AN ASSESSMENT OF LAND USE CONFLICT IN PERI-URBAN AREAS OF NAIROBI: A CASE OF DRUMVALE ESTATE – RUAI

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DECLARATION

This is my original work and has not been presented for award of a degree in any other university

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This Thesis has been submitted with my approval as the University Supervisor

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DEDICATION

With special appreciation to
My
Husband,
Sons and daughters,
Granddaughter,
All the Movers

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ABSTRACT

Conflicts over land use have led to both complex laws and serious disputes in many societies. Tenure insecurity is a factor in the generation of conflict. In Kenya land use conflicts has resulted in loss of lives and properties as seen in the cases of Sinai fire tragedy (2011) and Lang'ata Road demolitions (2013). They sometimes cause rampant pollution to the environment. With the increase in urban land use conflicts, there is need for evidence, documentation and mitigation measures since there is relative lack of research focused explicitly in this area.

This study investigated the nature and causes of land use conflicts, their effects on development, general living conditions and possible planning intervention measures to address the underlying land use issues in the entire Drumvale estate.

Survey design methodology was employed targeting entire Drumvale estate's households/landowners population. Registry Index Maps (RIMs) were digitized, attributed, mosaic created and 5 clusters formulated from which 3 clusters were randomly selected. Questionnaires were administered to 36 household/landowners from each cluster selected by simple random sampling. Interview schedules were administered to Drumvale cooperative, local chief and police, county and private surveyor, Nairobi county planning department and NEMA. Spatial data was collected from field survey, and satellite imagery. Three land use conflict case studies were purposively analyzed. Data was analyzed by excel, SPSS and GIS software.

The findings show land ownership, site development, drainage, soil dumping and boundary conflicts as the major land use conflicts. Their major causes were found to be informal land subdivisions and transactions, lack of land tenure documents, inadequate planning and non-implementation of development controls. Their effects were land grabbing, tenure insecurity, flooding, loss of life and properties, and environmental degradation.

The study recommends immediate adequate planning, sensitization and implementation measures, creation of an efficient and effective land management system, professional ethics and policing, and paradigm shift on issues related to land transactions.

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List of Acronyms

CBD	Central Business District
CCN	City Council of Nairobi
FAO	Food and Agriculture Organization
GC	Ground Coverage
GIS	Geographical Information System
GPS	Global Positioning System
MCLG	Maximum Contaminant Level Goals
MLHUD	Ministry OF Lands, Housing and urban Development
NEMA	National Environment Management Authority
PDP	Part Development Plan
PR	Plot Ratio
RIM	Registry Index Map
SOK	Survey Of Kenya
UN	United Nations
USAID	United State Agency for International Development
U.S.	United States
WHO	World Health Organization

CHAPTER ONE: INTRODUCTION

1.0. Background to the research problem

Land is indeed a very vital factor of production and a backbone to life. Every activity literally takes place on, above or below land. It is also an inevasible fact that the supply of land is highly inelastic. Its use has therefore had to be as economical as possible to avoid unnecessary wastage. Furthermore, people have resorted to vertical expansion of physical developments to maximize on production and use of space. Owing to the fact that land is an essential but limited commodity, a lot of land and land use conflicts are significantly frequent. The major land conflict is tenure insecurity and this is crosscutting in different regions of the world.

Tenure insecurity has been seen as a particular factor in the generation of land use conflict, as seen in land conflict and violence in urban Peru (USAID, 2005). It has also been identified as one of several increasingly serious threats to urban security and safety, alongside disasters and violence (UN-Habitat, 2007: 4). Land insecurity is a major contributing factor to extreme poverty and social instability, including conflicts and civil unrest, rural migration, land abandonment and poor economic growth (FAO, 2002). The Rio earth summit, Agenda 21, appealed to Governments across the world to put necessary mechanisms in place that would enable community participation in decision making on development matters especially on social economic needs that are harmonious to the natural environment (Njuguna, 2007).

In Kenya, the land owning ethic has taken a central stage whereby everyone dreams of owning land (Pretoria University Law Press, 2011). Central to land conflicts are issues of ownership, access and use. Land has been the crux of economic, cultural and socio-economic change in Kenya intensifying conflicts over access to and control of land (Wakhungu et al, 2008). Wakhungu stated that violence over land conflicts occurred sporadically in different parts of the country, and doubts over the worthiness of land titles almost caused major economic instability a few years ago. The nature and

characteristics of the issues surrounding land are intricately intertwined with the country's history and have been shaped by political and economic developments from the colonial period to the present. Urbanites look to the land to provide for a second income or security for their retirement, or buy parcels for speculative purposes.

Lomdar (2012) stated that linkages between urban land conflict, are complicated by the relative lack of research focused explicitly in this area but has long been *implicitly* assumed in debates on urbanization. He cited (Galtung 1965: 348-349), who defined conflict as the existence of two or more incompatible goal states in a system, (Miall et al in Carpenter 2010: 408) 'the pursuit of incompatible goals by different groups and (Watson 2011:4) 'conflict is often seen as inherent to urban life and urban growth'.

Land use conflict, on the other hand manifests in terms of incompatibility of land uses within close proximity, uncoordinated development densities vis a vis available services and environmental degradation. Incompatibility of land uses arise when one activity interferes with the smooth operation of another within its vicinity. For instance, locating a market near a school may interfere with learning especially because of the noisy conditions inherent of markets. Disharmony between development densities and service provision in an area is also a common land use conflict. When densities of developments are increased without a proportionate improvement in provision of services like physical and social infrastructure, inadequacies crop in and as such, members of the public begin to suffer.

Environmental degradation on the other hand is also a significant aspect of land use conflict. Pollution of whatever form automatically upsets the living standards in an area. There are health hazards and general discomforts that set in when environmental degradation happens. Deteriorated living conditions become the common phenomena in places that have been invaded by environmental degradation. Productivity is also lowered in such scenarios thus life just gets unbearable.

The only way to avoid land use conflicts is through effective plan preparation and implementation/development control. This however has not been done satisfactorily in

Kenya and Nairobi in particular. As a result, land use conflicts have become part of the people and this has caused a lot of suffering among the majority of Kenyans.

Nairobi County can be said to fall in the general views of Lombard (2012) who stated that conflict is context-specific, multi-causal and multi-dimensional, and can result from a combination of political and institutional, socio-economic, resource and environmental factors. It is characterized by three elements: behavior (coercion or cooperation), attitudes (perceptions, beliefs, emotions and underlying structure (competing material interests, relational structure). To Sifuna (2009), unbridled land use may lead to undesirable environmental consequences such as land degradation, soil erosion, sedimentation of water bodies, and pollution of environmental media and depletion of biological resources.

1.1. Problem statement

Land use should be in such a manner as to provide the greatest sustainable benefits based on the socio-economic conditions and expected developments of the population in and around a natural land unit (FAO, 1991). It is the designing of optimal physical infrastructure of an administrative land unit, such as transport facilities and facilities for towns and other human settlements.

Constitution of Kenya 2010, Article 66 (1) states that the State may regulate the use of any land, or any interest in or right over any land, in the interest of defence, public safety, public order, public morality, public health, or land use planning.

Housing development in Drumvale estate started in its earnest about seven years ago. This was precipitated by immigration of people seeking alternative housing. This high demand for plots and housing has resulted to Land owners flouting planning and land development regulation such as in construction, subdivision of land into small parcels (e.g. size of 0.015 Ha or 40 ft x 40 ft) and in land transactions.

The estate was planned as a low density zone with land parcel sizes of approximately an acre. The zone was planned for about sixteen thousand parcels of land (as per the

Registry Index Maps (RIM) for the area from Survey of Kenya (SOK)), but so far, it has been subdivided further into small parcels (most of the one acre parcels are subdivided into 40 ft x 60 ft parcels) to provide for high density residential area of mixed single and multiple residential units as well as business enterprises. Due to the resultant small sizes of land parcels, there is incompatible land use such as construction of pit latrines near shallow wells in adjacent parcels of land which may result to health and environmental risks.

The black cotton/clay soil covering the region has worsened the situation further. Soil excavated during construction is mostly dumped either on road reserves, blocking waterways and right of way, or on abutting parcels creating conflicts. Heaps of excavated soils litter road reserves within the whole sub-location, further affecting the access routes especially during rainy seasons.

The issue of land grabbing has not helped either, some of land that was set aside for public use (such as health, education and public utility), is in the hands of private ownership thus further suppressing public service delivery. Individual rights override public interest. There is neither piped water nor sewerage services and to bridge the gap, land owners dig shallow wells and pit latrine for water and sanitary services respectively.

There is little or no implementation of rules and regulations governing physical development and land transactions. Processes of land subdivision, land transactions, boundary re-establishments and development procedures are not adhered to. These have resulted to land use conflicts such as boundary disputes, encroachment, land tenure conflicts and ecological conflicts.

Unfortunately, there has never been any study carried out to identify the underlying factors causing these scenarios in an urban setup and an area which has initially been planned. Thus it becomes elusive to offer any amicable solution because understanding the nature of the problems in Drumvale is quite difficult. In other words, there is a knowledge gap regarding the matters of land use conflicts in the study area.

1.2. Purpose of the study

The purpose of this study is to examine relationships between land uses (in terms of form and function) in the study area, evaluate the land use conflicts that crop in due to inadequate planning and development control and as such propose planning interventions that can help improve the situation.

In particular, the study is intended to investigate the factors that have contributed to land use conflicts in Drumvale and examine the effects of the same on development of the area and living conditions generally. Some of the aspects that are examined include plans for the area; the legal and policy frameworks for development and development control; the institutional structures and capacities for the management and implementation of development controls of the area; the interaction between the study area and the surrounding neighborhoods; and the effects of land use conflicts.

It is expected that by the end of this study, the knowledge gap on the land use issues in Drumvale will have been filled and the factors that influence land use conflicts will be unearthed in the study. Finally, it is envisaged that, in cases of identifiable flaws, adequate policy and planning solutions will be reached for the purposes of improvement of the situation.

1.3. Scope of the study

The geographical scope covers the entire Drumvale estate (Kamulu sub-location) which has an approximate area of 10 square km and an estimated 1600 one acre parcels of registered land. The area is bounded by Kangundo road to the North, Athi River to the East, Machakos-Nairobi county boundary to the south and borders Embakasi ranch to the west. It is approximately thirty five kilometers from Nairobi CBD, within Nairobi County, and at the far east of Nairobi bordering Machakos County – Figure 1.

