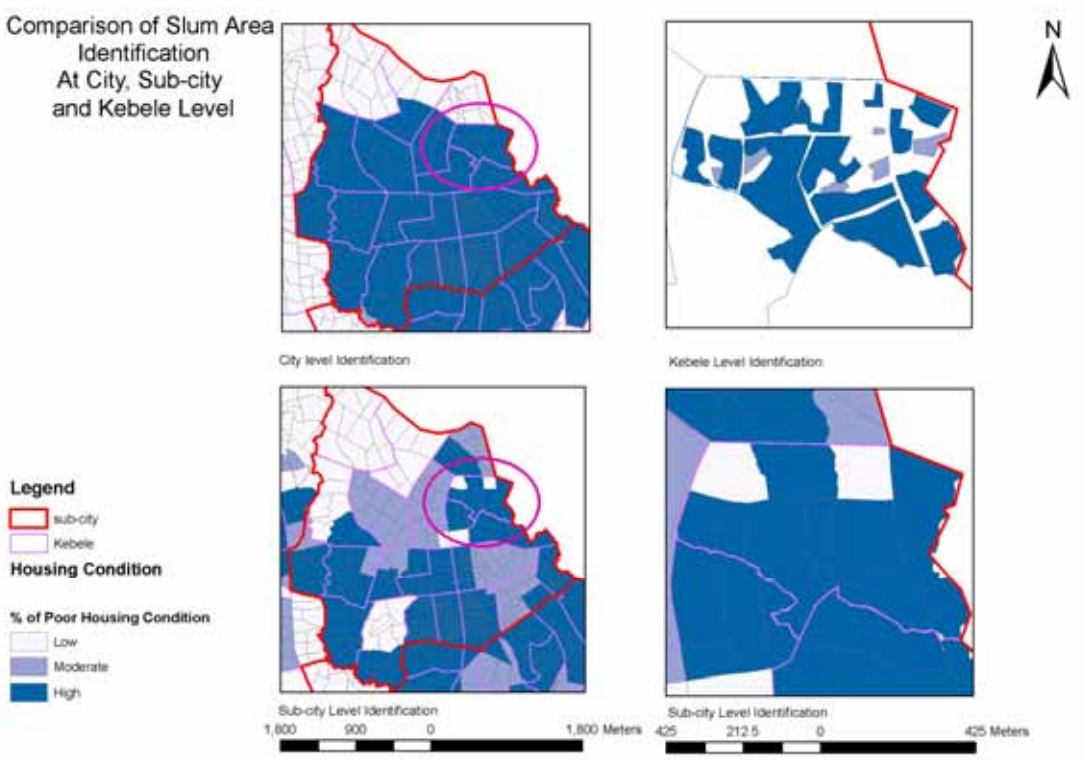
At kebele level which is an important administrative level in its closeness to the core of the problem, focus was given to the detail description and spatial identification of slum characteristics on the basis of related problems. Critical issues like problem identification and prioritisation were conducted in the form of group discussion and field observation.

Even though, in their discussion the starting point was the severe socio economic problem, the identification and prioritisation were mainly focused on the physical manifestations which are poor sanitation, housing condition and poor access routes.

In order to make comparison of the method application at all administrative level, the following map is presented (see Figure 5-1). Taking Housing condition as an example the spatial variation captured at all level is analysed. Although substantial data is captured concerning the slum concept, policies and intervention programmes, as it is evident from the map more generalised spatial

information is given by the experts at city level. Specifically, it is observed that their knowledge on newly developed expansion area is minimal.

Figure 5-1: Comparison of problem Area Delineation at Various Administrative Hierarchies



At sub-city, level, except experts at the higher managerial level, less detailed information and knowledge is observed concerning areas of the existing policy and strategy as well as the future plan of the government. As described in chapter three, the role played at this level concerns mainly the implementation of the plans designed at city level. However, much more detail data has been captured at this level. As shown on the maps, a significant level of spatial variation is gained. Moreover, in-depth knowledge of both physical and socio-economic characters of each kebele is observed.

At kebele level, as the residents of the area have been directly contacted, the actual problems and the spatial coverage of it could be captured. Moreover, the size of spatial coverage which is much smaller than the other levels, has facilitated and enabled the capture of much more detailed information at this level. However, among members of Neighbourhood Development Committee less knowledge is observed on the existing and future plans of the government for the specific area.

In the process of data capture, both weaknesses and strength at each administrative level are observed. Thus, concerning identification and prioritisation of problems, both spatial and non-spatial data capture is much better at kebele level on the basis of the local people participation and collaboration. At sub-city level prioritisation of kebeles and comprehensive information on the inherent characteristics of the slum areas can be captured. At city level, city wide information can be gained concerning polices, strategies and programmes. In view of this, the need for information is directly related on their role in the campaign of slum improvement.

Even though detailed information is gained at kebele level, among 55 kebeles only four are studied. For the reason of spatial coverage of the kebele level information is not used in the spatial analysis except for comparison of level of detail of the captured information at different levels of administration and also to illustrate the diverse socio-economic character of slums in the city. Thus, for the reason of spatial coverage, in this research, sub-city level identification is used for analysis in the following sections and chapters.

5.2.3. Analysis of Results based upon Data Captured at Sub-city Level

On the basis of common characteristics of slums in Addis Ababa, results of the spatial identification is described and analysed in this section. Thus, inadequate sanitation, poor housing condition, and poor access route are the three predominant top priorities that characterise slums in Addis Ababa. In addition, for the purpose of later comparison with the UN-Habitat's results, inadequate water supply and insecure tenure are also included in the analysis although there are other characteristics equally ranked. However, as described in the above section, demographic and socio-economic characteristics of slums are the central problem in slums that play a determinant role in formation and proliferation slum and also have a significant influence on the type of intervention that is going to be devised. Moreover, these characteristic reveals not only the commonalities of slums but also the diverse and inherent characteristic of slum that require distinct intervention. Although detail information is not gathered in this respect, as an introduction the socio-economic characteristics of the selected kebeles and sub-cities are described as follows mainly on the basis of focus group discussion.

Overview of socioeconomic issues of the selected kebeles and sub-cities

The mix of culture, functions as well as socio-economic and physical conditions has created heterogeneity in the city. The short distance spatial variability or heterogeneity has also created an overall effect of homogeneity. Though currently emerging, until recently there was no trend on the physical as well as the socio economic setting in the city. Thus, there are no areas with out poor households and vice versa. The recent study of UN-Habitat in Addis Ababa has also stated, "A significant characteristics of Addis Ababa is the distribution of its households. Typically, an area that contains ultra-modern buildings has a slum adjacent to it." (UN-Habitat 2004, p. 8). Hence, the distinct character of the city needs due consideration in the data collection and analysis.

Addis Ketema Sub-city: The deep rooted problems of this sub-city have a long history starting from the establishment of the city. The two prominent features that play a role for the present condition of the Addis ketema sub-city are the inter-city bus terminal and the well known market place "Merkato". The area is the destination for many of the migrants, who comes to Addis from the rest of the country hopping for a better life. It is a home for many of the poor from different ethnic group as well as working area of the well-off. Both the poor and the rich are economically dependent on "Merkato" that is found in the sub-city. It is also known for its high density and housing occupancy rate.

Accordingly, Kebele 14 found in Addis Ketema sub-city is full of highly deteriorated buildings. The estimated net population density, according to recently conducted study, is 1300 people/ha and the average household size is ten. Overcrowding is prevalent in the kebele. In many cases, compartments are made both horizontally and vertically within one or two room housing units to accommodate as many families as possible. As mentioned during the discussion with Neighbourhood Development Committee, although different ethnic groups live in the area, predominant residents of the kebele are the "Gurages" that are from central Ethiopia. Major economic activities undertaking in the kebele are

petty trade services and in a very few cases storage renting. Apart from this like street vending, begging renting spaces, informal video clubs are predominant economic activities in the area (AKSc, 2004).According to the committee; many of the residents are dependent on the charity of NGOs for more than 15 years, with monthly ration and yearly clothing. Children of this kebele have greatly suffered from poor health because of extremely deteriorated and unsanitary environment.

Lideta Sub-city: Lideta sub-city is predominantly residential area. According to NDC many of the residents in this sub-city are private house owners. Currently, many of them are old and economically dependent on pension and a certain proportion of payment from the government based on their confiscated extra houses. There is no dominant activity in the area that influences the socio-economic character of the residents. According to the focus group, although different ethnic groups found in the sub-city, predominantly people from specific ethnic group (the northern part of Ethiopia) are found in this sub-city. According to the kebele 17 Neighbourhood Development Committee, because of ethnic relation many refugees live in the area that are, victims of Ethio - Eritrean war.

Kolfe Keranyo Sub-cities: Kolfe Keranyo is mainly a newly developed residential area. Except the areas close by the inner city, the rest of the area is newly developed both formally and informally. Huge housing development projects have been implemented in this sub-city.

Kebele 11 and kebele 01 are selected from this sub-city. According to NDC majority of the residents in kebele 01 are socially marginalised because of serious health problem (leprosy). They come from different parts of the country and live there in search of medical treatment to the specific location because of its nearness to the hospital that provides the required service. Their main source of income is begging. Like the residents of other kebeles, the area lacks adequate access to services and they live in a very poor and deserted area following the bank of near by river.

Kebele 11 is also in this sub-city and studied by UN-Habitat. As it is stated in KKSc (2004), the people who reside in this kebele are composed of different ethnic group and “Gamo’ ethnic group are one of them who comes from southern Ethiopia. Their livelihood depends on traditional cloth making which usually is established in their dwellings. It needs different type of spatial arrangement in the dwelling; the floor level usually is lowered and made of earth material. Moreover, according to the document one of the reason of high rate of population growth in the kebele is because the specific ethnic group who bring too many children from rural areas to help them in their laborious work, traditional close making. This can be taken as a typical characteristic of the kebele which is the employment of child labour.

As mentioned above, although less information is captured in this respect it is important to note the possibilities of detail socio-economic data capture through participation and collaboration of the community. Moreover, it demonstrates the diverse nature of each settlement like wise the need for divers response, especially in the context of Addis Ababa. Thus, having the brief socio-economic description as a back ground, detail analysis on the results of spatial identification of prioritised slum characteristics is conducted in the following section based on sub-city level information.

5.2.3.1. Housing Condition

According to 1994 census, the construction type of 97.4% of housing units in the city is permanent. However, 82.3% of the total housing stock was built from local material (mud and pole) which needs frequent maintenance. More than forty per cent of the total housing stock is under the public ownership.

The data capturing method for this variable is mainly focus group discussion. As discussed in the previous sections, poor housing condition is described locally in terms of dilapidated housing condition which is caused by old age, lack of maintenance and low quality building material. The houses that are found in most of the inner city areas (Lideta and Addis Ketema sub-cities), are predominantly dilapidated mainly because of old age and lack of periodical maintenance. Based on the focus group identification in Addis Ketema an average of 71% of households are included in the category of high deterioration. In the inner city and particularly in these areas, the building materials that have been in use as a main wall and roof material are mud and pole and corrugated iron sheet respectively. These materials are of poor quality and, by their very nature, need frequent maintenances. However, there have not been significant periodical maintenances that can improve the condition. As a result, old age together with lack of maintenance for the specific weather made the housing condition beyond repair and thus, deterioration becomes the prevalent housing condition in the inner city. Thus, the status of maintenance is a factor for the poor housing condition. Houses with such condition are predominantly kebele houses that are under the kebele (government) administration. As history shows, initially the houses are built using local material for rental purpose. At present predominantly, the tenants are the urban poor. After the confiscation of the houses, according to 1994 census, 21% of these houses are rented with the price of 1-4 birr or €10- 40 cents, 24% are rented 5-9 birr or €50-90cents and 63% are rented with 10-100 birr or 1-10€ per month which does not seem to cover even the administration costs let alone the maintenances. The present government also kept the same payment system. For nearly three decades, there has never been a major maintenance neither by the government nor by the tenants. In addition, all these years, privately owned houses built in the same compound with that of kebele houses also could not get permission for major maintenances because of complex tenure ship. According to Lideta sub-city focus group, such condition is predominant in Lideta sub-city. An average of fifty five percent of households is estimated to be in the category of high deterioration.