The data scope will be guided by research objectives and the researcher will be assessing:-

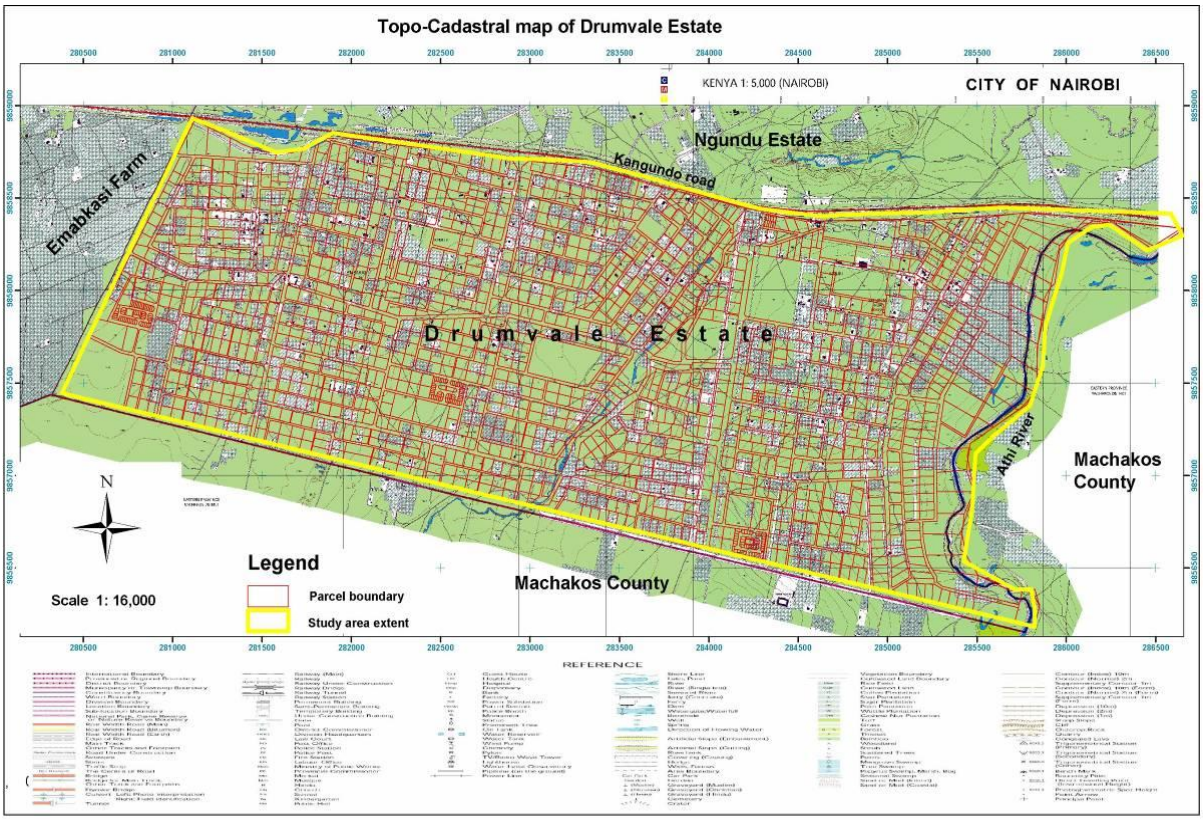
- Land ownership conflicts

- Site development conflicts
- Parcel boundary disputes
- Effects of these conflicts.

The research has targeted both public and private land.

The researcher also interrogates how planning and development regulations are observed and focuses more on land subdivision, development control and security of tenure.

Figure 1: Map layout of the study area



Source: Compiled from SOK data

1.4. Research questions

i. What is the nature of land use conflicts in Drumvale?

ii. What are the factors that contribute to these land use conflicts in the study area?

iii. What are the effects of the conflicts on development of the area and the general living conditions?

iv. What are the policy and planning interventions that can be sought to address the situation in Drumvale?

1.5. Research objectives

1.5.1. Research Goal

To assess land use conflict in peri-urban areas of Nairobi.

1.5.2. Research specific Objective

The specific objectives from the research goal are:

i. To examine the nature of land use conflicts occurring in Drumvale.

ii. To evaluate the underlying causes of land use conflicts in the study area.

iii. To establish the effects of the land use conflicts on development and the general living conditions in the area.

iv. To propose policy and planning interventions that can be sought to address the conflicts.

1.6. Justification and significance of the study

Land use disputes are taking up our time and often producing unsatisfying results (Nolon, 2013). Planning as an approach to resolving land use conflict may provide a better way to manage the most challenging situations. There is need to understand why some decisions about land use go smoothly while others generate multiple conflicts such as lawsuits, ruined relationships and waste community resources. While individual owners have sweeping user rights over the land they own, the unique characteristics of land as well as its crucial place in the life of humankind make a compelling case for

public intervention in the regime of private land. This necessitates the regulation of the use of such land in the public interest. It is undesirable to permit absolute rights of use of land whether under public, communal or private ownership (Sifuna, 2009) without taking measures to ensure that it is used in a manner that is not injurious to public interest. Concerns such as transportation, recreation, water resources, security, sanitation, health and similar common needs have to be provided.

In Kenya, land use conflicts sometimes has resulted in loss of lives and property as was seen in the cases of Sinai fire tragedy (2011) and Lang'ata Road demolitions (2013). The enormity of these conflicts was captured by Machua Koinange (2013) at the height of Lang'ata demolitions when he said *'the strip between Kibera slums and Lang'ata Road, off the Southern Bypass has been reduced to something like a war zone; Demolished buildings, rubble, plumes of dust, heavily armed police officers with tear gas holding back a crowd of onlookers. A section of a multi-story building collapsed under a curtain of dust.'* He captured the pain of a woman after losing her property who stood with her daughter pensively watching an excavator take painful digs at her former three story rental complex and said, '*I don't want to talk please. This is just too painful to talk about*'. In other times they cause rampant pollution of our environment as is the case of urban rivers (Nairobi and Ngong rivers in Nairobi).

Five specific grounds that would justify intervention in the use of land despite its system of ownership are the scarce nature of land, ethical considerations, environmental considerations, land planning needs, and public responsibility for promotion of the public good (Sifuna, 2009). In Kenya the endless wants of people to own land resulting from its limited availability and its inelastic nature have increased land use conflicts and disregard of law and order in the usage of land particularly in Drumvale.

Drumvale estate is one of the upcoming residential areas in Nairobi's suburb. The estate had been planned for as a low/middle density residential area with laid down development control regulations. The estate previously under Drumvale land buying company was planned, subdivided and individual rights issued to the owners except rights for public land which was left under the company. Other estates within its

neighborhood such as Ruai and Utawala are still being regulated by the land buying companies and their subdivisions have not gone through the whole planning process. Drumvale being a developing estate may have acute conflict over land use particularly in the context of rapid and often uncontrolled urban growth where growing populations is exerting additional pressure on the environment in already marginalized area, therefore becoming a focus for urban conflict (De Souza 2001; Barry et al. 2007)..

The Constitution of Kenya, 2012 provides that the Government must protect the lives and property of its citizen and it is in this aspect that land conflicts must be prevented or amicably resolved to allow for sustainable development and improvement on the lives of the people of Kenya and in particular Drumvale residents. Land use conflicts when not addressed slow down both social and economic growth and are recipe for insecurity and a platform for environmental degradation.

1.7. Assumption of the study

The main assumptions of the study are:-

- That the subdivision of land in Drumvale estate will continue as long as there is ready land market.
- Illegal land transactions will continue to cause land use conflict in Drumvale estate.

1.8. Definition of terms and variables

- **Parcel boundary disputes**

These are fixed Parcel boundaries of geometrical mathematical dimension that define a land parcel in size, shape and location on a horizontal geographical plane. These are boundaries which were established during the first subdivision survey as per the Survey Act and those resulting from subsequent subdivisions of land in Drumvale estate.

- **Land owners**

These are the people in actual possession of land or with legal/any document which may prove that they own land in Drumvale.

- **Land use conflict**

This are conflicts as a result of incompatibility of the use of land especially from site developments and urban growth.

- **Land ownership conflict**

These are conflicts originating from user rights held individually or collectively over land where there is site development.

- **Site development conflict**

These are conflicts that have adverse effects on third party causing threat to both health and environment as a result of site development of land in Drumvale estate.

- **Planning and development regulations**

These are regulations as per The Physical Planning Act, Survey Act, The Registration of Land Act, Environmental Management and Co-ordination Act and Public Health Act.

- **Immigration**

These are the people who have migrated to reside, work or do business in Drumvale estate.

- **Informal land transactions**

These are land transactions which are illegal. They include unapproved and unauthorized subdivisions, sale of land without legal documents and site developments without building plans and with no approvals from relative authorities.

CHAPTER TWO: LITERATURE REVIEW

2.0. Introduction

This section looks at previously written works on land and land use, both globally and locally, including theories and concepts related to the subject matter. Policy documents and standards that guide the location and operation of different land uses are also reviewed and analyzed. Case studies of existing models of proper land use are also considered to help determine and propose appropriate measures of dealing with land use conflicts in the present and future situation of the study area.

2.1. The Concept of Land

2.1.1. Definition of Land

FAO defines land as "a delineable area of earth's terrestrial surface, encompassing all the attributes of the biosphere immediately above or below this surface, including those of the near-surface climate, the soil and terrain forms, the surface hydrology (including shallow lakes, rivers, marshes and swamps), the near-surface sedimentary layers and associate ground water reserve, the plant and animal populations, the human settlement pattern and physical results of past and present human activity (terracing, water storage or drainage structures, roads, buildings etc.)".

In the **Constitution of Kenya 2010**, "land" includes; the surface of the earth and the subsurface rock; any body of water on or under the surface; marine waters in the territorial sea and exclusive economic zone; natural resources completely contained on or under the surface; and the air space above the surface;

Land in most of Africa has economic, religious and political connotations. Asabere (1994) points out that land, as an economic asset, is the most important input in subsistence agriculture and for the production of housing. In a religious sense, the land also ties the dead to the living and to the yet unborn in a perpetual fellowship. This requires the living to honor ancestral heritage by preserving the land and so manage it for the benefit of future descendants. Politically, land expresses territorial sovereignty. It

supports the chieftaincy economically and swears the chief to protecting the ancestral stool argued Mensah. Land is a key asset to majority of Kenyans, said Syagga (2007), whose livelihood depends on it. It provides social status and security. There is, therefore, the inevitable intersection between property and power. It is a natural resource, a factor of production and is inelastic in nature.