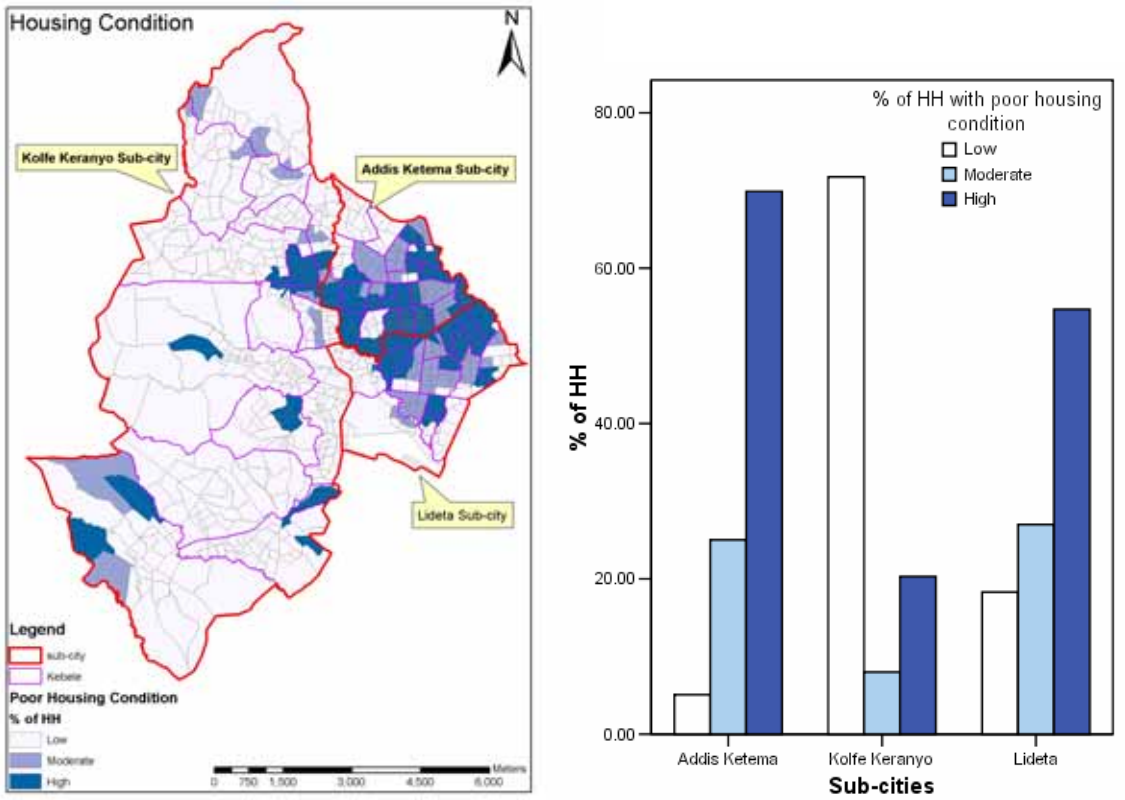
In Kolfe Keranyo sub-city, there are a few places as shown (Figure 5-2) close to the boundary of Lideta and Addis Ketema sub-city that housing deterioration is observed because of the above reason. The rest, especially in informal settlements, poor housing condition observed because of the construction material which is the same as above locally available (mud and pole) without finishing. The residents can be categorised with three different groups. The first group is a low income group squatting on available open land and on a hazardous location like on river banks. Since, residents of this group have no chance of getting affordable housing through the legal procedure; they squat and construct a house with very cheap material. The second group is the lower middle income group that cannot afford participate in the land allocation process of the government, prefers to buy the land (illegally) from the farmer with a lower price and spend what he saved on one or two room low quality housing. The third group is the speculator; this group do not actually reside in the houses but just to occupy the land, build a house with very cheap material.

The poor housing condition in Kolfe Keranyo takes up an average of 20% of the households in the sub-city. The high proportion of good quality housing in Kolfe Keranyo is observed because of the fact that the majority of new housing development scheme is implemented in this sub-city. Moreover, even in the informal settlements many good quality houses are observed in the specific sub-city.

As shown on the map as well as on the graph, the housing condition in the inner city especially in Addis Ketema is very poor in most cases beyond repair. Although one can be certain that the majority of the people who reside in the houses with poor condition are the urban poor, it can not be concluded that all them are the urban poor. The present prevalent poor housing condition is a result of not only

poverty but also a long year deep rooted problem in relation with complex tenure system, unregulated housing development and unresponsive planning regulations.

Figure 5-2: Housing Condition

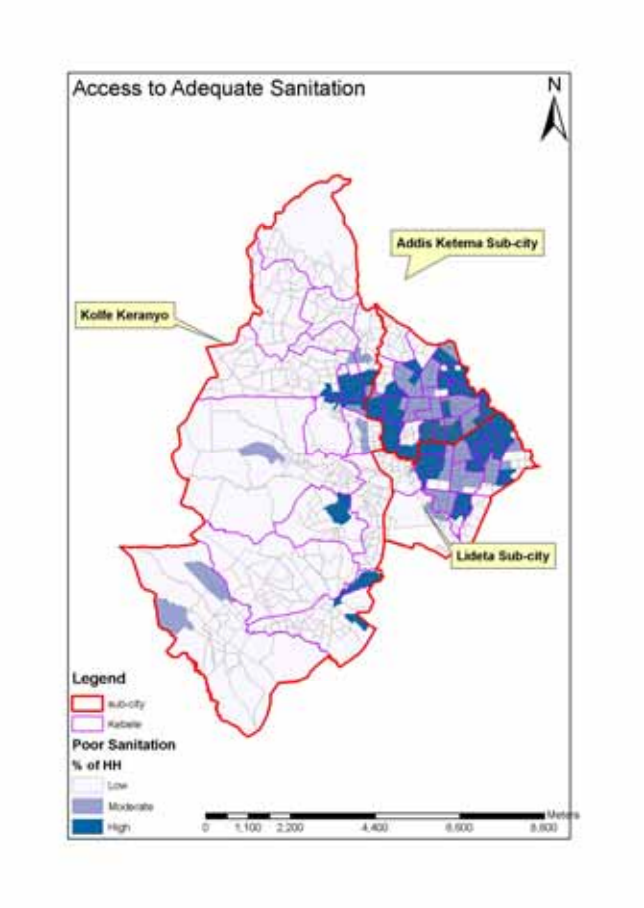


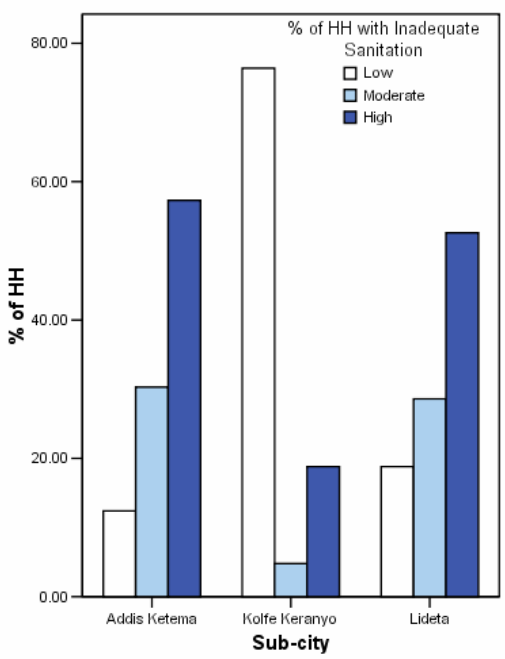
5.2.3.2. Access to Adequate Sanitation

According to 1994 census in Addis Ababa, 23.9% of housing units in the city have no toilets, 45 % shared pit latrine, and 1.9 housing units share and privately own flush toilets. At present, also no significant improvement has been made considering the deep rooted problem and the type of response given to it. Lack of adequate sanitation, as poor housing condition is identified as one of main slum characteristics that are prevalent in the city. Based on the focus group, it is described in terms of lack of sufficient and proper toilet facility, lack of drainage system, and accumulation of uncollected solid waste.

As shown on (Figure 5-3) Addis ketema and Lideta takes an average of 58 and 55respectively in a category of high sanitation problem. At present, in these areas especially in Addis Ketema sub-city sharing toilet facility is common. In many cases, over flowing of the existing latrines is also prominent because suction trucks can not access the areas for the reason of extreme density, irregularity and blocked or narrow routes.

Figure 5-3: Access to Adequate Sanitation



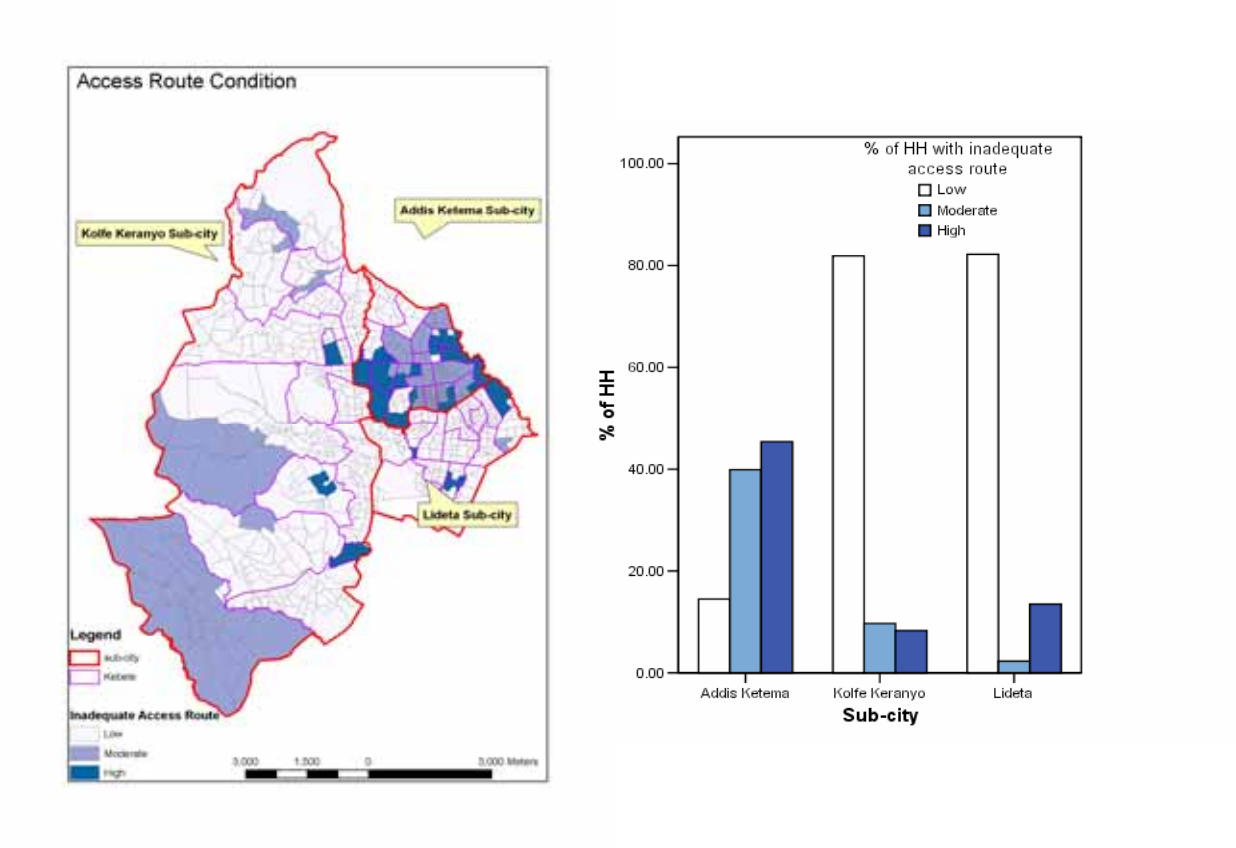


Moreover, the usual upgrading practice in Addis Ababa is that liquid wastes are connected to the open ditch where strong smell is causing problems. In addition, solid waste management is poor in general in the city and in particular in these areas that every unused space, streets as well as rivers are major places of solid waste accumulation. As described in the above section, there is on going intervention in these regard. However, it couldn't advance to improve the central cause of the problem. Communal toilets are being constructed but that could not be enough to improve the condition in a sustainable way. Even the present ad hoc intervention is constantly hampered by the lack of space and access roads, technical and financial capacity. Except a few places, the problem in Kolfe Keranyo is much better with an estimated average percentage of 21 because the majority of the area is newly developed which is planned and regulated.

5.2.3.3. Adequate Access Routes (Internal and External)

Inadequate access on both internal and external access roads is also one of slum characteristics described in the focus group discussions. The spontaneous development of the city has major effect on inner city mainly Addis ketema and partly Lideta sub-cities resulting in inadequate internal access roads that are characterised by irregular, narrow and blocked routes prohibiting vehicular access. Consequently, such settlements are inaccessible during like fire, flood, hazards and other emergency cases.

Figure 5-4: Adequate Access Routes



Moreover, solid wastes are not collected occasionally because the tracks can not access the areas. Laying out and maintenance of infrastructure are also a problem and that is one of the reason the physical services are not provided readily in those areas. As the figure shows the majority of areas with poor access route are found in Addis Ketema sub-city as taking up the proportion of 45%. In Lideta sub-city, in addition to the above reason there are a few places with both lack of internal and external access route because of sloppy nature of the area. The proportion of these areas in Lideta sub-city is also estimated to be 14%. The figure is relatively much lower than the two sub-cities because there is relatively less density in the area than Addis Ketema and also the condition improved through recent upgrading projects organised by neighbourhood development committee.

In the expansion areas, like Kolfe Keranyo, inadequate external access and poor road condition is prevalent because of both natural and man made causes. The natural cause for inaccessible site condition is the sloppy nature of the areas as well as the presence of rivers and creeks. The man made cause for inaccessible external site condition is road construction, especially the ring road, with a limited consideration of access to settlements. As a result, majority of the urban poor who reside in those areas are subjected to walk longer distances to find the nearest transport station.

Even though the right of way of the roads are in an acceptable level, the other prevalent access route problem in Kolfe Keranyo is Poor road condition. Such problem results in lacking provision of transportation system even for emergency vehicles. The problem has concentrated on a few part of the sub-city taking up ratio of 8%. The main victims of the poor access route are predominantly the urban poor and considering this factors areas with inadequate access routes were also delineated by the experts and indicated by the local people in neighbourhood development committee.