2.1.2. Importance of land

Land is not just a commodity. It is perhaps the most fundamental natural resource and the resource base that supports most life forms and provides the physical stratum that sustains political, socio-cultural, economic as well as natural systems. In economics, it is one of the major factors of production. Besides being the basis of all livelihoods, many traditional African customs regard it as a gift from God that passes on from generation to generation by inheritance (Mbithi, 1982). Despite its numerous uses, land is a rather sensitive and emotive issue in Kenya and, therefore, a major source of controversy and conflict.

Land in society is of great significance and numerous benefits to humankind, whose value may be classified into five broad categories, namely: Economic, ecological, socio-cultural, and political value. It is of vital importance such as foundation of shelter, food and work, sense of nationhood, closely related to livelihoods as a basis for assets, capabilities and activities. Conflicts over land use have led to both complex laws and serious disputes in many societies and tenure insecurity has been seen as a particular factor in the generation of conflict linked ,for example, to land conflict and violence in urban Peru (USAID, 2005).

Swan (2011) stated that land lies at the heart of social, economic and political life in most of rural Africa, and is tied to a complex network of issues ranging from power relationships to economics and from symbolic attachments such as identity to systemic inequities, and addressing land issues effectively demands a comprehensive, conflict-sensitive, and integrated approach. Land issues are often multifaceted and difficult to

resolve, especially in the aftermath of violent conflict, and the conflict risks involved are often complex requiring a deep understanding of the political economy of a given context. Land is a limited resource and has a fixed location (Sky, 2003). Disputing parties often have long term relationships at least, as neighbours. Since properties are inherited and often stay in families for generations, owners become intimately linked with their property and this makes it difficult to separate people from land. Land in Kenya is held under different land tenure.

2.1.3. Land tenure

Land tenure refers to the systems of land ownership. These vary from one country to another. In Kenya, there are three major land tenure systems namely: public ownership, communal (customary) ownership and private ownership. While a substantial portion of land in the country is either under communal tenure or under public ownership, most of the land in the country is under private ownership either under freehold or leasehold terms. Private ownership was introduced in the country by colonialists, before then, there existed no formal regulation of land use and the only forms of regulation were taboos and practices.

Land rights in Kenya are registered under The Land Registration Act, 2012 which repealed all previous registration acts (Registration of Land Act, Land titles Acts, Land Registration Act and Government Land Act) and harmonized the process of land registration in Kenya.

Having secure land tenure is vital from a social-economic perspective and also, it promotes social cohesion and political stability. When people are not afraid of losing the land that they live and work on, it increases stability. Governments and development practitioners prioritize establishing or strengthening a land tenure framework that allows households or individuals to obtain and possess secure rights to the land they use or occupy," (Swan, 2011). There are three types of legally defined rights in Kenya namely; Estates, Encumbrances and Servitudes. The doctrine of estates is the period of time in

which the rights of the land will last and they are two: freehold and leasehold. More than one estate can exist in one piece of land at a time. Land in urban areas including Drumvale is held under leasehold tenancy where, period of ownership is fixed, rent is payable and restriction in land use/human activities exist.

2.1.4. Land use

Land use is the human use of land and involves the management and modification of natural environment or wilderness into built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. Although land uses/activities are numerous they can be grouped broadly into various classes and in Kenya they are classified into ten categories, residential, industrial, education, recreation, public purpose, commercial, public utility, transportation, deferred and agricultural land uses (Table 1), each requiring special planning considerations.

Residential Land uses are areas in which people live and they normally take up most of the land in urban areas. This land use is mainly occupied by residences but other necessary and compatible land uses such as local shops, service industries, nursery and primary schools, lower order medical services e.g. clinics and dispensaries, playgrounds and small scale stadiums and open spaces, are also included. These residential or housing areas are further classified by their respective densities; thus resulting in high, medium and low-density housing estates or neighbourhoods. These classifications can in turn be translated into low, middle and high-income residential areas or low, middle and high cost residential areas. Drumvale is predominantly planned for medium and low density residential estate.

Table 1: Classification of various land uses

Class Code	Main land use Activity	Class Colour
O	Residential	Brown
1	Industrial	Purple
2	Education	Orange
3	Recreation	Green
4	Public Purpose	Yellow
5	Commercial	Red
6	Public Utilities	Blue
7	Transportation	Grey
8	Deferred	Pale Grey
9	Urban Agriculture	White

Source: physical planning hand book

Industrial land uses are areas or zones occupied by both light manufacturing industries and heavy manufacturing industries. Within such areas, one can also find other public utilities such as electricity and water works, and large scale warehousing for bulky goods.

Educational land use comprise all land uses for both public and private educational institutions, such as; nursery, primary and secondary schools, tertiary colleges and universities including playgrounds and grounds used for agriculture and nature study /trails

Recreational land use includes open spaces except those attached to education/research institutions and those under private ownership. These areas include local parks, general outdoor recreational areas, and natural environment areas (Arboretums, unique natural areas, wilderness/ wild areas and historical sites). This land use, if not well planned and / or protected, can easily be overtaken or overlooked, yet it performs various functions that are necessary and important, in both urban and rural human settlement.

The functions of recreational/open spaces include: Resting or relaxation, playing or exercising, picnics and out-door activities or games, evacuation grounds during disaster, aesthetic and numerous environmental functions such as purification of air within built-up areas, hydrological services or reducing flooding through effective percolation of surface run-off water. Some wetlands and natural recreational areas are homes to a variety of both fauna (rich biodiversity) and a source of livelihood for surrounding communities and tourist attractions

Commercial land use areas or zones occupied by both business enterprises mostly of processed goods and offices. Within such areas, one can also find other public utilities such as electricity and water works, and whole sale premises.

Public utilities under this land use are water supply works, sewage and storm water drainage systems, garbage/refuse disposal system, mortuaries and cemeteries and electricity and telecommunication networks.

Their requirements are; appropriate way-leaves and plot sizes (water, sewage and other infrastructure systems), appropriate wind direction (refuse disposal, cemeteries, sewerage /septic ponds and where possible use of buffer zones to separate them from incompatible land uses and adequate parking space

Transportation land use is essentially a service which enables people, firms and various other entities to carry on activities at sites selected for their respective purpose in separated zones or locations. It is, therefore, a link between various activity sites/ land

uses). Such land uses comprise all transportation systems which try to maximize accessibility for the essential movement of major linked activities, giving due consideration to safety, comfort and amenity, as well as cost (Chapin, 1976) Goodman and others saw the role of transportation networks as that of bringing people and their goods in the community within close proximity and providing the means by which people can move freely from one activity to another. Basically, therefore, transportation can be said to be a product of economic and social pursuits. In practice, transportation land use comprises of three interrelated subsystems/components; travel ways (Channel or paths), vehicles (flows) and terminal facilities

Deferred / undeveloped land use consists of land that is set aside for future development. It is basically land stored or banked for the development of the above land uses at a future date.

Agricultural land use consists of all the other land that is used for agricultural purposes, e.g. the growing of horticultural food crops and other agricultural products for the residents.

Land use in Drumvale estate: The estate was planned comprising all of the above land uses except industrial land use. The area is predominantly for residential use with other land uses as subordinate. However land set for public purpose and public utility has fallen into the hands of private developers denying the community rights to the basic services and site developments are carried out in disregard to Nairobi County development control.

2.1.5. Theoretical orientation on land use

Theoretical work on urban spatial structure (order and relationship among physical elements and land use as they evolve from interactions among the key systems - development and nature agents, and pass through transformations in time and space) is

the type of theory which has special relevance for urban land use planning. There are two levels of generalization that can be used in reviewing with the focus of spatial structure. These are, one, primarily descriptive (what is) and second, explanatory (why). These two provide a basis for taking a normative view (what ought to be) which is the focus for decision makers in utilizing land use planning and management process. Theoretical work can be the basis for approaches to land use planning in practice. Land use planning approach is used by a locality to determine what courses of action are appropriate in shaping the built environment of facilities and land uses for the collective good.

Three classic descriptive models of spatial organization are; concentric-zone model, sector model and multiple model

- **Burgess – Concentric Zone**

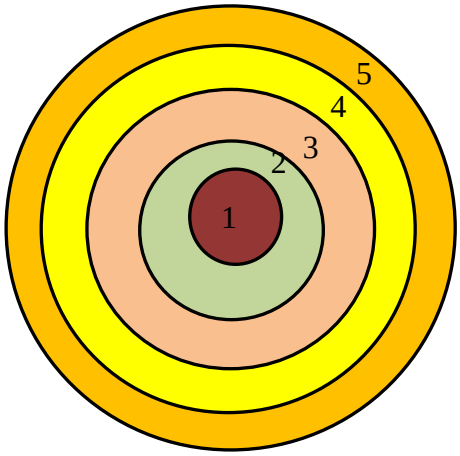
Concentric-zone model (Figure 2) was one of the first models created for use by academics. It was developed in the 1920's by the urban sociologist Ernest Burgess at the University of Chicago (1925) book titled *The City*.

What Burgess wanted to model was Chicago's spatial structure with regards to the usage of "zones" around the city. These zones radiated from Chicago's center, The Loop, and moved concentrically outward. In the example of Chicago, Burgess designated five different zones that had separate functions spatially.

The first zone was the loop, the second zone was the belt of factories that were directly outside the loop, the third zone included homes of laborers who worked at the factories, the fourth zone contained middle-class residences, and the fifth and final zone hugged the first four zones and contained the homes of the suburban upper class. Keep in mind that Burgess developed the zone during an industrial movement in America and these zones worked mainly for American cities at the time. Attempts at applying the model to

European cities have failed, as many cities in Europe have their upper classes located centrally, whereas American cities have their upper class mostly at the periphery.

Figure 2: Concentric zone model



1 Central Business District (CBD)

2 Zone of transition

3 Zone of independent workers

4 Zone of better residences

5 Commuter's zone

Burgess used ecological factors to explain the spatial variations within the city; competition; dominance; invasion; and succession. Burgess assumption was that; the population throughout the city is evenly distributed; movement is equally easy in all direction; the whole city is considered an isotropic plain; values decline regularly from a common central point in the city; economic rent is highest near city centre and decreases progressively away from the core; and low income families are forced to live in high density apartments or tenements close to the city core

Advantages of the Burgess Model are that the model has the advantage of its simplicity and comprehensiveness. Significant land uses and their relationships are pinpointed in a generalized form. Moreover, since it is an inductive model, taking real examples from American cities in the 1920s, it represents a way to interpret the process of city growth during that particular period for some existing towns and cities

As a theoretical description of the relative position of the major functional area of land use in the city and how they change over the years, the elementary simplicity of this approach has had considerable appeal. It is a useful visual way to describe broad and

general tendencies at work in the patterning of the urban land uses; it has an oversimplification. The sector and multiple nuclei approaches provides theoretical description of land use patterns which take into account the irregularities that tend to develop in use patterns.

The theory postulates that cities grow outwards from the centre in a series of rings and as such; older buildings tend to be in the city centre; newer buildings are at edge of the city; land values are highest in the city centre; there is strong economic and ethnic segregation; low income groups lack transport and live close to city centre; and cities develop on a flat plain with equal access to transport.

- **Hoyt – Sector Model**

This theorist argues that cities have sectors radiating out from the CBD along transport routes, income and status divide the society and housing areas reflect social segregation.

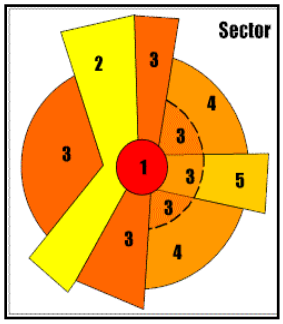
Since the concentric zone model isn't applicable to many cities, some other academics attempted to further model the urban environment. One of these academics was Homer Hoyt, a land economist, working for U.S. federal government, who was mostly interested in taking a look at rents within a city as a means of modeling the city's layout. The model (also known as the Hoyt model or sector model – Figure 3), developed in 1939, took into account the effect of transportation and communication on a city's growth. His thoughts were that rents could remain relatively consistent in certain "slices" of the model, from the downtown center all the way to the suburban fringe, giving the model a pie-like look. It has been found that this model works especially well in British cities.

He based his model on a huge study of housing values in more than 100 cities and positioned a CBD around which other land uses cluster. In this model the important factor is not *distance* from CBD as in the concentric zone model, but *direction away from CBD.* The theory holds that similar types of use originating near the center of the city tend to migrate within the same sector and away from the center. High-rent areas are

conceived as having a dominant influence on the direction of residential area growth. Likewise, where a certain sector develops originally as a low-rent or low-price area, the balance of that sector is likely to be occupied by low-rent/price residences as expansion proceeds outwards. This is replicated with all other sectors.

The sector theory thus provides a more detailed explanation of residential patterns of land use than that set aside by concentric-zone formulation in the way it deals with dynamics of growth processes. Hoyt's model is generally considered to be better than the burgess model as both the distance and direction from the city centre are considered**.**

Figure 3: Sector model



1 Central Business District (CBD)
2 Wholesale & Light Manufacturing
3 Low-income Residential
4 Middle-Income Residential
5 High-Income Residential

- **Harris and Ullman – Multiple Nuclei**

The postulation of this theory is that as an urban area grows, it develops around a number of different business centres or nuclei.

The third well-known model is the multiple-nuclei model. It is an ecological model developed by two geographers, Chauncy Harris and Edward Ullman in the 1945 article "The Nature of Cities". The model was based on Seattle, Washington and tried to further describe a city's layout.

Harris and Ullman made the argument that the city's downtown core (or CBD) was losing its importance in relation to the rest of the city and should be seen less as the focal

point of a city and instead as a nucleus within the metropolitan area . The automobile began to become increasingly more important during this time which made for greater movement of residents to the suburbs.

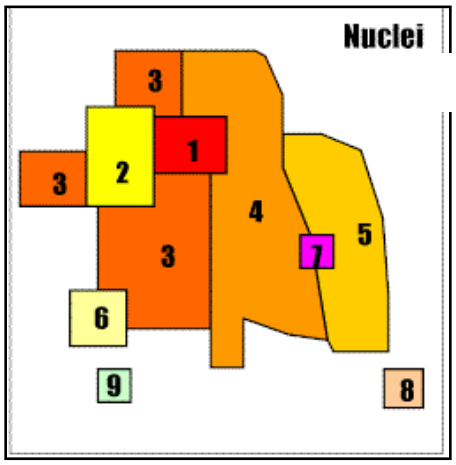
The model describes the layout of a city and says that even though a city may have begun with a Central business district (CBD), other smaller CBDs develop on the outskirts of the city near the more valuable housing areas to allow shorter commutes from the outskirts of the city. This creates nodes or nuclei in other parts of the city besides the CBD thus the name multiple nuclei model, Figure 4. Their aim was to produce a more realistic model but it was a more complicated model.

Harris and Ullman identify four factors that tend to account for the emergency of separate nuclei in urban land use patterns. These are (a) the interdependence of certain types of activities and their need for close physical proximity, (b) a natural clustering tendency among certain types of activities that find it mutually profitable to locate together, as is seen in retail centers, medical centers and out-lying office-building centers, (c) the appearance of centers to accommodate activities that may have no particular affinity they generate e.g. truck-loading facilities and (d) factors of high rents or high land costs which have the effect of attracting or repelling users in the process of nucleation.

These nuclei develop into independent areas because of their activities. For example, some economic activities that support one another (for instance, universities and bookstores) will create a nucleus. Other nuclei form because they'd be better off far from one another (e.g., airports and central business districts). Finally, other nuclei can develop from their economic specialization (think of shipping ports and railway centers).

The theory is based on the assumptions that: Modern cities are more complex than suggested by other theorists; each nucleus acts as a growth point; and growth occurs outwards from each nucleus, until they all merge into one large urban area. Criticisms of Hoyt’s Theory argued that it is not an exact fit for all cities and towns; and it is too complex.

Figure 4: Multi nuclei model



1 CBD
2 Wholesale & Light Manufacturing
3 Low-income Residential
4 Middle-Income Residential
5 High-Income Residential
6 Heavy Manufacturing
7 Outlying Business District (Mall)
8 Residential Suburb
9 Industrial Suburb

Source: Adopted from Chapin and Kaiser (1979)

The land rent theory

The **land rent theory** is a geographical economic theory that refers to how the price and demand for real estate change as the distance from the Central Business District (CBD) increases. It states that different land users will compete with one another for land close to the city center. This is based upon the idea that retail establishments wish to maximize their profitability and so they are much more willing to pay more for land close to the CBD and less for land further away from this area. This theory is based upon the reasoning that the more accessible the area is, the more profitable.

The multiple nuclei theory takes consideration of movement of goods and services as well as that of residents to the suburbs and is a good fit for planning of sprawling and expansive cities. Besides the economic force that produces this pattern, there are other factors such as topography, government policy and cultural and social influences with various impacts on the urban development.

Urban-Realms Model

As a means of improving upon the multiple nuclei model, the geographer James E. Vance, Jr. proposed the urban-realms model in 1964. Using this model, Vance was able to look at San Francisco's urban ecology and summarize economic processes into a sturdy model. What the model suggests is that cities are made up of small "realms" which are self-sufficient urban areas with independent focal points. The nature of these realms is examined through the lens of five criteria: The topological terrain of the area, including water barriers and mountains; the size of the metropolis as a whole; the amount and strength of the economic activity taking place within each of the realms; the accessibility internally of each realm in regards to its major economic function; and the inter-accessibility across the individual suburban realms.

This model does a good job at explaining suburban growth and how certain functions that are normally found in the CBD can be moved to the suburbs (such as shopping malls, hospitals, schools, etc.). These functions diminish the importance of the CBD and instead create distant realms that accomplish approximately the same thing and allows the 'suburbs' to function as small independent business districts, with their own shops and businesses.

In Drumvale estate, there exist fused model, in which elements of all three models are present but retains Nairobi CBD as the central core. It has radial growth along the main transport arteries such as the Kangundo road and other access roads within the estate. The resultant product is a multi-shaped estate with various distinct functional zones along the axes of growth.

2.1.6. Urban Land use systems/Structures

Urban structure is the distribution of land uses and population densities, i.e. distribution of human activities over urban space (Obiero, 1992). It must be noted that transport networks play an important role in determining the forms that urban areas take.

- **Forms of Urban Land use systems/Structures**

One of the most common urban structures is the radial organic form whose main feature is its strong centre which tends to attract traffic and hence leads to traffic congestion near the centre. The second most common urban form is the grid iron. This tends to distribute traffic more evenly over the urban space than the radial form and hence reduces congestion considerably. It however works against the optimal use of public transport services and facilitates the use of private transport (Ibid).