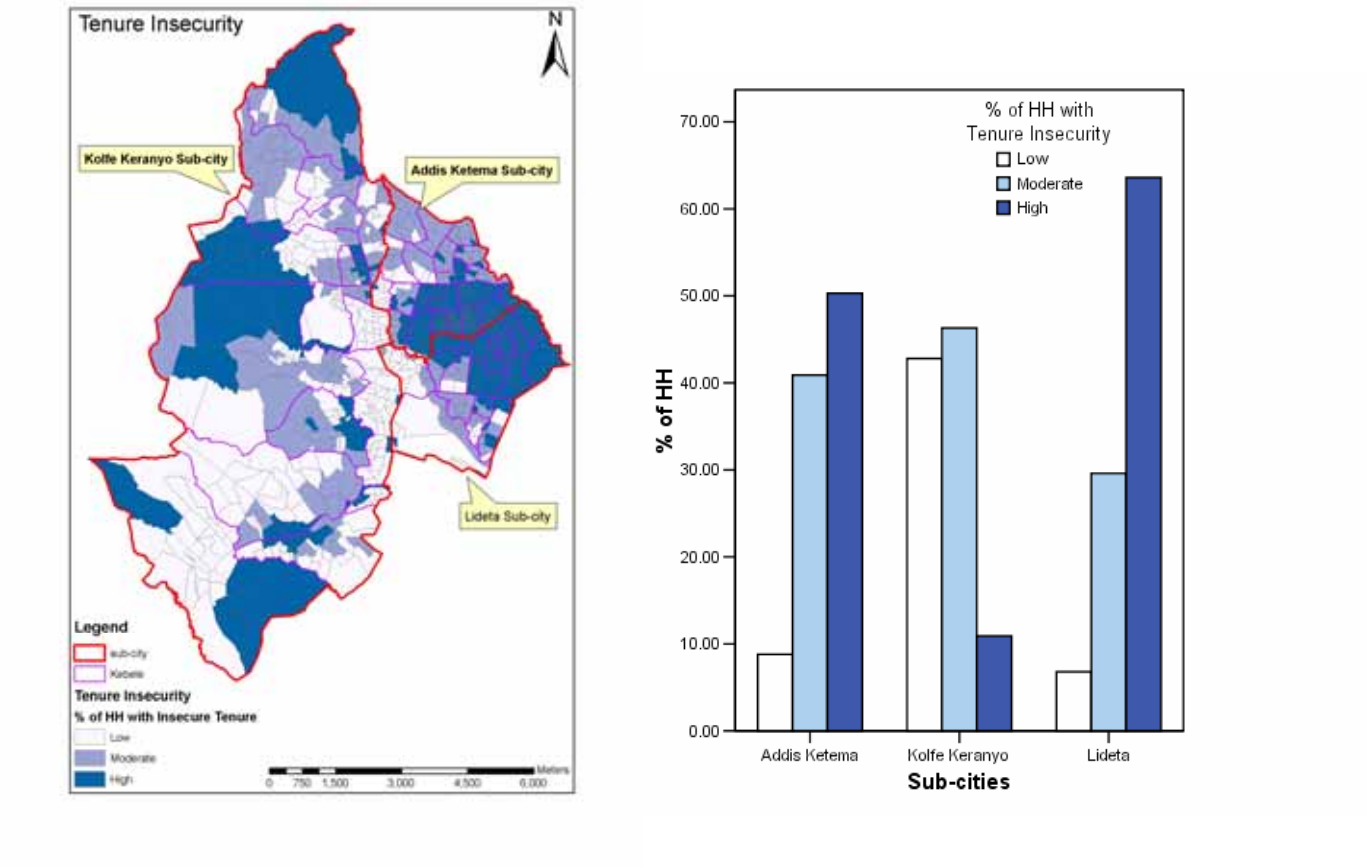
5.2.3.4. Tenure Security

In the context of Addis Ababa, the governing factor for tenure security is compliances with the standards of the proposals of the structure plan. According to focus groups in many cases, two of the components of the structure plan, strategic investment areas and the green zone, are factors that predominantly result in tenure insecurity of the people who reside with in the specific boundaries. Strategic investment areas are identified in the structure plan for concentrating investments in the city centre and sub-centres, along main roads and other focal points in the city. In these areas, the building height is high and the land use is predominantly commercial or industrial. The idea is, unless residences or even commercial buildings changed up to the envisaged standard, sooner or later they will be replaced by new developments. In addition, for the residents owning a property with or without a title deed with in this boundary, it is inevitable to move out unless they have the capability to rebuild according to the envisaged standard. The same works for the green zone. Other uses permitted in this zone are also very limited thus; people who reside in these areas also face similar type of insecurity because they can not get permission to make major maintenances or building extensions. Of course, concerning the green zone there are settlements that dangerously located along the river banks and on steep slops that needs to be relocated through negotiation and consultation.

One of the major activities is redevelopment of the inner city through the urban renewal scheme. The fact that the inclusion of the major part of the inner city within the renewal boundary, which is with very high population density, according to the focus group, it has created high tenure insecurity for many of the residents. Residents in this boundary can not sell, do maintenances or extend the houses unless their proposal goes along the proposed planning scheme. They could not even be included the land regularisation plan which is one of the present intervention that grants a title deed for the private house owners. This intervention scheme brings about low transaction and minimal owner investment living out people investing with out the knowledge of what the structure plan proposes which is usually the case.

The other factor for tenure insecurity is the type of housing ownership. This concerns the houses that have been confiscated during the socialist regime. Considering the conditions of these houses which is discussed above, at present, the city government planned to secure tenure by demolishing these housing structures and change it to a new low cost apartments so that in the long run the residents become the owners of the houses at different location. However, if we see it closely, according to the plan when one’s house get demolished, the tenant will get another substitute from the new housing scheme in the nearby location. Given the high occupancy rate in such houses (housing occupancy in the city is 1.1 according to census 1994), even if the government gives a house for the tenant, the sub-tenants in many of the cases more than one, will be homeless. As consequence, there will be high tenure insecurity guaranteeing the creation of another slum. Further, according to HDPO (2004) an estimated 60% of the tenants may not afford to cover the minimum initial cost.

Figure 5-5: Tenure Insecurity



Despite the fact that, the efforts made by government to relocate people on the vicinity and guaranteeing the housing ownership is highly acknowledged, the same as the above case, the scale of the project and the presence of financial and human constraint, even unbalanced construction material provision in the city, will result further deterioration for the ones that remain and very hard transition period and social chaos for the ones that are going to be relocated.

5.2.3.5. Adequate access to water

As stated in urban indicators guidelines, water is one of the greater necessities of human life yet two billion people lack access to adequate water supply or obtains it at a higher prise. (http://www.unhabitat.org/programmes/guo/urban_indicators.asp). In Addis Ababa, according to 1994 census, only 27% of housing units are connected to private piped water in yard or in side a dwelling and 26% of housing units share water taps in the yard, while 45% of housing units share water taps outside the compound. Given the high housing occupancy rate in poor areas, the specific figure indicates a huge number of households. It is also indicated in the document that .7 % of housing units use protected well, while 1% use unprotected well and 3% uses pond or river. Apart from field observation and informal discussion with experts, the main source of information for this variable is secondary data. On the basis of informal discussion with water and sewerage authority experts and 1994 census, the initial step taken is classification of predominant type of access to water supply

considering the intervention to be designed. As shown on the following table, there are four major type of access in Addis Ababa.

Although use of communal water tap and shared water tap in yard are considered as an access to improved water, they both have negative effect on the day to day life of the urban poor. According to the local people, one water tap is shared with an average of 15 household and the management of it is mostly poor. The water from communal water tap is provided only early in the mornings and late in the afternoon creating long queue. Every time the taps and water meter are stolen, monthly payments are not paid regularly and service is not given properly. This is evident that during field observation, many of the communal water taps were out of order. In total there are 447 communal water taps in the three sub-cities, per kebele the number ranges from 1-9 in some cases it goes up to 16.

Table 5-2: Classification of Access to Water Supply

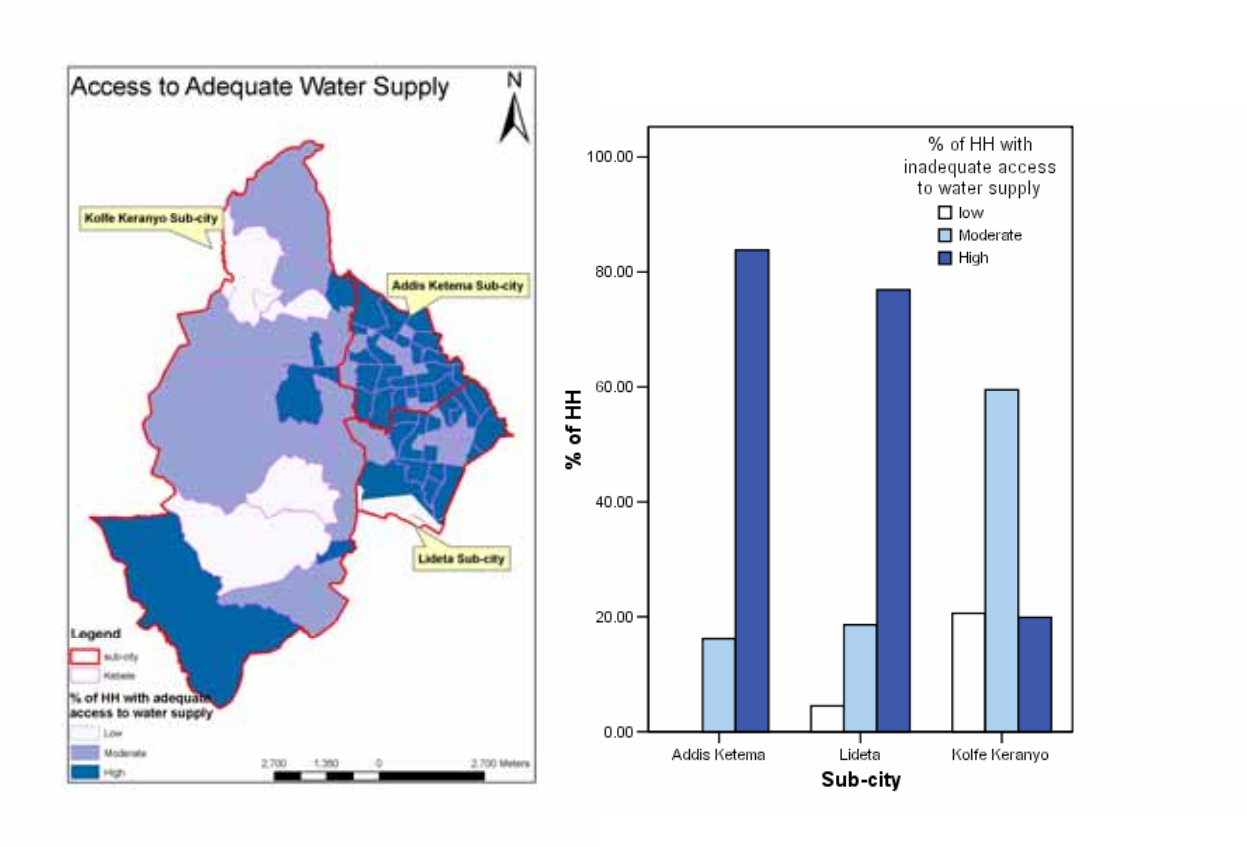
No	Type of access to water supply		Water source	Positive attributes	Negative attributes	
1	Access to private water tap connected to dwelling or yard		Piped water	Affordable, sufficient10, convenient (secure, privacy), no time constraint	-	
2	Access to communal water tap		Piped water	Affordable and can be sufficient	Shared by many households (av.15 hh) the minimum thresh hold in UN-Habitat standard is 5 hh, inconvenience, waiting time,	
3	Access to shared water tap connected in yard	Purchased from owner	Piped water	Less physical effort than communal water tap	affordability, sufficiency and security are factors that are in question	Social conflict
		Communal use		Less physical effort, affordable, sufficient	Mismanagement	
4	Access to shared water tap out side yard (purchased from water vendor)		Piped water	-	Mostly unaffordable for many of the urban poor, insufficient, inconvenient	

Concerning the use of water taps shared in the yard, although it seems to have a better side, mostly there is a question of affordability and security in it, especially if the main house is owner occupied. As discussed in previous chapter, in most cases sharing a water tap in yard came in relation with the confiscated houses in the compound of an owner. In such cases, the management is in hands of the owner, thus he has a power to limit the volume, time usage including cost. Moreover, according to the local people, in both cases of sharing water tap, repeated social conflict arouses as they live in a congested environment lacking private space.

[10] Sufficient- the level of disruption, pressure and other factors are not taken into consideration

Hence, the main factors considered for adequate water supply are private connection to piped water both with in the dwelling and private yard connection. Even though the use of communal water tap is affordable to many of the urban poor and the majority of them are using it, because of the above reason communal water tap is not included as adequate access to water supply, shared yard connections are considered as serving one housing unit. Based on the considered components areas with inadequate water supply are identified as follows (see Figure 5-6).

Figure 5-6: Access to Adequate Water Supply



According to the experts, many of rural settlements and some of both formal and informal newly developed residential areas do not have access to water because the government could not provide for the reason of lack of water source. Residents living in these areas having high and middle income, transport water by track or donkey at least for drinking and cooking but for other household use like for cleaning clothes, they usually use rainwater during wet seasons. They pay five times as that of the communal water tap. As shown above in Kolfe Keranyo the proportion of households that have piped water connection within the category of high inadequate water supply is 22%.

In the inner city, there are some areas without access to water supply both in a form of private, shared or communal water tap. As shown on the map nearly 80% of the residents in Lideta sub-city do not have secured and affordable access to water. In addition the result, also shows in Addis Ketema no settlement is within the category of low inadequacy which means no settlement have more than 50% of households have access to improved water. This is mainly because the settlements are unplanned, dense and the majority of residents are poor. Provision of such infrastructure in settlements with dense and unplanned nature, is mostly resulted in expropriation which is very complex in many cases with

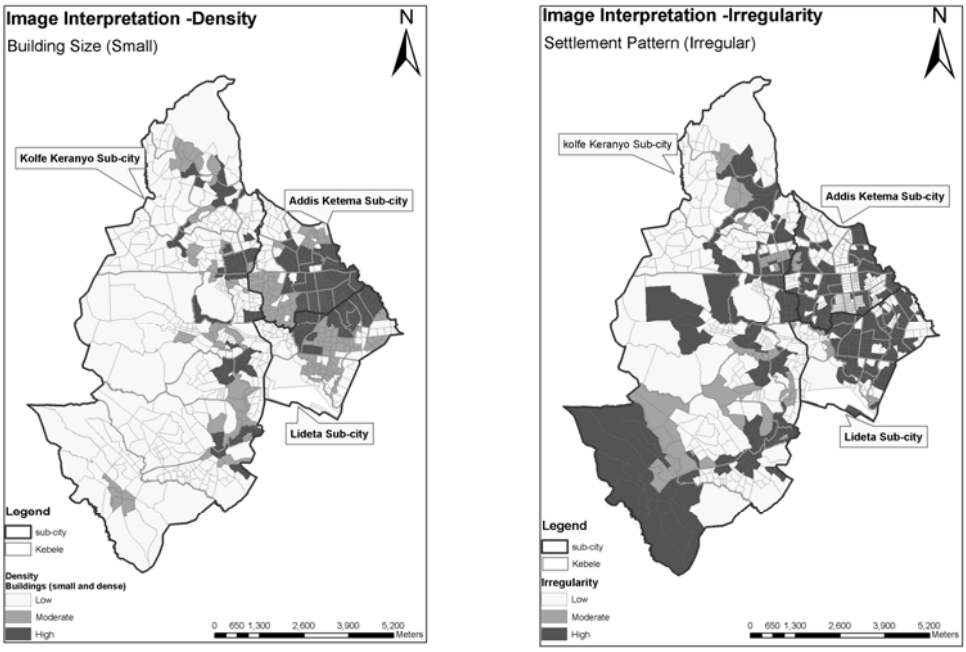
complicated tenure system. This is always a discouraging factor for both parities (residents and government), unless the initiative comes from the municipality who can deal on the tenure system. Even so the regulatory, compensation relocation processes are very lengthy and complex.

As shown on the figure, Kolfe Keranyo has a better access to adequate water supply even though there are settlements devoid of any type of water supply. Communal water tap is used in some of informal settlements and of course in settlements that are close to Lideta and Addis ketema sub-city.

5.2.3.6. Unplanned and Dense Settlements

As described in chapter three, more than six decades, Addis Ababa was developing spontaneously with out any concrete plan. “For the first time during the short lived Italian invasion in 1936-1941, after five decades of the cities establishment, the famous French architect Le Corbusier prepared a guide line sketches for Addis Ababa” and afterwards, “many plans have been prepared for the city, but none of them were implemented to guide the development” (ORRAMP, 2000). However, the city developed with a particular emphasis to the north, northwest and south of the nodal points. This part of the city, which is partly in the case study area, is presently congested and deteriorated part of the city.

Figure 5-7: Irregularity and Density based on Image Interpretation



Moreover, the landholding system coupled with weak regulatory enforcements encouraged the cities unplanned growth and irregular pattern. The visual image interpretation of irregular development pattern is observed in all the three sub-cities even though the scale varies. While irregular development pattern in the inner city is related with the city establishment and development pattern, the one in the expansion is related with the informal development and uncoordinated planning practice.

Apart from the irregular pattern of development, the size of the dwellings is also considered. According to 1994 census, nearly 60% of the housing units in the city are attached non-storied. Many of these houses are built, as mentioned before during the monarchy regime for rental purpose by the

landlords mostly with small since many of them are build in the same compound with that of the landlord. The image interpretation has also proven that the concentration of small size buildings is in the two sub cities Lideta and Addis Ketema. Together with irregular pattern, the small size, created congested environment lacking open space, adequate physical and social infrastructure. As a result, such areas are characterised as a slum area. Because of the above reason, the two elements (pattern and size) of visual image interpretation are selected.

5.2.4. Conclusion

The description and analysis of results has shown that the present poor physical condition is manifested on the major area of the inner city, both Lideta and Addis Ketema and also partly on Kolfe Keranyo. It is resulted mainly because of unplanned development, unbalanced land distribution, severe housing shortage, poor institutional arrangement and unresponsive policies apart from the central poor socio economic problem in the city.

As the focus of the research is the development of a methodology, this chapter has been devoted mainly to demonstrate the potential of the method in capturing comprehensive information on the main causes and present slum conditions considering the current and the past strategies and urban planning programmes in the city. It was also noted that, in the process of data capture, relevant and very detailed data can be captured at the lower administrative level (kebele level), through the collaboration of local community. This level is not only for provision of detailed information but it is the foundation of sustainable improvement on the lives of the slum dwellers. Moreover, each level has its own role both in data capture and intervention, thus the inclusion of all administrative hierarchy in this process has supportive contribution for getting comprehensive information. As it is also evident in the analysis the integration of different techniques in the methodology, has important contribution in compensating the limitations in one method by the strength of the other method.

The continuation of the development of the method is also an important factor that should be considered in the future. For poor cities like Addis Ababa prioritisation of problem areas is very important for the efficient use of limited resource, thus, combining the thematic layers of individual slum character is also an important element in the process of slum monitoring although slum intervention is a sectoral issue. Thus, through collaboration of different actors in the slum intervention, prioritization and estimation of slums should be included as part of the methodology in the future.

6. Comparison of Methodologies

In the previous chapter, analysis is performed mainly based upon the data captured through the developed methodology. In this section, the results of this methodology and the results of statistical method employed by UN-Habitat are compared. The purpose of comparing the results is to illustrate the technical strength and limitations of the two methodologies and ascertain on the appropriate methodology for slum identification and analysis to support decisions on appropriate interventions. The comparison is not done in actual values because the data sources used in both methodologies are not the same and the captured information is gained based on different definitions. However, since both methods have measured slum conditions for the same city, Addis Ababa, and for the same purpose, it would be worthwhile to compare based on the trend and magnitude of their results through the ranking of the selected kebeles and sub-cities. Further, the comparison of the methods is started by comparing the definition because it is one of the major factors that create difference both on quantification and interpretation of slum condition.

6.1. The UN-Habitat's statistical method

As described both in chapter one and three, in 2003 UN-Habitat has conducted sample household survey to collect information on demographic, social, economic and health information from " a representative of 1,500 households in Addis Ababa" (UN-Habitat 2004, p.2) as part of urban inequities programme which collects detailed information for a global sample of 35 cities. The objective of the programme is to increase information and understanding of the inequities in living conditions within cities. The methodology employed and the procedure followed by UN-Habitat is presented as stated in the document of UN-Habitat 2004.

The survey was based upon the sampling frame provided by the list of census enumeration areas (EAs) with population and household information from the 1994 population and Housing Census. However, the same sampling frame was not used but adopted because of the decentralization the administrative boundaries are revised.

According to the description in the document, the survey was based on a four stage, stratified citywide representative sample of households. Fifty two clusters were selected and later another four are added to cover non responses. The following outline the four stage sample selection process.

At the first stage of sampling the 56 kebeles were allocated proportionally to the ten sub-cities based on the proportional division of the population in each of these sub-cities. The primary sampling units are therefore the sub-cities. After the completion of this process the population for all the old kebeles in each sub-city was calculated and from those the total number of old kebeles within each of the 10 sub-cities was subjected to a second stage stratification process and was proportionally selected from all the kebeles in each sub-city. The secondary sampling units are therefore the new kebeles. Hence, after mapping old kebeles under each sub-city, old kebeles from all old kebeles in each sub-city were using systematic sampling with probability proportional to size. The selected old kebeles were then traced into the new kebeles after completion of the sampling.

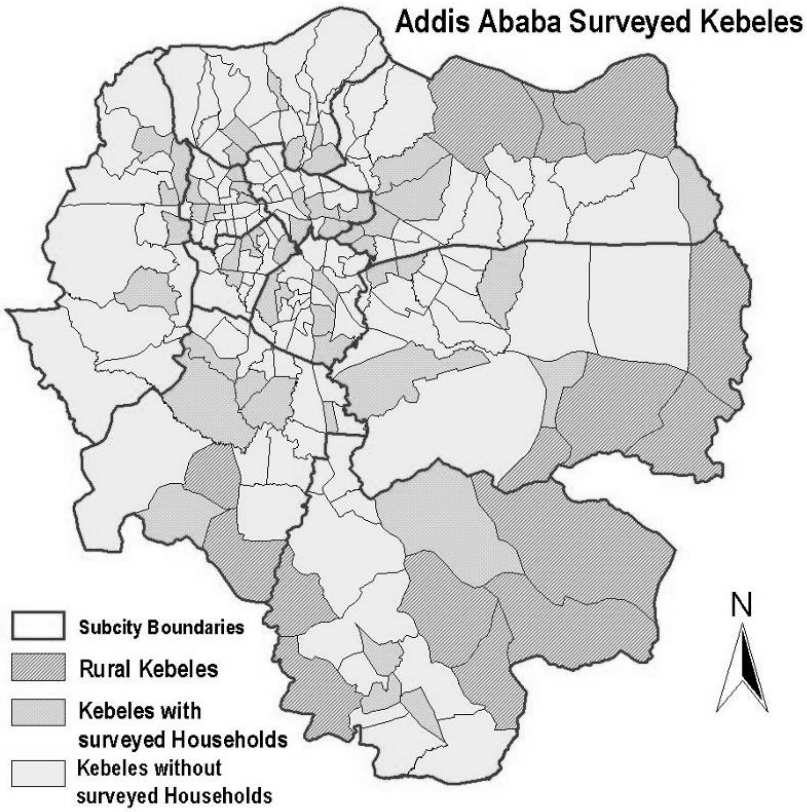
The third stage stratification resulted in the selection of one EA from each of the old kebeles, were selected using systematic sampling with probability proportional to size. The tertiary sampling units are therefore the ENs. This was then followed by a complete household listing operation which was carried out in all the 56 selected ENs to provide a sampling frame for the fourth stage selection of households. The quaternary sampling units are therefore the ENs.

Sketch maps, considered an important component of the Urban Inequity Survey, were composed to ascertain the relative position of all infrastructures, including all habitable dwellings (household units) within an EA to ensure that the enumerators could correctly identify each of the selected households during the field work. These maps were also used during the fourth stage of sampling; a systematic sample of 28 households in each EN was selected in all EAs to provide statistically reliable estimates of the key demographic, socioeconomic, social and health variables.

The survey was designed to obtain completed interviews of one respondent from a minimum of 1400 households. In addition, one woman of reproductive age from each of the households was also interviewed on a number of child reproduction and mortality issues. In order to take non-response in to account, 1,568 households were selected and interviewed. The surveyed kebeles (by UN-Habitat) are shown in the following map.

Figure 6-1: Surveyed Kebeles by UN-Habitat in 2004

(Source: UN-Habitat, 2004)



6.2. Comparison of methods and their results

6.2.1. Slum definition by UN- Habitat and slum definition in Addis Ababa by local experts

As presented in the previous chapter slum is defined in both methodologies as a prior step before slum identification and analysis is conducted. In this chapter, the two definitions are compared from local perspective where the intervention is going to be implemented.

The main purpose of defining slums at a global level is for global comparison of countries and cities, to estimate and monitor slums for the achievement of the Millennium Development Goal, which is to improve the lives of the slum dwellers. At the local level, also slum is defined to locate, quantify and to design appropriate intervention programmes to improve the lives of slum dwellers. Even though, it seems that the definitions are formulated from different perspective, both are meant for the same goal. Each component of both definitions as well as how they are combined is illustrated in table 6-1

The variables that are stated in the global definition describe slums of the world in one way or the other. However, describing slums on the limited number of variables and characters will affect the type of intervention to be designed because depending on the locality there might be additional characteristics that may influence the intervention. The same is true in the context of Addis Ababa; there are additional variables are identified which can influence the type of intervention. For instance, kebele 01 in Kolfe Keranyo sub-city have different socio-economic profile and also lacks services and tenure security like other slums in the city. Even if the intervention would take place based on the slum characteristics that are part of the global definition, the real need of intervention type is different. The people who live in that kebele are economically dependant on begging and socially marginalised which needs a great consideration and specific intervention. Even if water is provided and tenure is secured, that can not be an end for improving their life. They need special attention which the global definition overlooked by focusing only on the physical condition. The other example is kebele 11 in the same sub-city which in a way also socially marginalised and only with provision of physical services even tenure security, is not enough to improve their way of living which is highly attached with their cultural and economical situation and also level of awareness. They need specific type of intervention like for instance, support in capacity building and establishing micro-industry that improve the traditional cloth making and their livelihood. Evidently, there is a need for physical improvement but these are all required to support and enhance social and economic linkage (Abbott, 2004) to improve their life in a sustainable way.

Another area of concern and subject of comparison is individual variables of the working definition of slum with regard to number of slum dweller estimation. In the global definition, each variable is related with another under the logical operation ‘OR’. “If any one, any combination of, or all of the indicator conditions are ‘TRUE’ then a household is counted only ones as a slum dwelling. The true condition means that the household lacks the attribute identified by the indicator.” (UN-Habitat 2003a, p.20). This means, if a household proves one of the indicators it automatically is considered as slums. But this does not work in Addis Ababa specifically for water and tenure. As indicated in table 6-1 except for housing condition and sanitation, the rest of the variables can not individually characterise slums, thus to get slums as a composite index the operation “AND” is used.