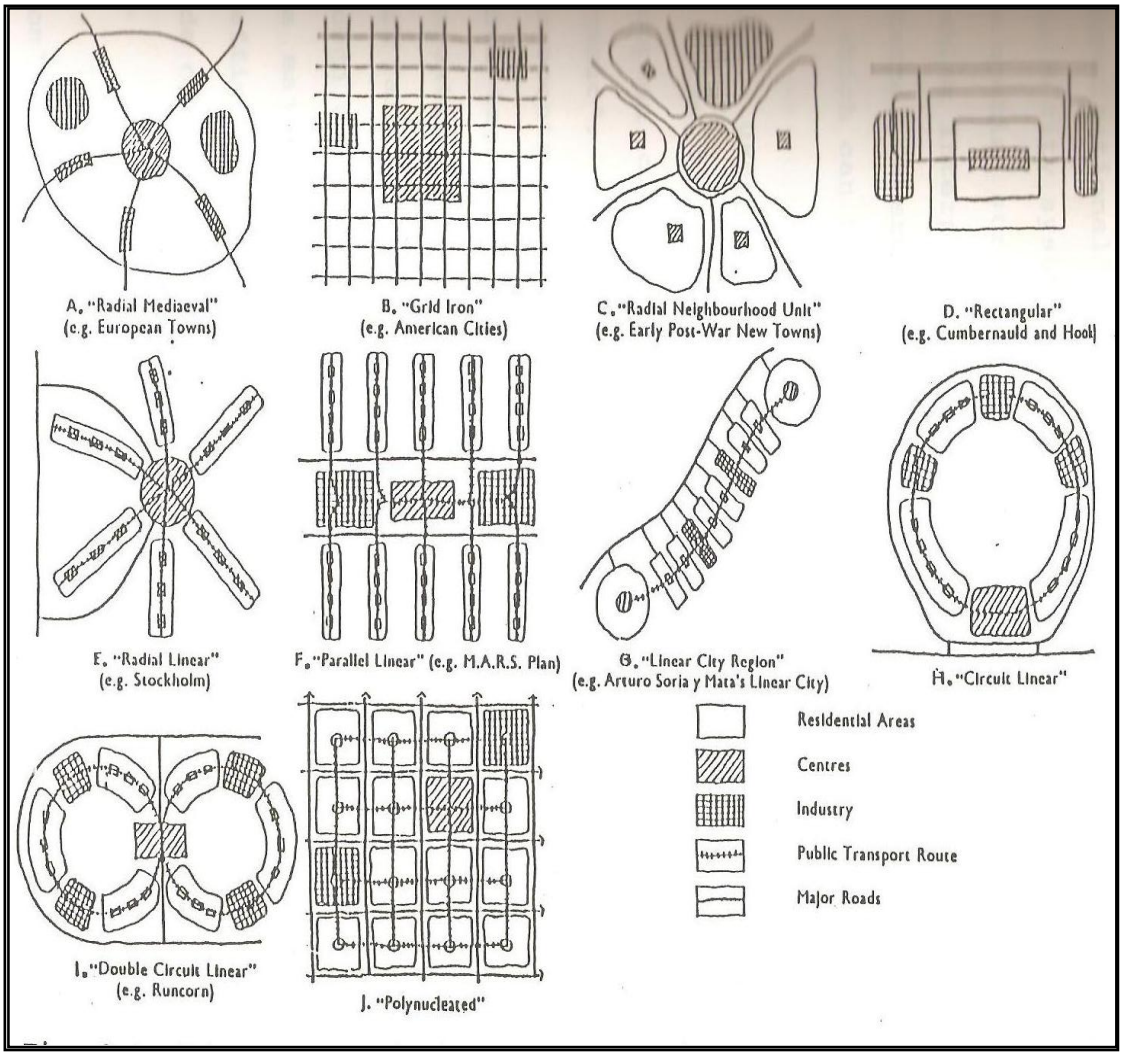
There are also other forms which are derivatives of the radial organic form. They comprise of the radial neighbourhood unit and the rectangular forms. They have been majorly adopted as a remedy to the traffic congestions strongly linked with the radial organic form and were mostly used in British New Towns Schemes since the end of the Second World War.

There is also the linear city form. It is manifested by a major study area or spine linking two communities and which is connected to feeder roads at various sections. Variants of the linear form are the radial linear and the circular (circuit) linear urban forms, the latter of which has an extension known as the double circuit linear form.

In contrast to the linear form is the concentric city form which is based on separate satellite communities surrounded by permanent open space connected to the central city by rapid transport (Gallion *et al*, 1975 in Obiero, 1992). There is also the combination of the concentric, linear and grid iron concepts and is known as the polynucleated urban form (Ling, 1967 in Obiero, 1992). Drumvale estate takes the structure of a polynucleated urban form.

Figure 5 below shows an illustration of the various urban structures.

Figure 5: An illustration of the various urban structures



Source: Obiero S. (1992), Pg. 78

- **Factors Influencing Urban Land use systems and changes**

Land use systems and changes are influenced by a variety of factors operating on more than on spatial and temporal level and acting not in isolation but in intricate webs of place and time-specific relationships. Several theories, originating from the natural and the social sciences, most recently, in interdisciplinary research, have been advanced to describe and explain land use systems and changes.

Land use changes occur initially at the level of individual land parcels when land managers decide that a change towards another land use type is desirable. Aggregately, individual land use decisions produce land use changes at higher spatial levels.

One of the factors that influence land use is the characteristic of the local biophysical environment that, to a considerable extent, determines land suitability for a range of uses. In the case of contemplated or planned change of use, these factors act as constraints on the range of choices considered by land managers and determine the final decision. The most important of them include: Local climate and weather conditions (temperature, rainfall, snowfall, wind, moisture); Local topography (slope, aspect); Bedrock type; Soil type (and access to water); Current state of the quality of land (e.g. erosion, contamination and Salinity).

The other site-specific characteristic of the individual land unit which influences the decision of locating a land use is accessibility. This prominently refers to access to road networks and other transport infrastructure (airports and ports), access to markets, sources of raw materials and suppliers of needed inputs such as labor (of the required skill level), capital and technical assistance.

Economic considerations are also critical land use determinants as Von Thunen's land rent theory emphasizes. Most important among them is the transportation cost to markets, sources of primary inputs – a function of distance or accessibility – and of anticipated profits from exploitation of a particular land parcel. The latter depend on the demand for the goods and services associated with the given land use type.

Moreover, the tendency of activities to locate close to each other for the reasons of functional inter-relationships influences the land use structure of the town. The CBD in most cases provides the setting within which major economic functions operate. Other uses then spread out around the CBD and as population increases, the developments radiate into the outskirts of the city. Cities with strong central foci of activities therefore tend to assume a radial pattern of developments, Nairobi being a good example.

Generally, urbanization trends influence the direction of growth of the city and as such its land use structure. Most of the time as the city population grows, there are new people's trends and the boundary of a city extends as the need to locate new activities arises. At the same time, in cities which initially had a strong central point of economic activity concentration, the escalated distance between the new residential developments and this centre dictates that other nodes of economic activities develop in other parts of the city and as such, the land use structure of the city changes over time.

- **Peri-urban systems**

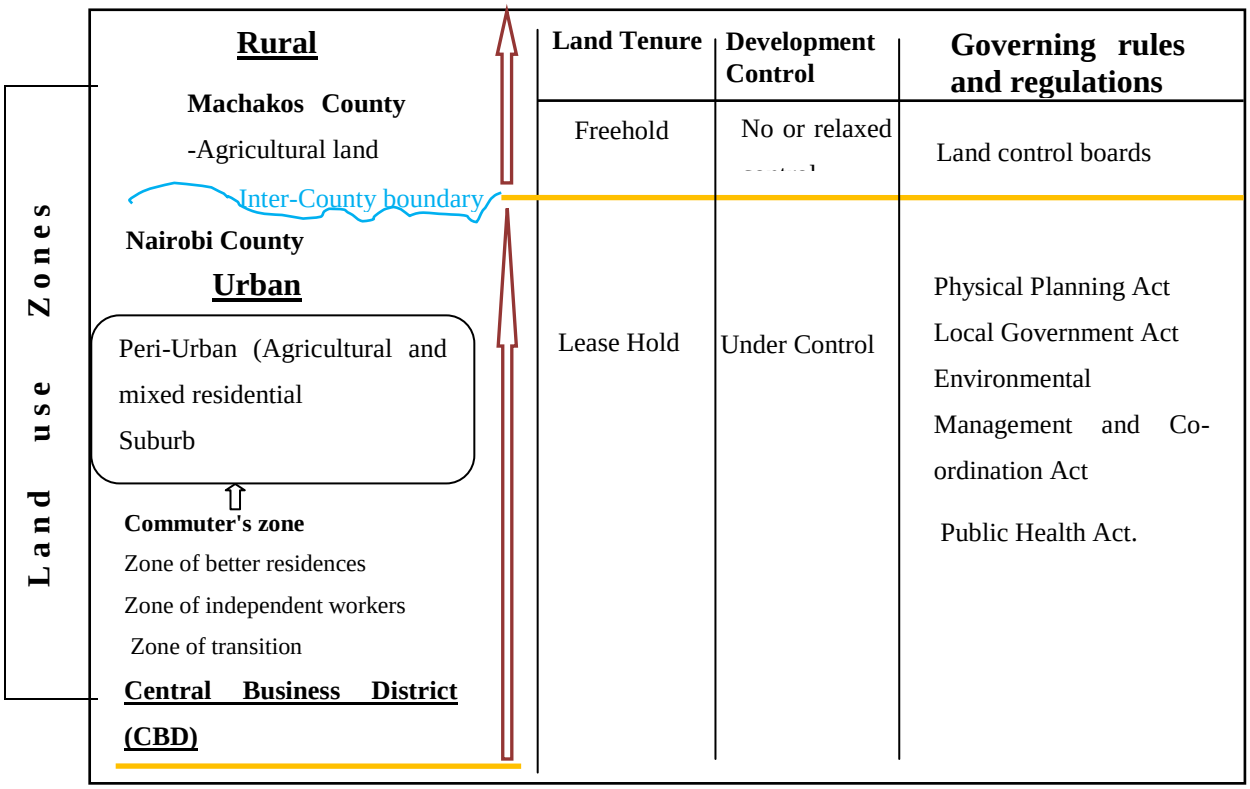
As a specific and non-neutral space, a peri-urban area refers to a transition or interaction zone where urban and rural activities are juxtaposed and landscape features are subject to rapid modifications induced by human activities (Douglas, 2006).

A peri-urban area is not only a zone of direct impact experiencing the immediate impacts of land demands from urban growth and pollution, but is also a wider market-related zone of influence that is recognizable in terms of the handling of agricultural and natural resource products (Simon et al., 2006). Peri-urbanization can be regarded both as a driver and an effecter of global environmental changes.

In this research context it is the area outside the Nairobi Suburb and at the extreme but within the border of the city, bordering agricultural land of Machakos County under freehold tenure, which is in the process of urbanization. Figure 6 demonstrate the author's concept of the transitional region within which the study area falls. Though the area is under Nairobi County development control this is not replicated in

the areas rapid development which is taking place with the structure and form of the other side Machakos County which is relaxed and under freehold.

Figure 6: Rural and urban land tenure and land control



Source: Authors concept 2014

- **Land subdivision and Development controls**

Land subdivision is the fragmentation of a parcel of land into subsequent parcels. Legally, as stipulated by Physical Planning Act (1996), all subdivisions of land should be approved by the Director of Physical Planning and the County Planner. Authority to subdivide any land is issued by the Ministry of Lands upon owners' fulfillment of the conditions set forth by the County Government. The subdivision is then authenticated by the Director of Surveys, in accordance to the Survey Act, and presented for registration under Registration of Land Act (2012). Under the same acts land can also be amalgamated.