Table 6-1: Comparison of Local and Global level Slum Definitions

	Slum definition at Global level		Slum definition at local level (in Addis Ababa)
	Access to improved water		Access to improved sanitation
"OR"	Access to improved sanitation	"OR'	Structural quality/durability of dwellings
"OR"	Sufficient living area	"And"	Adequate access rout
"OR"	Structural quality/durability of dwellings	"And"	Security of tenure
"OR"	Security of tenure	"And"	Access to improved water
		"And"	Adequate provision of social services
		"And"	Socio-economic profile

As discussed in the previous chapter, there are newly developed areas specifically in Kolfe Keranyo lacking access to water because the government could not provide service for the reason of lack of water source in the vicinity. However, the houses can not be considered as a slum and the dwellers as slum dwellers at least in a local context because those areas are newly developed areas and a home for middle and high income residents. Most of all, if the campaign is to improve the lives the urban poor; definitely, these groups will not be included in the slum population estimation as an urban poor.

The other variable is tenure insecurity. There are areas in Kolfe Keranyo that lack tenure security or developed informally but with all infrastructure provision as well as good quality building material and durable condition. According to Neighbourhood Development Committee, the owners of these houses are the rich business men in the city. Again here, also if we are to improve the lives of the urban poor, in this manner the real target group can never be reached. This does not mean there is no need for intervention in those areas but the whole purpose of Millennium Development Goal is to improve the lives of slum dwellers that obviously are the urban poor.

In addition to this, the variable "access route" is prioritised in focus groups as one of the top three variables commonly observed in the slums of Addis Ababa. However, it is not one of the variables that are stated in the global definition. This indicates that depending on the locality there may be various characteristics that are essential than the ones that are stated in the global definition. Moreover, the definition focuses only on a household level improvement while important variables like access route is not included because it is not a direct attribute of a household but is a main spatial elements of a settlement. Hence, "it is not possible in many developing cities to talk of upgrading at a household level without a parallel discussion about upgrading at the level of the settlement." (Abbott 2004, p.9)

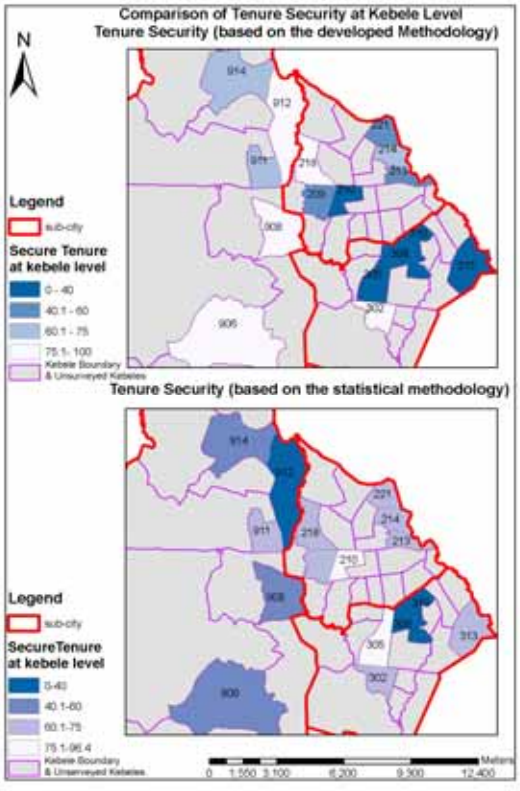
To sum up, in comparing the two definitions what becomes clearer is by employing the global definition in Addis Ababa, one can not identify particularly the urban poor. The definition rather includes almost all income groups residing in the city.

6.2.2. Comparison of Results Produced based on the two Methodologies

6.2.2.1. Tenure Security

In the previous chapter, through the developed methodology it was possible to know that in Addis Ababa context the determinant factor for tenure insecurity is not conforming to the standards of the structure plan especially for settlements that are within the boundary of strategic investment areas and green zone. In addition, settlements within the boundary of the present intervention (urban renewal scheme) and renting kebele house, particularly referring to the sub-tenants. However, through the statistical methodology by UN-Habitat, tenure insecurity is described or indicated by studying the perception of insecurity by residents and the documentation they have for the house they own or rent. Accordingly, as shown in the document, the result indicated higher proportion (33%) of perceived eviction among the owners than that of renters (5%), which is "a fact that contradicts the traditional belief that ownership provides more security" (UN-Habitat 2004, p.19). This confirms that ownership is not a real factor for security. However, it is interpreted as tenure insecurity comes mainly "due to the fact that renters have the freedom to move unless they default with their rent payment. The situation is different for the owners who are not ready to move, therefore if they feel they do not have the appropriate documentation they may feel more insecure." (UN-Habitat 2004, p.19). Although this description and the survey result by itself convey its own message, it does not necessarily reflect the reality.

Figure 6-2: Comparison of Tenure Insecurity



The fact that, the level of information dissemination in a country like Ethiopia is minimal; it is unlikely to know for every resident what type of proposal the structure plan has envisaged for the specific area. Thus, the real insecurity might not be known for many of them at a household level.

There are many instances that only being confident with the document and with out being aware of the plan proposals, residents invest or sell the house but ending up in a problem whenever the need comes for property transaction or redevelopment. As shown on the map (see Figure 6-2) some of the kebeles that are under renewal scheme or in a strategic investment area like kebele 313 and 210 did not perceive insecurity but the ones in Kolfe Keranyo that are very much secured in respect with the structure plan or intervention programme, like kebele 912 or 906 perceived insecurity.

The fact that, the broad authority that the government retained to expropriate any urban land or house "for public purpose"

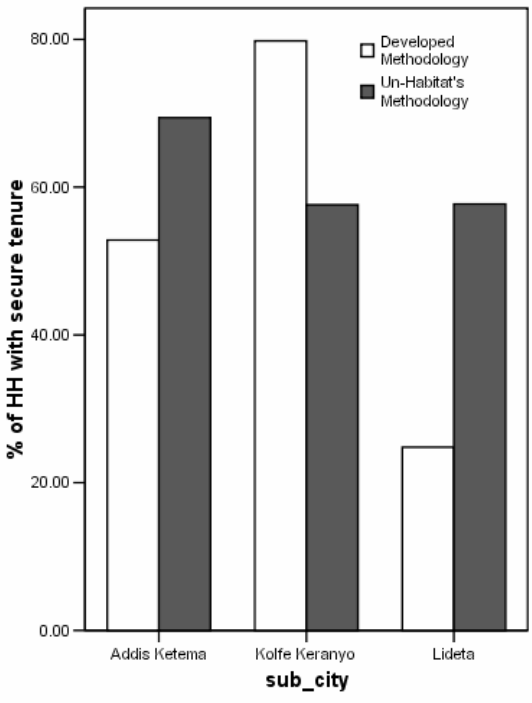
including other investments on the basis of proclamation 1947, is the primary reason for the perception of insecurity.

Thus, what ever type of documentation the residents have they might perceive insecurity because whenever the land is needed for redevelopment they will be in no position to refuse unless they have a capability to build up to the standard. On top of this, any resident who has the capacity and wants to invest on a specific area can apply for it and redevelop as long as the original owner can not develop according to the required standard.

Thus, the combination of all these factors resulted in perception of insecurity. The insecurity is much stronger in the private house owners because they feel they might loose what they have invested even if they are "compensated". According to the focus group of land Development Agency experts, though currently it is under revision the compensation cost does not consider the current market value. It was studied long a go and still it is implemented. Moreover, the land that is given for compensation may not always be where they want because the option obviously is limited. Hence, whether they are secured or not in real terms, many of private house owners feel insecurity. Moreover, at present in Addis Ababa context, it is not a matter of documentation to be secured, the only factor to be secure is being in compliance with the structure plan or have a capacity to build up to the standards. This is not to lessen the value of title deed, but with in the above mentioned boundaries its value is only for compensation.

Concerning the renters, according to the focus group of land development agency and HDPO (2004), if the kebele house is needed for another development the tenant will be given another kebele house in exchange or the renter will be included in the new housing scheme which is going to be implemented in the near by locations. Thus, except for the sub-tenants, the tenants got nothing to loose if things go smoothly as envisaged (related problems are discussed in the previous chapter).

Figure 6-3: Comparison of Tenure Insecurity at Sub-city Level



As shown on Figure 6-1 Addis Ketema and Lideta are located in the inner city and many of the kebeles with in the sub-cities are included in the renewal scheme. Moreover, as part of the inner city there are many kebele houses in them thus less insecurity is observed than Kolfe Keranyo where different housing development schemes are implemented that comply with the structure plan. In addition, many of informal settlements that are developed in the residential zone, according to the present regulation (see Table 3-2) are going to be granted a title deed.

However, the result of the statistical methodology shows, residents in Addis Ketema perceive high level of security than Kolfe Keranyo and Lideta because there are many kebele house renters that reported their perception of security. But this will divert the intervention to

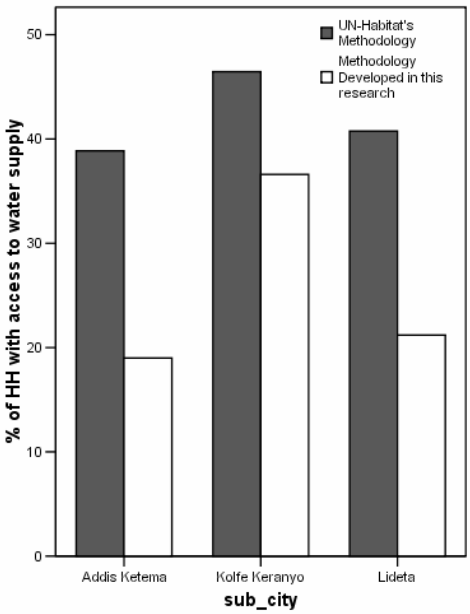
Kolfe Keranyo and overlook the urban poor who live in a crowded and dilapidated single room in Addis Ketema. Even Lideta and Kolfe Keranyo show similar perception level but in reality it is incomparable considering the envisaged structure plan.

Although the information gained through the statistical method shows the perception of the residents which by itself needs intervention, it may not depict tenure insecurity with practical consequences in the city. Thus, the intervention that is going to be implemented might still miss to improve the core problem. Therefore, it is important to identify the target to have a sustainable improvement in slum condition.

6.2.2.2. Adequate Access to Water supply

The major types of access to water supply are classified on the basis of 1994 census and local knowledge in this research (See Table 5-2) as access to piped water connected to dwelling or yard the rest (communal water tap and shared tap) are also not considered as an adequate access to water supply. The main purpose of excluding the other type of access to water supply is to illustrate the disparity among the city dwellers in a literal way and at same time, it is to point out the extent of the problem.

Figure 6-4: Comparison of Adequate Access to Water Supply at sub-city level



Concerning the UN-Habitat statistical methodology, as reviewed in chapter two, the components that are considered for improved, affordable and sufficient water supply are: “Direct Connection (piped water) to dwelling or plot, access to public stand pipe shared by a maximum of two households, access to a non piped water: bore dug well, protected spring, rain water collection. In addition to this, water should take less than one hour per day for the minimum sufficient quality of at least 20 litres per person per day. The water must be affordable, implying that it should take less than 10% of household income.” (UN-Habitat 2004, p.10).

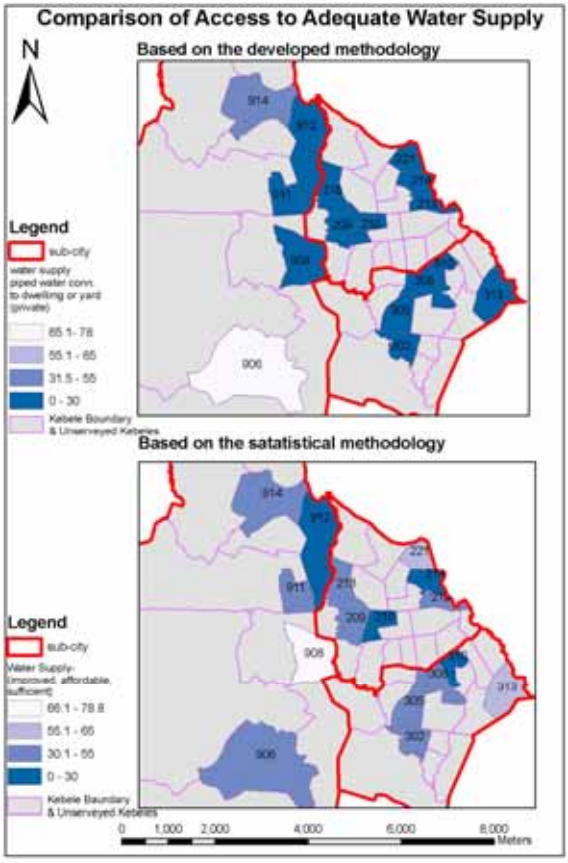
On its application, the statistical methodology primarily excluded unprotected water sources and considered all other water sources as an access to water supply and then quantity of water and time are taken into consideration to get improved, affordable and sufficient water supply.

Even though threshold is set on the shared water in the above standard, it was not included in the questionnaire when it is applied in Addis Ababa, thus initially the result includes all type of access to water. Then time, affordability and sufficiency are checked for the final result. In doing so, this methodology has provided detailed and relevant information. However, factors that can not be filtered only through affordability and sufficiency, like the effect of shared taps and social factors which are the prominent problems are not considered. In addition to this, the fact that generalization of results

based on a few sampled kebeles together with the above stated draw back has minimised the severity of lack of access to adequate water in Addis Ababa. Moreover, it is less easy to identify the main intervention areas in respect to this method.

Concerning the developed methodology, it also have a drawback in measuring the volume (consumption) of water as it varies tremendously from place to place and also there are many more factors to be considered to use the option of using secondary data. Apart from this, with minimum resource allocation the problem of access to water supply can be identified based on local knowledge (bill collectors and field technicians) and secondary data. One thing that has to be noted is the consideration of types of access to water supply is the major intervention areas in improving access to water supply.

Figure 6-5: Comparison of Access to Adequate Water S.



Comparison is made on the result of the two methods which shows in both cases, affordable, improved and sufficient water supply. As shown on Figure 6-5 inadequacy of access to water supply is highly pronounced on the results of the methodology developed in this research. However, in the ranking of sub-cities in both methodologies Kolfe Keranyo has a better access to adequate water supply, then Lideta and finally comes Addis Ketema. Both Addis ketema and Lideta got less rank because many of the residents are dependent on communal or shared water tap.

Concerning the kebele level, the comparison of the two methodologies result is conducted on kebeles that are surveyed by UN-Habitat. It indicates major differences in magnitude and both similarity and difference in ranking, for instance the ranking on kebele 313 shows more inadequacy of access to water supply than 908 in the identification of the developed methodology but based on the other methodology 313 has a far better condition. The main reason for this is all water sources are considered as equal as long as they are affordable and have sufficient access to water in the statistical methodology. The majority of residents who live in kebele 313 are the urban poor, which is evident from the identification of problem areas, and many of the residents are dependant on communal water tap or tap shared in the compound. Kebele 906 show the same result in both cases and this specific kebele happens to have a good private house connection. However, it can be noted that both kebele 906 and 313, based on Un-Habitat's approach have equivalent access to improved water, while residents in kebele 906 enjoy private water

access, residents in kebele 313 are considered as enjoying their public access. These types of information again affect the type of intervention and the poor will hide behind the figures. Moreover, the sample is taken only on a few kebeles, the rest do not have information. Hence, the result of kebele level can not be implemented at kebele level because of the spatial coverage.

6.2.2.3. Access to adequate Housing condition and Sanitation

Based on the developed methodology, housing condition was explained on the level of deterioration and sanitation was explained on the availability of toilet facility, drainage system both for sewer and storm water and on the level of uncollected solid waste. Through the statistical methodology, UN-habitat has collected data on housing condition through building material and status of maintenance of the dwellings. Concerning sanitation data has been collected through the availability of toilet facility and solid waste disposal systems. By using both methodologies, the results gained have more or less similar trend and in the inadequate housing condition, even similar magnitude is observed. In both cases, high proportion of dwellings in Addis Ketema has deteriorated and Lideta and Kolfe Keranyo proceeds respectively. Although not exactly the same, the definition also shows similarity for instance, housing condition is taken by the level of deterioration and it encompasses the type of material used and the level of maintenance. The same goes for sanitation the mentioned attributes are included, except liquid waste and storm water that are not included in the statistical method. While they play a significant role in contributing to environmental degradation because the usual practice in Addis Ababa even in the upgraded areas, liquid wastes are connected to the open ditch and that causes health problems. Moreover, because of lack of appropriate drainage system storm water problem is prevalent in the city.

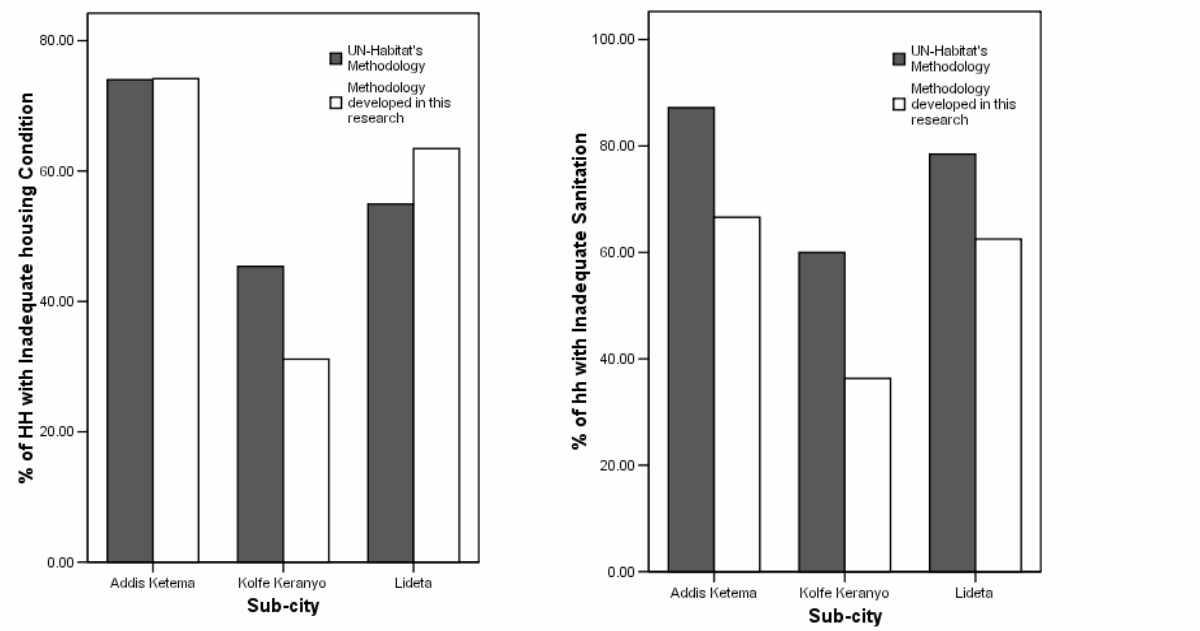
However, because of the existing condition of Addis Ababa in respect with its history of development and landholding system that have been discussed above, the physical manifestation like housing condition and poor sanitation are distributed throughout the city in various degrees. Thus, even though the actual value of result varies, the trend and magnitude is similar in the results of both methods except for Lideta sub-city in the inadequate housing condition variable the trend is reversed. This can be explained comparing it with Addis Ketema sub-city. In Lideta sub-city, there are a number of private houses with a better condition than that of kebele houses. The probability of sampling those houses is higher in Lideta sub-city than in Addis Ketema where there are relatively less private houses especially in the sampled kebeles. Thus, the result based on the UN-Habitat's methodology shows a better magnitude than the result of the methodology developed in this research.

Concerning sanitation, the variation in magnitude is higher in results of Un-Habitat's methodology in Kolfe Keranyo Sub-city. This is because the sampled kebeles in Kolfe Keranyo located close to inner city excluding the majority newly built-up settlements with a better access to adequate sanitation. Moreover, dwellings that are in informal settlements with relatively poor housing condition have a better access to sanitation because primarily there is no problem of density. Many of households have protected private pit latrine which is considered as an adequate housing condition in both cases. However, these parts of the sub-city (periphery) are not included in the sampling of the UN-Habitat's methodology.

This indicates that depending on the location, there are different characteristics that affect the identification. Hence, it is difficult to rely on the sample survey especially in this case the sample size is very minimal. Here the usefulness of GIT comes to the fore because it is powerful in identifying and locating slums spatially.

To intervene in this area there is a need to identify the real target group, the urban poor and differentiate the problem that is going to be tackled through the combination of other slum characteristics through GIT because location plays an important role in slum identification and quantification.

Figure 6-6: Comparison of Housing Condition and Sanitation



6.3. Limitations and Strength of the Methodologies and their Application

Through the research process, it has been noted that the two research methodologies have both strengths and limitations in their application in Addis Ababa, specifically in monitoring slum for the common goal. Within this, one is better for a particular type of problem than the other is and vice versa depending on the purpose. Denzine (1989) has mentioned in the work of Gaber (1993, p.138) as each method has "different line of action towards reality-and hence each will reveal different aspects of it depending on the angle at which it is held, will reveal different colours and configuration of objects to the viewer."

6.3.1. Strength of the Two Methodologies

The methodology developed in this research: One of the prominent strength of the developed methodology is its need of modest resource allocation and time, especially when it is applied in poor cities like Addis Ababa. Moreover, cities like Addis Ababa with heterogeneous cultural, social, economical and physical condition, needs in depth study to be able identify the weak points that incubate slums. This is possible only through such method that are capable of "…representation of reality and not constitute a reproduction of social world" Hammersley (1992) in Gaber (1993, p. 140).

Even though it does not get in a detailed standardised questionnaire, it gives detail, reliable and in-depth description and understanding of the condition of slums in the city. The approach is contextual, as stated in Bryman (1992) in (ibid), "the focus is on the need to interpret what is going on in terms of an understanding of the whole society and the meaning it has for the participants." The distinct and inherent characteristics of each slum areas, which is tremendous in Addis could be differentiated and identified through this method specifically not studying through individual household but studying a settlement as a whole. The other strong point is it is participatory, starting from the community to experts and officials, thus institutional imbedding would be easier. It also has a potential of extraction of information in a collaborative manner by involving all actors that are involved in intervention. In general, it is practically relevant, in its spatial coverage and reliability that enables the design of different intervention programmes in addition to the above stated strength.

The Statistical methodology by UN-Habitat: This methodology has strong points particularly on its implementation of detailed questionnaire that encompasses detail aspects of the living condition. Accordingly, the quantification process is also simplified above all more generalisation or aggregation was possible to all administrative levels to be able to make comparisons between kebeles and sub-cities. Moreover, data on some of the variables that worth being studied like demographic and some socio-economic characteristics could be collected in a better way through such methodology.

6.3.2. Limitations of the Two Methodologies

The Methodology developed in this research: The main limitation of this methodology is mainly on the quantification. Actual quantification was not possible for some of the variables specifically for the ones totally dependent on local knowledge. Moreover, the approach is area wise not specific on households, thus specific attributes of a household can not be captured like, demographic characteristics.

The Statistical methodology by UN-Habitat: The main limitation of this methodology is its detached way of data collection and analysis from the one that is going to be studied. As a result as it is stated in Gaber 1993, p.139 by Orum et al., 1991 " the flesh and bones of everyday life is removed from the substance of the research itself… In contrast a principle argument for case study research is that it provides a way of studying human events and actions in their natural surroundings". Hence, even though the information gained through this methodology is proposed to be implemented by the local authorities to reshape their policies, institutional embedding and acceptance might not be easy.

The limited spatial coverage at local level (few sampled kebeles) would minimize it s practical relevance for intervention. Moreover, the need for huge resource allocation would make it even less practical to implement in the resource scarce environment like Addis Ababa. The other limitation is the focus of the methodology only on the commonalities of slums not on their diversity; on their household attributes not the settlement ones. The way the definition works, is also another limitation specifically in its application in Addis Ababa context, the use of conditional operation "OR" which creates exaggeration of quantification and leads to losing focus on the main target, the urban poor.

To sum up the section, the above discussion is summarised in the following table.

Table 6-2: Comparisons of Methodologies

	Local	**Global**
Strength	o Local perspective o Modest expense, fast o Reliability of results o In-depth study and understanding o Captures both commonality and diversity of slums o Participatory o Practical relevance (easy for sectoral intervention) o Embedding is easier	o Easy quantification and aggregation o Implementation of detail questionnaire o Appropriate for demographic data capture
Limitations	o Less easy quantification o Difficulty in aggregation o limited with the extent of local experts acquaintance of areas o The approach is only area based, specific household attributes like demographic characters are missed	o Outsiders perspective o Generalized approach for identifying the target (the Urban Poor), focus only on commonalities of slums o Less acceptance at local level o Rigid slum dweller estimation mechanism o Poor spatial coverage o Requires considerable resource o Limited practical relevance (cost, intervention) o Focused on quantification and less focus intervention

7. Conclusion and Recommendation

This research was concerned on an investigation of appropriate methodology that enable to acquire information on slum conditions with a limited time and resource allocation for decision making on various types of slum interventions. In many developing cities especially in Sub-Saharan African Region where there is highest proliferation of slums, the level of information is limited and data collection and analysis mechanisms are not well developed mainly due to both financial and human constraint. For this reason, appropriate methodologies that are developed in the light of resource scarce urban environment are particularly important for informed decision making at local level.

In the following sections the main result of the research are highlighted. The first and the second section has focused on providing reflections and conclusions on the identified research problem and the lesson learnt in the study area. The third and fourth sections provide reflections on the two methodologies for the fulfilment of MDG. In the fourth section, conclusions are drawn from the reflections on the above sections which in turn sought to answer the research questions in chapter one. The last section consist recommendations for further research that is drawn from the conclusion.

7.1. Reflections on the Research Problems

The Millennium Development Goal has aimed at making a significant improvement on the lives of hundred million slum dwellers by 2020. However, to achieve the goal, there is a need for detailed, reliable, timely and policy relevant information which is very limited in cities of many developing countries including Addis Ababa which is the case study area in this research. In relation to this, the main research problem has been identified as the lack of appropriate localized methodology that can respond to the three interrelated elements; the lack of adequate and timely available data, limited understanding of the inherent characteristics of slums and limited resources for data collection and analysis. During data capture, it was evident from local documents and focus group discussions that, lack of comprehensive information on slums is constantly hampering the effort that is being made to implement various intervention programmes. Despite the lack of data, an ad hoc intervention programmes are being implemented, resulting with imbalanced responses and sometimes ambitious plans that may create inefficient resource expenditure in addressing the complex nature of the slum problem.