Land amalgamation involves the combination of two or more contiguous or adjoining lots of alienated land, usually under separate titles. When combined, the land is held under one title henceforth. Both subdivision and amalgamation have to be approved by County Planning Department which also gives guideline on developments thereon.

The City Council of Nairobi (CCN) - Planning Department gives a simplified guide to the aspects of the development ordinances that every property developer in the City requires in setting up any form of development – be it residential, commercial, industrial, institutional or religious. It has noted that with the continued high rate of urbanization, it has a duty to use planning controls to ensure that development is allowed only where it is needed while ensuring that the character and amenity of the area are not adversely affected. The *guide Of Nairobi City Development Ordinances and Zones* gives guidelines to the city development process as shown in Table 2.

The table is a summary on planning guidelines on how development in Nairobi County should be carried out. The first column indicates the reference zone number within Nairobi with the second column giving the name of the specific region referred within the county. The type of development allowed is indicated in column six and column seven of the table gives the minimum allowed area of a parcel of land within that particular zone. Each zone has a certain percentages of permitted Ground Coverage (GC) and Plot Ratios (PR) as shown in columns three and four respectively.

Drumvale estate is located in Ruai location, Kasarani constituency and from the table it is zone 18. The minimum area for a parcel is 0.1 Ha since there is no provision of sever services. However the estate has been informally subdivided into small parcels such as 0.015 Ha.

Table 2: Nairobi City planning control guidelines

ZONE	AREAS COVERED	GC %	PR %	Dept Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
1A	**Central Business District (CBD)**			CP/FP/XXX	Commercial/Residential/Light Industry	0.05	
	• Core CBD	80	600				
	• Peri-CBD	80	500				
	• West of Tom Mboya St	60	600				
	• East Of Tom Mboya St	80	350				
	• Uhuru H/W/ University Way/Kipande Rd	80	500				
1E	**Upper Hill Area**			CP/FP/XXX	Commercial/Offices/ Residential	0.05	
	• Block 1 - Offices (Community)	60	300				
	• Block 2 - Comm/Off	60	250				
	• Block 3 - Offices	60	300				
	• Block 4 - Residential	35	150				
	• Block 5 - Institutional (KNH)						
	• Block 6 - (Mixed: Inst;Htls;Offs)	60	200				
2	**Eastleigh**			CP/FP/XX X	Commercial/Residential (High-rise Flats)	0.05	
	• Eastleigh District Centre	80	250				
	• Eastleigh Comm/Residential	60	240				
	Pumwani/Califarnia	60	240	CP/FP/XXX	Commercial/Residential (High-rise Flats)	0.05	
	Ziwani/ Starehe						
	• Commercial	80	150				
	• Residential	35	75				

ZONE	AREAS COVERED	GC %	PR %	Dept Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
3	**Parklands**			CP/FP/XXX	Commercial/Residential (High-rise Flats)	0.05	
	• Commercial	50	100				
	• Residential	35	75				
	City Park Estate /Upper Parklands	35	75				
	Westlands			CP/FP/XXX	Commercial/Offices/Residential (High Rise Flats) – Four Storeys Max.	0.05	
	• Westlands CBD	80	240				
	• Westlands/Museum Hill						
	o Block 1 Commercial	80	200				
	o Block 2&3 Offices & Highrise Residential	35	80				
	o Block 4 Offices	80	200				
	o Block 5 Commercial/Residential Hotels						
4	**Spring Valley**	35(s) 25(u)	75(s) 25(u)	CP/FP/XXX	Residential (Apartments allowed on sewer only) – Four Storeys Max.	0.05	• Policy Under Review
	Riverside Drive						
	Kileleshwa						
	Kilimani						
	Thompson						
	Woodley						
5	**Upper Spring Valley**	25	25	CP/FP/XXX	Low-Density Residential One-Family House	0.2(u) 0.1(S)	• Maisonettes Allowed On Sewered Areas Of Lavington
	Kyuna						
	Loresho						
	Lavington /Bernard Estate						
	o On sewer	35	75				
	o Unserwerd	25	25				
6	**Muthaiga**	25	25	CP/FP/XX X	Low-Density Residential	0.2	Single Family Dwelling
	New Muthaiga						

ZONE	AREAS COVERED	GC	PR	Dept Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
7	**Mathare Valley** **Mathare North** **Lower Huruma** **Kariobangi** **Korogocho Dandora**	50	75	CP/FP/XXX	• High-Density Residential (Flats) • Informal Settlements (Slums)	0.05 Lower in S&S Schemes	Special Scheduled High-Density Informal Development
8	**Old Eastlands** • Shauri Moyo • Maringo • Bahati • Kaloleni • Makongeni • Mbotela • Jericho • Jerusalem			CP/FP/XXX	• These largely constitute old City Council housing – ripe for high-rise high density redevelopment		• Special Scheduled Areas o NCC Site-and-service o Schemes as Low-Income Housing
	Makadara	50	100	CP/FP/XXX	**Residential –** • Mixed Development o Flats, o Maisonettes, o Bungalows, o Site-and-service Schemes Condominiums (Single Rooms)	0.05	• Comprehensive Subdivision allowed • Minimum to fit a House on Type Plan design
	Doonholm Neighbourhood (Block 82)	50	75				
	Uhuru (1-3)	50	75				
	Buru Buru (1-6) (Blocks 72-79)	50	75				
	Umoja (1-2)	50	75				
	Umoja Innercore	50	150				
	Komarock						
	• Commercial	80	150				
	• Residential	50	75				
	Kayole						
	• Commercial	80	150				
	• Residential	50	75				

ZONE	AREAS COVERED	GC	PR	Dept Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
9	**Main Industrial Area**	80	300	CP/FP/XXX	Industries/Godowns	0.05(on sewer)	Becoming Over Developed
9E	**Dandora Industrial Zone**	80 (s) 50(u)	150(s) 100(u)	CP/FP/XX	Light Industries/Godowns	0.01 if not on sewer	Ruaraka EPZ covered
	Kariobangi Lt/Industrial	50(u)	100(u)	CP/FP/XX			
	Mathare North Lt/Industrial	50(u)	100(u)	CP/FP/XX			
	Kariobangi Lt/Industrial	80 (s) 50(u)	150(s) 100(u)	CP/FP/XX			
10	**Nairobi West**	35	75	CP/FP/XX	High Density Residential Development Mixed Residential Development • Flats, • Maisonettes • Bungalows	0.5	• Comprehensive subdivision allowed with lower sizes on type plan • Development density @ 35 units per hectare
	Madaraka						
	South 'B'	35	75	CP/FP/XX			
	South 'C'						
	Nairobi Dam	50	75	CP/FP/XX			
	Ngummo	50	75	CP/FP/XX			
	Highview						
	Magiwa						
	Golf Course						
	Langata Estates • Southlands • Otiende • Ngei 1&2 • Onyonka • Masai • Uhuru Gardens • Jonathan Ngeno	50	75	CP/FP/XXX			
10E	**Villa Franca**	50 (s) 25(u)	75 (s) 25(u)	CP/FP/XX	Residential Mixed Development	0.5	• Area not fully sewered • Comprehensive subdivision allowed with lower sizes on type plan (max 35 units/ha.)
	Imara Daima	50	75	CP/FP/XXX			
	Tassia						
	Fedha						
	Avenue						
	Embakasi Village			CP/FP/XX			
	• Commercial	80	150				
	• Residential	50	75				

ZONE	AREAS COVERED	GC	PR	Dept Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
11	**Special Scheduled Area (Kibera Slums)**			CP/FP/XX	Informal Mixed Developments Comprehensive Residential Schemes	0.05	• NHC Plan Lacking In Social Infrastructures e.g. Schools Clinics, Recreation and Commercial Zones • Comprehensive subdivision allowed with lower sizes on type plan
	National Housing Corporation (NHC) Estates			CP/FP/XX			
	• Ayany	50	75				
	• Olympic						
	• Fort Jesus						
	• Karanja Road						
12	**Karen/ Langata**			CP/FP/XX	Low Density Residential Developments (One Family Dwelling House)	0.2 0.4	Local Re-Development Plan Under Review/Preparation
	Karen						
13	**Gigiri**	25	25	CP/FP/XX	Low-Density Residential (One Family Dwelling House)	0.2	Plan well implemented only pockets of intensity of developments e.g. Village Market & American Diplomatic Housing
	Kitisuru	25	25	CP/FP/XX			
	Ridgeways	25	25	CP/FP/XX			
	Garden Estate	25	25	CP/FP/XX			
	Safari Park/Balozi Housing	25	25	CP/FP/XX			
14	**Roysambu**	25	25	CP/FP/XX	Low-Density Residential (One Family Dwelling House)	0.2	Intensive Development in Mararui & Roysambu
	Thome	25	25	CP/FP/XX			
	Mararui	25	25	CP/FP/XX			
15	**Dagoretti**	35	75	CP/FP/XX	Agricultural/Residential Mixed • Gap Flats • Maisonettes • Bungalows	0.1 0.05 on township sewer	• Area Maintains Agricultural Character • High-rise Flats develop becoming popular
	• Riruta	35	75	CP/FP/XX			
	• Kangemi	35	75	CP/FP/XX			
	• Mutuini	35	75	CP/FP/XX			
	• Waithaka	35	75	CP/FP/XX			
	• Ruthimitu	35	75	CP/FP/XX			
	• Uthiru	35	75	CP/FP/XX			

ZONE	AREAS COVERED	GC %	PR %	Dept Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
16	**Baba Dogo**			CP/FP/XX	Industrial Zone Residential (Mixed Residential Development	0.05 lower if comprehensive	High Density Residential
	• Industrial	80(s) 50(u)	300(s) 100(u)				
	• Residential	35(s) 25(s)	75s) 25(u)				
	Ngumba/Ruaraka/	50(s)	200(s)				
17	**Githurai 44 &45**	50(s)	200(s)		Industrial Zone Residential (Mixed Residential Development		• Replete with unplanned developments hence "Blanket approval" vide TP resolution of 18/7/97
	Zimmerman						
	Kahawa West	50	100				
	• Commercial	50	100				
	• Residential	50	75				
	• Industrial	50	100				
18	**Kasarani**			CP/FP/XX	• Agricultural • Residential Mixed Development	• 2.0 • 0.05 on sewer • 0.1 ha. if not on sewer • lower min. size if land buying company	Area has potential for residential developments (invasion by land buying companies and land speculators) Industrial not attractive here
	• Clayworks	50	100				
	• Clay City						
	• Sports View						
	• Mwiki	50	200				
	• Njiru	25	25	CP/FP/XX			
	• Ruai						
19	**Special Scheduled Area Outside Nairobi Boundary**			CP/FP/XX	Agricultural Residential (Mixed Development)		• Area fully influenced by city dynamics • NCC not in control of development • Overwhelmingly dependant on services of the city
	• Githurai Kimbo						
	• Wendani						
	• Kahawa Sukari						

ZONE	AREAS COVERED	GC %	PR %	Dept Ref. Map	TYPE (S) OF DEVELOPMENT ALLOWED	MIN. AREA (Ha.)	REMARKS/POLICY ISSUES
20	**Public/Strategic Reserved Areas (Gazetted)** • State House • JKIA Airport • Wilson Airport • Military Sites o Military Airbase Eastleigh o DoD Headqaters o Kahawa Barracks o Langata Barracks o Defence College, Karen o Forces Memorial Hospital			CP/FP/XX	Special/strategic facilities and Developments		Boundaries require to be clearly defined
20g	**Recreational And Forests** • City Park • Arboretum • Ngong Forest • Karura Forest **National Game Park** **Stadiums** • Moi Sports Complex, Kasarani • City Stadium • Nyayo Stadium **Uhuru Park** **Central Park** **Uhuru Gardens**			CP/FP/XX	Public Open Spaces, Reserves and Recreational Facilities		

Source: A guide Of Nairobi City Development Ordinances and Zones

2.1.7. Sustainability of Land use

To ensure sustainable land development, planning has to be undertaken. Planning has traditionally been one of the major responsibilities of state, governmental and other public authorities all over the world especially at macro-level. While it is necessary for these authorities to provide stimulus for land-based economic activity for development, it is also necessary to ensure that such development activities are done in an orderly way and not in a haphazard manner that can undermine further development.

- **Planning as a pre-requisite to sustainable land use**

Whereas development activities are desirable and should be undertaken measures should be undertaken to ensure that growth does not take place in a manner that is haphazard or injurious. Notably, planning requirements do actually limit the use of any land including land that is privately owned. Land planning entails not only deciding where to put which development but also the preparation and implementation of physical development plans for orderly management of human activities (FAO, 1993) cited by Sifuna (2009). This is to ensure efficient and sustainable management that mitigates the adverse effects of unplanned development activity as well as unsustainable land use forms and practices.

- **Hindrances to Sustainable land use - Kenya**

It is unfortunate that as urban population grew rapidly, the government at all levels failed to cope. Most urban developments in Kenya (as elsewhere in Africa) take place outside planning control, and an estimated third of land and property transactions occur outside the legal framework. This is the case in Nairobi County with most of the properties in East lands, specifically Drumvale, being under informal land transactions and land development.

In Kenya, the public regulation of land use is exercised by three institutions namely: the national government, County governments and local management institutions. While the national government is the predominant institution of public regulation of land use in the country, there are instances where certain laws have vested this function in County governments. The principal legislation in this regard is the County

Government Act which establishes County governments and spells out their functions. All land in the County of Nairobi is predominantly regulated by the County government Act and other management acts such as Environment Management and Coordination Act and Public Health Act.

Kenya has weaknesses in the existing institutional arrangements, Sifuna (2009). These hamper the effective exercise of the function by the respective institutions. While this regulatory function is generally vested in three broad institutional arrangements (government, County governments and local management institutions), the actual exercise of the function is carried out by several agencies even within the same institution exercising different functions with different mandates. This has resulted in fragmentation in the institutional arrangements for land use control.

- **Environmental sustainability**

Unbridled land use may lead to undesirable environmental consequences such as land degradation, soil erosion, sedimentation of water bodies, and pollution of environmental media and depletion of biological resources. It is therefore proper that land use be regulated to minimize such costs and promote uses that are environmentally sound, ecologically and economically sustainable as well as those that do not unduly undermine other beneficial uses. Land use practices that have such environmental costs are undesirable and should be discouraged, (Sifuna, 2009)

The Environmental Management and Co-ordination Act prohibit the undertaking of certain activities and projects without first conducting an environmental impact assessment. Also in the public nuisance regulation under the Public Health Act, certain activities are considered as nuisances and are prohibited. Under the Act it is unlawful, for instance, for any owner or occupier of any land or premises to allow or cause to exist on such land or premises any nuisance that is injurious to human health, for instance filth, garbage, smoke, foul smell or other noxious matter

Constitution of Kenya (2010) has set obligations in respect to the environment, Article 69, states that the State shall ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources and encourage public participation in the management, protection and conservation of the environment. Every person has a duty to cooperate with State organs and other

persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

2.2. Land use conflicts

Wehrmann (2008), cited (ZARTMAN 1991: 299), "Conflict is an inevitable aspect of human interaction, an unavoidable concomitant of choices and decisions. Conflict can be prevented on some occasions and managed on others, but resolved only if the term is taken to mean the satisfaction of apparent demands rather than the total eradication of underlying sentiments, memories, and interests. Only time really resolves conflicts, and even the wounds it heals leave their scars for future reference. But short of such ultimate healing, much can be done to reduce conflict and thereby release needed energies for more productive tasks"

Lambard (2012), cited Galtung (1965: 348-349) who defined conflict as the existence of two or more incompatible goal states in a system and (Miall et al 2005 in Carpenter 2010: 408) , said that conflict is 'the pursuit of incompatible goals by different groups'. Wakhungu et al (2008) found that in Kenya, central to land conflicts are issues of ownership, access and use while land has been the crux of economic, cultural and socio-economic change, intensifying conflicts over its access and control. Violence over land conflicts has occurred sporadically in different parts of the country and doubts over the worthiness of land titles almost caused major economic instability a few years ago. The nature and characteristics of the issues surrounding land are intricately intertwined with the country's history and have been shaped by political and economic developments from the colonial period to the present. As salaries fail to keep up with inflation, urbanites look to the land to provide for a second income or offer security for their retirement or buy parcels for speculative purposes. Titling has its pros and cons in general, whatever benefits the title-holder result in the dispossession of 'secondary rights' holders, e.g. tenants becoming a source of grievances in some areas.

Wehrmann (2008) said that not even a perfect, economically efficient land market can prevent land conflicts as land market forces alone do not lead to socially and ecologically optimal land use patterns. The functional deficits of institutions are not

the core reason for land conflicts, they merely facilitate them. Profit maximization by a multitude of actors is the driving force, manifested either by unjustly grabbing land or by excluding disadvantaged sections of the population from legally using land.

All land conflicts, no matter how peaceful or violent they are, produce negative consequences for individual people as well as for the entire society, (Wehrmann, 2008). Many families across the world have seen their shelters – their homes – being bulldozed out of existence. And in Africa, many daily experience the selling of their property by someone else who also claims to be the owner. Three main land use conflicts are those that are tenure based conflicts, parcel boundary conflicts and environmentally based conflicts.

- **Boundary disputes**

There are two types of parcel boundaries in Kenya; general and fixed boundaries. General boundaries are boundaries that are of descriptive nature and are usually determined by adjudication and demarcated by hedges. Their accuracies are low and relative to their source of description which is mostly historical and relative to fixed physical features. Their re-establishment is the responsibility of land registrars who are supposed to listen to the history of the boundary position and determine their correct position, the registry may be assisted by a Surveyor as need may arise (Registered Land Act, 2012).

Fixed boundaries, as the name suggests, are fixed mathematically by geographical coordinates and can be re-established mathematically by a Government Surveyor or a Licensed Surveyor as per the Survey Act. Most of these boundaries are found in urban areas and lease hold properties.

Robert (2010) in his paper, the U.S. surveyors' role, wrote that boundary disputes between neighbors over their common boundaries are ubiquitous. The source of the disputes is found quite often within the realm of the surveyor's expertise. He found that boundary disputes have their origin in the retracement work of a surveyor and most of them are caused by either inadequate, erroneous legal descriptions, obscure or ambiguous conditions on the ground.

Inaccurate Measurement/Mapping Dispute are most common types of dispute in Ireland, followed by property boundary disputes, encroachment, Right of Way and Adverse Possession. Digitized property boundaries are not quite the same as old paper maps and one of the impacts is that landowners cannot take new digitized PRA boundaries at face value as they must be checked on the ground by a qualified and competent surveyor to verify their position (Prendergast, 2008). The digital property boundaries did not match the property boundaries on the ground, O'Brien et al (2013).

Landowners are very passionate and protective of their property and what they perceive to be their land (ibid). If one then adds in other external factors such as stress at work or financial trouble, one then has a potent cocktail for a property boundary dispute with the most prominent dispute often being over some seemingly minor issue such as, a fence being erected or a hedge being planted on the boundary line (Kirwan, 2011). Boundary disputes between neighbours can be wretched affairs known to destroy neighbour relations. Sometimes the financial cost of litigation frequently exceeds the value of the land concerned and even when land in dispute is very small, litigation may ensue because of the critical location of land in dispute or its strategic importance to the owners concerned. In some other cases the dispute may become a proxy for another issue dispute because the land concerned may not be worth much at all.

Robert (2010) argued that it is often within the surveyor's ability to reconcile differences in boundary conflicts whether in friendly negotiation or bitter litigation. The surveyor and the attorney have distinctly different roles in dispute litigation.

- **Land tenure conflict**

Titling may contribute to increased tenure security though many alternative forms of tenure, including those in many informal settlements, also provide high levels of security, (Satterthwaite 2009: 305 in Lombard, 2012). Widespread policies of land tenure legalization are highly contested and may contain the potential to generate antagonism. Competition over land as a scarce resource may disrupt attempts to make processes open, transparent and participatory. Land tenure legalization is not only a response to conflict over land rights but also a potential generator of land disputes.