Moreover, as demonstrated on a few selected kebeles in chapter five the diversity of the socio-economic conditions in the city, needs in depth understanding of inherent characteristics of each slum area in the context of Addis Ababa. For these reasons, it is essential to have comprehensive information to support a sustainable and significant improvement on the lives of slum dwellers.

In this regard, it was recognised that developing a methodology that enable to gain comprehensive slum information should be the prior step to be taken together with the exploration of other methods that have been in practice for slum data capture and analysis. Thus, considering the serious resource constraint in the city, in this research methodology is developed that allows capturing relevant information in a rapid, cheap and efficient way. By employing the methodology, the term slum has been defined in the local context, in relation to UN-Habitat slum definition and data has been collected, prepared and analysed.

7.2. Reflection on Addis Ababa Case and Related Lessons

The case study city, Addis Ababa was used for the development of the methodology through studying and illustrating the slum conditions of the selected sub-cities. Although slum information provision in itself is not the focus of the research, to test the methodology data on slums was captured, analysed and information is gained. In the course of the research, it was learnt that in Addis Ababa, there is a potential for data capture through such methodology. The present decentralised hierarchical administrative structure gave a good opportunity of capturing different insights and knowledge from local experts and the community. In addition, the willingness and collaboration of different actors in municipal as wall as community organisations is also another opportunity for information extraction. Even though outdated and incomplete, and also uncoordinated, the existing data sources could be a good potential when coupled with the rich local knowledge and can be a starting point to form a comprehensive information base. Although at its infancy the use of Geo Information System, in various municipal organisation has shown the potential and opportunity in data capturing and processing tasks. Under these conditions, the developed methodology can be strengthened and improved to contribute for the formation of comprehensive information that enable to design appropriate slum intervention programmes.

7.3. Reflection on Methodology Developed In this Research

Acquiring comprehensive slum information for the campaign of slum improvement in cities like Addis Ababa with extreme resource constraint requires unlimited effort in search of approaches and methodologies to be able to achieve an efficient and sustainable slum improvement. In view of this, the research has focused in developing methodology that is based on the combination of GIT and local knowledge comprising an integration of different techniques and methods. Accordingly, Rapid Urban Appraisal methods, RS and GIS technology are employed in both data capture and analysis. The methods and techniques used in data capture include Focus Group Discussions, Field Observation, and Visual Image Interpretation together with secondary data resulting in both non-spatial and spatial information in the form of thematic layers in a GIS environment.

Thus, **Focus Group Discussions** in capturing data on slums has demonstrated a potential in extracting rich and in-depth knowledge and insights in a very rapid and economical way. In its application at various administrative levels in Addis Ababa, it has revealed the potential in capturing enriched information in specific areas of concern of each hierarchy in relation with the function and responsibility that the group is engaged in. It was also possible to note that the level of knowledge in an overall condition of the city or city wide strategy differs from one administrative hierarchy to another significantly. Moreover, the inclusion of such method gives an opportunity for participation and collaboration of different actors including the community guaranteeing the sustainability of intervention programmes. The other data capture method employed is **Field Observation** that acquires direct information and a richer understanding on slums and their characteristics in their own natural setting. It has been proven that it is an effective and economical method specifically for data capture at kebele level where the size of the area is manageable. It is also a more reliable method that enables to cross validate the information acquired through focus group delineation of problem areas as well as image interpretation. Specifically, it was very much helpful in proving the relative classification of areas which was performed based on focus group with high, moderate and low ratio of households that are in a poor condition.

Image interpretation is also an effective tool employed especially in capturing data that could not be easily captured with both field observation and focus group. As many slums in Addis Ababa have

small size dwelling structures that have irregular pattern of development, it was possible to detect them by interpreting the image. The visual image interpretation has highly supported, filling the gap of missed information in the data capture through focus group and field observation. Information extraction through available and reliable **Secondary Data** is also an important and effective source of information which does not require much resource.

Each method and technique has contributed to form a comprehensive information base with in a short time and limited resource. The integration of methods and techniques enable to acquire rich information, which could not be possible to achieve in a single method, thus a limitations in one method can be amended by the strength of the other. In general, the research has demonstrated that with out mobilisation of huge resource, methodologies and different approaches could be developed depending on the local context.

However, as it is discussed in Gaber (1993 p.143) "…all research methods suffer from one kind of inadequacy or another', this method also have drawbacks mainly in relation to actual quantification. As a result, it was found to be difficult to generalise and aggregate the results. Moreover, since the approach of the method is area based, it has limitations in capturing information that are at household level.

7.4. Reflection on Methodology Developed and Implemented by UN-Habitat in Addis Ababa

UN-Habitat has examined different aspects of living condition in Addis Ababa based on its recent sample household survey. This international effort which is part of urban inequity survey programme has significantly improved its level of information capture and aggregation to lower level (sub-city) than national or city level as it was the case in previous international level information on slums. Accordingly, in its coverage of detailed and a wide aspect of living condition, it can contribute in strengthening baseline information in the city. Based on the gained information, it is also possible to make a comparison and prioritisation between sub-cities. However, the fact that, the information is aggregated based on a few sample households which is less than one percent of the total household in the city, will result in a highly generalised aggregation and information loss especially considering the divers nature of slums and Addis Ababa's heterogeneous physical and socio-economic condition. Hence, the result may not reveal a correct depiction of slums at a local level and can undermine the ability to design appropriate interventions as well as assess the implemented slum improvement programmes. Moreover, the methodology requires huge resource allocation which makes it difficult to be implemented under the present local condition.

7.5. Reflections on the comparison of the two methodologies

- The methodology developed in this research has local perspective as its core component which is the major advantage it has against the statistical methodology employed by UN-Habitat in Addis Ababa. The methodology has demonstrated its capacity in identifying and incorporating locally relevant and important issues through the participatory and collaborative approach. For instance, identifying the effect of implementation of the structure plan and current urban renewal scheme as a major influence on tenure security was made possible through the discussion with local experts. This kind of information which is of little knowledge to the

public and particularly at a household level, could be difficult to uncover through the standardised questionnaire with the possibility of extracting uninformed perceptions. The other advantage is the potential for easier institutional embedding which in the later methodology may not be easy because of limited local body involvement from the outset.

- In its application, the developed methodology can have detail and in-depth as the same time wide spatial coverage information which maximizes its practical relevance for different intervention programmes in terms of providing comprehensive information on both commonalities and divers nature of slums insuring the inclusion of all social groups. The statistical methodology can have very detail information on many aspects of living condition. However, because of limited spatial coverage, and aggregation at a higher administrative level, there will be loss of information that limit the correct depiction of slums at local level. In this regard the it has less practical relevance to be able to design interventions at a local level particularly in an area with heterogeneous characteristics such as Addis Ababa.
- The methodology developed in this research can be implemented with limited resource allocation however, the statistical methodology can only be implemented with huge resource allocation which makes it less applicable to be implemented by local bodies in cities like Addis Ababa with high resource constraints.
- The developed methodology has limitations on actual quantification and aggregation as a result generalisation is mostly becomes difficult. However, the UN-Habitat methodology has a good potential of quantification and aggregation which makes generalisation much easier.
- Household attributed data are mostly difficult to be captured through the methodology developed in this research such as demographic data; where as the other method has this as its advantage. However, it has limitations in capturing data on slum characteristics that are attributed to settlement like “access route”.

7.6. Conclusion

The key issue discussed in this research is the usage of appropriate methodologies that enable to capture comprehensive information on slums and support to minimize the implications of the identified research problems on the over all achievement of the Millennium Development Goal. Hence, exploring and investigating on various approaches and methodologies in the light of the local context comes to the fore in order to support effective interventions. In this research, the whole point of developing a methodology as well as making a comparison with methodology developed by UN-Habitat revolves to the effectiveness and applicability of methodologies at a local level where the actual intervention is implemented.

Since both methods have their own limitations, the optimal solution may be taking the best and make a hybrid of the two. However, considering the physical, social, cultural and economical condition of the developing cities like Addis Ababa and the achievement of Millennium Development Goal with in the proposed 15 years, measuring the effectiveness and applicability of the methods would lead to practical solutions. Hence, based on the comparison of the two methodologies’ results and approach, the methodology developed in this research is found to be applicable to local level data collection and analysis on slums based on the stated potentials and strong pointes of the methodology. Strengthening its limitations through investigation and testing would be the ultimate option for localizing the Millennium Development Goal. Nevertheless, integrating the two level efforts (both the local and international level) would be an important issue to consider. In conclusion, to be able to implement intervention and monitor the slum conditions, strengthening the local level data collection

and analysis methods in the light of resource poor environments would remain to be an essential element towards achieving the Millennium Development Goal.

7.7. Recommendation for further research

It has been demonstrated that the developed methodology has a potential to capture detail and comprehensive information with limited resource and time. It can be further improved and information can be captured based on detail spatial identification using smaller spatial unit which can tremendously strengthen the methodology in terms of quantification of slum conditions. In this regard, GIT together with the collaboration of actors can play a significant role. Thus, in this respect a better investigation could be made which was only a glimpse of demonstration in this research. Furthermore, in this research thematic layers of the main slum indicators are developed. Based on these, sectoral intervention programmes can be designed. However, considering resource poor cities, for efficient resource allocation, it is also essential to make targeted intervention based on small spatial units (blocks) through prioritisation of slum areas. This can be done on the basis of individual layers or by combining the layers in to composite index (slum) based on agreed weighting and standardisation through collaboration of different stakeholders by using tools like SMCE (Spatial Multi Criteria Evaluation). This helps decision making on various slum intervention programs in an efficient and transparent way and thus, it is useful to make an in-depth study and further research (see Appendix E).

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Appendices

Appendix-A: Discussion guide for focus group at city level

City level

Organization – Policy Study and planning commission

I. Purpose: To define slum in a local context and to develop indicators of slum and slum living condition

Slum Definition and Indicators:

1. How is slum defined in the local context of Addis Ababa?
   a. Are there official definitions related to slums that are used for policy purposes or other official use?
   b. Is there local language term used (for example like "cherekabet" for informal settlements)?
   c. If no, how would you define slum in a local context?
2. What characteristics does slum area have?
3. Which are the most common characteristics (list and prioritize) accordingly? Why?
4. Are you aware of main characteristics (indicators) of slum used by UN-Habitat?

Checklist: Lack of secure tenure, Lack of improved water, Lack of improved sanitation, overcrowding, lack of structural quality or durability of buildings

A Brief description of each characteristic in terms of indicators and definition will be given.

5. How useful are these (UN-Habitats) indicators in the context of Addis Ababa? Why?

As Summary for the section: List and prioritize indicators of slum that are appropriate for Addis Ababa Condition.

Checklist:

Housing Condition: Main Material – Wall, roof, foundation, floor

Status of the house (state of reparability) – beyond repair (dilapidated), needs major repair, needs no or minor repair

Improved Sanitation: Checklist: lack of proper drainage system, type of toilet facility (private, communal toilet or none), connection of sanitary facility to sewer line, septic tank, river *etc.*

Based on the identification and the indicators try to measure (quantify in percentage) for each settlement.

Improved water supply: Water source – Piped in to the dwelling, Communal tap, well (protected/ unprotected), river (during summer), tanker truck, and vender, Water quality and Water price

Insecure tenure: Housing ownership type, Location (being in CBD, along main road, or in a farm land), proposed land use

II. Purpose: To identify slum settlements on the Quick bird image based on prioritized indicators

Slum Area Identification:

1. Do you think the top three or two indicators could describe slums of Addis Ababa according to the priority order?
2. Can you identify those areas according to the prioritized indicators (top three or two)?

Based on the indicators try to measure (quantify in percentage) for each identified settlement.

III. Purpose: To identify the existing problem in relation to lack of information and supporting policy or strategy or intervention programmes

Policies, Strategies and Intervention Programmes:

1. Is there a measure being taken to solve the problem or improve this situation in respect with planning and implementation? What type?

Checklist: Policy- in relation to tenure or housing ownership, strategy, or intervention like upgrading, renewal-relocation or expropriation

2. Is there supporting policy, strategy or programme for each action or intervention? What are they?
3. How is the problem being addressed? Is it based on the individuals' request or community request or area wise identification?
4. If it is area wise identification, who does the identification of areas for action? At which administrative level?

Table to be filled in for question 1 - 3

Component (indicator)	Policy/ Strategy-under which the action is being performed	Measure	Motivation for action
1			
2			

5. What was the main source of information for identification of problem areas?

Checklist: local knowledge, survey, secondary data - format, date, level of aggregation

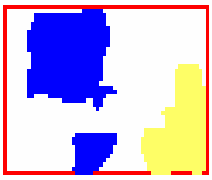
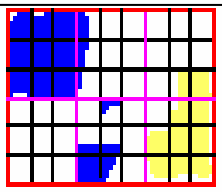
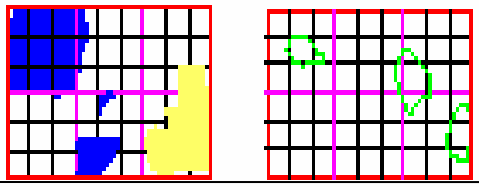
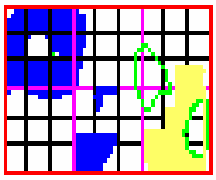
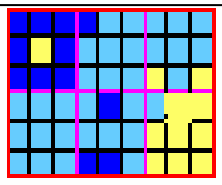
6. How do you prioritize the identified areas?
7. What was the role of the commission at city and sub-city level in this respect? What about the kebele administration? In what way?
8. What are the major problems or the major constraints faced during the process of improving the situation (the poor living condition)?

   Checklist: Lack of Information (Identification, documentations), financial and human capacity, tenure, lack of policy or strategy, lack of space *etc*.
9. What is your information requirement in relation to improving the situation?
10. What type of intervention do you recommend for each settlement with different component or indicator? Table to be filled in for question 11-12

Component (indicator)	Intervention type (Recommended)	Information requirement
1		

11. As you are responsible for the city urban planning and management, how do you consider the implication of slums in the planning and implementations of the envisaged structure plan

Appendix-B: Schematic representation of primary data preparation

Schematic representation of data preparation process	Main task and brief description of the process
	Step-1: Delineation based on focus group Areas with high, moderate and low % of poor HH
	Step-2: Overlay with Kebele and Block boundary Kebele boundary and Block boundary are introduced in the process
	Step-3 Overlay with existing residential land use Existing land use is used for exclusion of predominantly non-residential areas (See Appendix C)
	Step-4: Compute No. HH of per block Exclude predominantly non-residential built-up areas and compute no of HH in the delineated areas per each blocks
	Step-5: Mapping / visualization Mapping based on the proportion of poor hh in the delineated area per total number of hh in each block

Legend

Block Boundary

Kebele Boundary

Sub-city Boundary

Non-Residential Land use

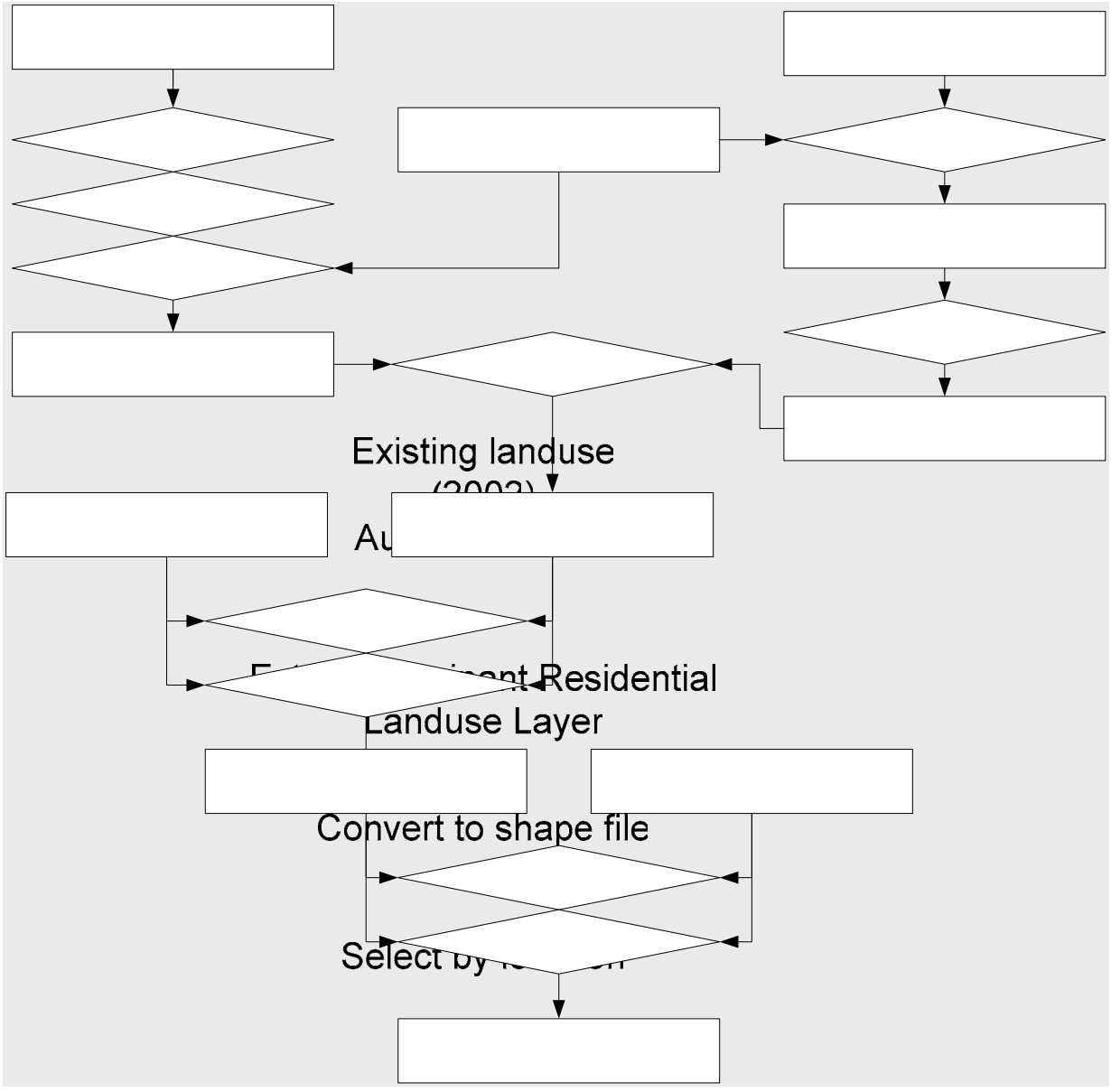
High % poor HH

Moderate % poor HH

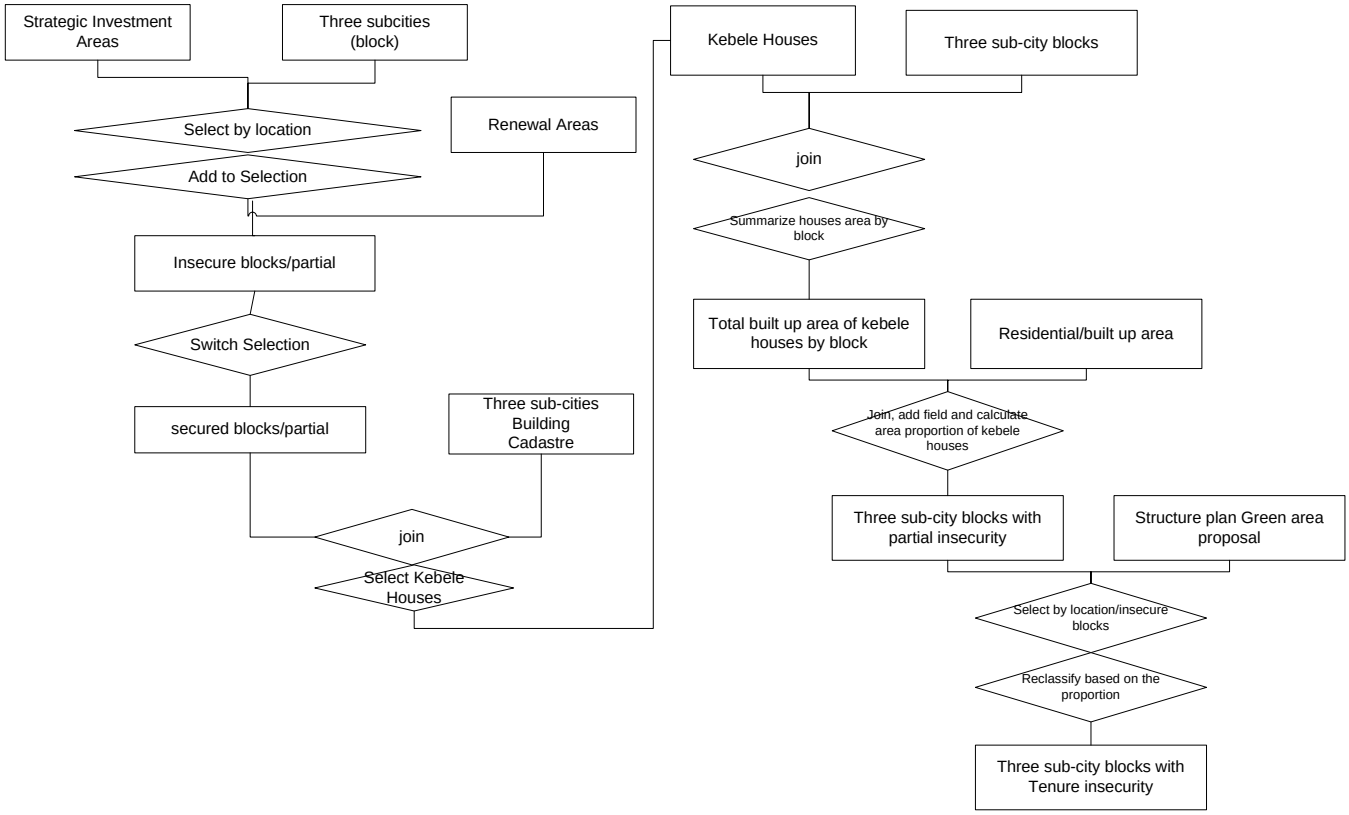
Low % poor HH

5.1 persons per hh (household)
Source: 1994 census

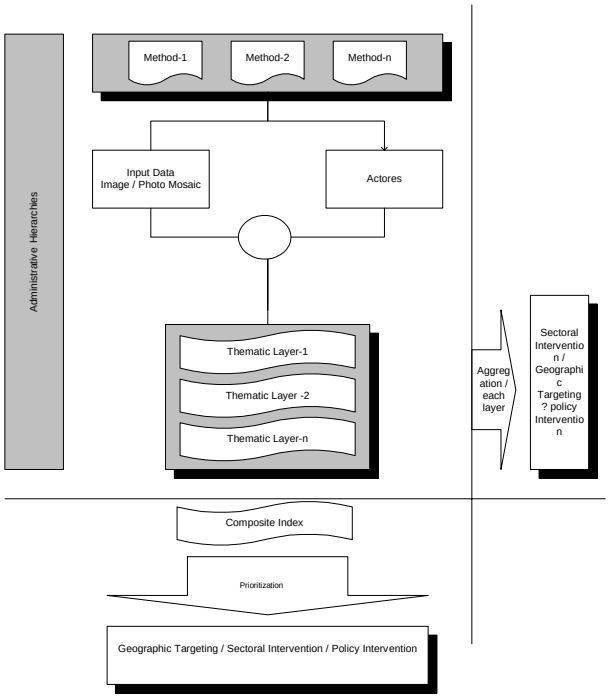
Appendix-C: Population Estimation and Residential Land use extraction process Model



Appendix-D: Tenure Insecurity Process Model



Appendix E: Concept for slum Information Extraction

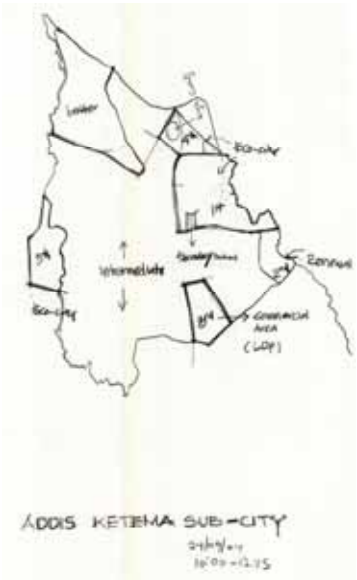


Appendix-F: Slum Characteristics Prioritization

	Slum Characteristics (indicators)	City Level						Sub-city level			Kebele level		
		G-1a	G-1b	G-1c	G-1d	G-2a	G-2b	G-3	G-4	G-5	G-6	G-7	G-8
Physical - Spatial	Poor Sanitation	2	5	4	2	3	3	3	4	3	4	3	3
	Inadequate access to water supply	3		3						5	2		1
	Lack of open space (High Density),				3			1	1				
	Overcrowdings	4	3					3					4
	Inaccessible site condition		4			1	5	5	2	4	3	2	
	Poor Housing condition	5	2	5	2	2	4	4	5	2	1	1	2
	Unplanned (irregular)				5								
Social	S.service provision				1		2						
	-Tenure insecurity	1	1	1		4		2	3				
	Socio-economic			4			1	1			5	5	5
Environmen	Hazardous location					5						4	

Appendix-G: Slum identification based on Field Observation and focus group at City, Sub-city and Kebele Level

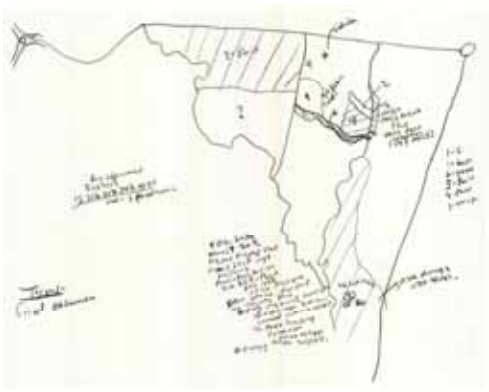
Sub-city level Focus Group



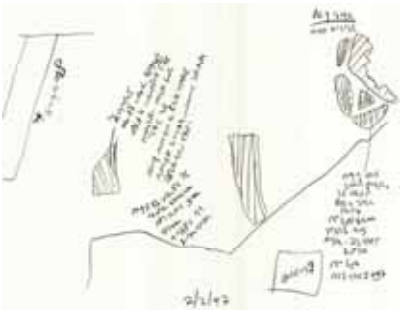
City Level Focus Group

Sub-city level Focus Group

Field Observation



Field Observation with AAWSA Technicians



Sub-city Focus group

Appendix-H: Aerial Photos (2002)

Appendix-I: QuickBird (2002) image used for slum identification on focus group discussions