Tenure insecurity resulting in conflict has been identified as one of several increasingly serious threats to urban security and safety alongside disasters and violence (UN-Habitat 2007: 4 in Lombard, 2012). Land has both economic and social dimensions, and rights to land are not just a source of economic production, but are also a basis of social relationships and cultural values, and a source of prestige and often power, (FAO 2002: 5). Rising urban land values, compounded by urban growth, have resulted in a severe security of tenure crisis, mainly in the countries of the global south, (UN-Habitat 2007: 114). Insecure tenure leads to constant threat of (violent) eviction; limited or no access to basic services; social exclusion and homelessness; human rights violations; reduced revenues for local government; gender violence and problems for other vulnerable groups; reduced housing investment and distortion in land prices; and weakened governance and long-term planning (UN-Habitat 2007: 121).

Syagga (2007) discussed how land grabbing created inequalities in land ownership and interfered with protected lands, lacked ecological integrity, cultural relevance or strategic location. Such lands include forests, wetlands, riparian reserves, the foreshore, historical sites and monuments.

The suggestion that tenure legalization may result in greater insecurity derives from the fact that titles may generate increased speculation over land and possible market evictions. Disputes over land and its use can be understood as 'intractable' or 'resistant to resolution' (Campbell 2003 in Syagga, 2007), and research from a conflict-resolution perspective suggests that any intervention must be conflict-sensitive.

- **Power and land conflict**

According to Wehrmann (2008), the most difficult type of land conflict to resolve involves a powerful person (include high-ranking politicians, civil servants, the military, the police, companies and other rich and influential groups or individuals) against one or more poor people. In many countries or situations, the poor hesitate and often do not dare to resist the powerful, not least in court. If they do, or if the powerful sue them instead, the chances are very low that the poor will win the case. Resolution in these cases tends to favour the powerful. In many cases bribery plays a

major role and in other cases, the richer party simply can afford the better lawyer. These groups generally have better access to the information and resources needed to sustain and resolve land-related conflict.

- **Violence related to land conflicts**

Swan J. V. D., (2011) stated that land conflicts commonly become violent and serve to perpetuate insecurity and instability especially when linked to wider processes of political exclusion, social discrimination, economic marginalization and a perception that peaceful action is no longer a viable strategy for change. They can result to damage or destruction of property records and cadastres, undermine customary or statutory rights to land ownership and access, and further weaken judicial or traditional instruments for the management of land-related disputes. The existence of sound well recognized arrangements for dealing with such conflicts quickly and decisively offers several advantages.

Conflict undermines the guarantees that encourage investment by users and outsiders in land, particularly the most productive tracts, thus depriving the economy of part of its resources for growth. If people cannot trust the state to enforce their property rights or resolve conflicts over land they will take measures to do so themselves, often in ways that are outside the law, drawing resources from more productive activities, and perpetuating the vicious circle of violence. Also, conflicts can easily escalate into larger clashes with damaging and far-reaching political, social and economic consequences.

2.2.1. Conceptualizing Land Use Conflict

Land conflicts between single parties, inheritance conflicts between siblings and disputes over the use of a given piece of land are comparably easy to solve (Wehrmann, 2008). Those that include several parties such as group invasions or evictions of entire settlements are more difficult to deal with. Not even a perfect, economically efficient land market can prevent land conflicts as land market forces alone do not lead to socially and ecologically optimal land use patterns. The functional deficits of institutions are not the core reason for land conflicts; they merely facilitate them. Profit maximization by a multitude of actors is the driving

force, manifested either by unjustly grabbing land or by excluding disadvantaged sections of the population from legally using land.

To O'Brien et al (2013, landowners are very passionate and protective of their property and what they perceive to be their land. If one then adds in other external factors such as stress at work or financial trouble, one then has a potent cocktail for a property boundary dispute with the most prominent dispute often being over some seemingly minor issue such as a fence being erected or a hedge being planted on the boundary line

Wakhungu et al (2008) found that there is inability to adequately address the land question in Kenya which is likely to continue to lead to violence unless its root causes are addressed and will therefore remain high on Kenya's political and development agenda. In Africa, many countries has shown to be incapable of acting as a neutral arbiter of competing claims to property rights, meaning that 'more law' or 'better law' are not the only answer. When faced with controversial and complex decisions, communities often become embroiled in battles that tear at the civic fabric, pit neighbor against neighbor, demonize the applicant, and wear down local officials. The processes for solving these difficult are time consuming, (Nolon et al, 2013).

Wehrmann (2008), stated that root of conflicts there are psychological fears and desires (e.g. fear for existence, fear of insecurity, desire to be recognised, cared for and loved) resulting in material and emotional needs (need for shelter, need for a production base, longing for self esteem, or seeking power and wealth). These needs shape people's interests, which then result in their attitudes and positions and finally define their behavior. However conflict behaviour is not necessarily destructive (Lombard, 2012), sociologists understand conflict as a social dynamic that defines relationships which determine group formation and breakdown within a given society. Tenure insecurity, on the other hand, resulting to conflict is a serious threat to urban security and safety, alongside disasters and violence (UN-Habitat 2007: 4). Land has both economic and social dimensions, and 'rights to land are not just a source of economic production, but are also a basis of social relationships and cultural values, and a source of prestige and often power' (FAO 2002: 5). Titling contribute to increased tenure security but may also generate increased speculation

over land and possible market evictions. Disputes over land and its use can be understood as ‘intractable’, or ‘resistant to resolution’ (Campbell 2003).

Land conflicts commonly become violent when linked to wider processes of political exclusion, social discrimination, and economic marginalization (Swan, 2011). They generate land-related challenges such as damage or destruction of property records and cadastres; undermine statutory rights to land ownership and access; and further weaken judicial or traditional instruments for the management of land-related disputes. Conflict undermines the guarantees that encourage investment by users and outsiders in land, thus depriving the economy of part of its resources for growth. If people cannot trust the state to enforce their property rights or resolve conflicts over land, they take their own measures usually perpetuating the vicious circle of violence. Land insecurity is a major contributing factor to extreme poverty and social instability, including conflicts and civil unrest, rural migration, land abandonment, and poor economic growth (FAO, 2002 in Alarima, 2012).

Boundary disputes between neighbours are known to destroy neighbour relations (O'Brien et al 2013). Sometimes the financial cost of litigation frequently exceeds the value of the land concerned and even when land in dispute is very small, litigation may ensue because of the critical location of land in dispute or its strategic importance to the owners concerned.

The Law press stated that chapter 5 of Constitution of Kenya 2010 deals with land, planning and environment. It starts with certain governing principles, and declares that all land ‘belongs to the people of Kenya collectively as a nation, as communities and as individuals’. Articles 60 to 72 take care of land and environmental issues. The articles stipulate the responsibilities of all the peoples of Kenya in ensuring that environmental standards are met. Most urban developments in Kenya (as elsewhere in Africa) take place outside planning control, and an estimated third of land and property transactions occur outside legal framework. Kenya has weaknesses in the existing institutional arrangements (Sifuna, 2009). These hamper the effective exercise of the function by the respective institutions. This has resulted in fragmentation in the institutional arrangements for land use control.

- **Cases of land and land use conflicts**

Liberian

H. Morris, 2009 stated that tens of thousands of Liberians were displaced during the 1999-2003 civil wars. Many returned to their villages to find their land had been sold on or taken over by neighbours. Disputes over land occurred all over the country, but were mainly concentrated in Nimba, Lofa and Bong counties, which had high levels of displacement. Since then many of the neighbour disputes have been resolved without too much difficulty, given that the conflicting parties already had an established relationship, and thus a shared interest in negotiating said Gregory Kitt, project manager with NGO Norwegian Refugee Council, which has helped resolve hundreds of land disputes over the past decade.

Kenya

In Kenya, as urban population grew rapidly, government at all levels failed to cope. Most urban developments in Kenya (as elsewhere in Africa) take place outside planning control, and an estimated third of land and property transactions occur outside legal framework (ibid).

Conflict in land use is also reflected in the KMA report on Aids to Navigation assessment. Wyatt, (2007) in this report, he indicated a worrying tread of encroachment and obstruction of AIDs to Navigation (Light houses and beacons) by developments along the sea shores. This is affecting the docking of ships and endangers safety and security of life at sea. The obstruction also threatens blacklisting of Mombasa port as a point of entry due to safety issues. The feasibility study report by SOK (2013) on Bench Marks also indicate a worrying tread of destruction of fundamental monuments (geodetic control beacons, fundamental bench marks and triangulation pillars) which are usually very expensive to establish and of primary importance to land matters.

Nairobi County has not been spared either. Recently Kenyans witnessed loss of life and property from land use conflict as is seen from the cases of the Sinai fire tragedy (2011), where people and property were burned beyond recognition. The Sinai slum lay on an oil pipeline, when the pipe carrying hundreds of litters of petrol busted,

petrol gushed along the river, caught fire which killed and injured hundreds of residents. The political interference always hinders relocation of such residents, protecting them and the land they occupy (unconfirmed view).

Plate 1, is a pictorial representation of Sinai fire tragedy and its aftermath, which shocked Kenyans the day it happened.

The demolitions of buildings in road reserves and transport corridors have left majority of Kenya citizens calling for land redress. The same government which issued them with titles is the same government that orders demolitions of their investments. This is seen in the cases of Syokimau – Plate 2; Langata and Thika road demolitions. Koinange (2013) brought out the story of Keng'ara, a civil servant, who lamented that he spent close to sh6 million to put up his Lang'ata house.

> *"My entire life savings are gone right here" (Keng'ara, 52 in Koinange, 2013). His house was demolished by armada of bulldozers and excavators supported by an army of hired destroyers. He said "By the time I got here, my bungalow was gone."*

Plate 1 : Result of Land use conflict; Sinai fire tragedy (2011)

Petrol leakage that exploded into fire-bolls meandering along the river

The Petrol fire ignited iron sheet structure that were constructed along the riparian reserve of the river

The aftermath of the fire that destroyed properties and left many dead and others with serious burns

Source: NTV (2011)

Keng'ara was crestfallen and says he bought the 15million (15m×43m) plot in 2003 and received the title deed of the previous owner. He did not complete the transfer assuming the property was his anyway. He spent approximately Ksh.6 million to

purchase and put up a three bedroom bungalow. His investment was supported by a loan. He is liable for the loan despite his dream crashing that Saturday, July 20, 2013. Keng'ara lamented (quoted from the newspaper but cannot be confirmed)

> *"I really blame our Government, they cannot protect us, they give us a title deed then come and destroy our house, they should compensate us, am so bitter and angry that I do not feel like a Kenyan anymore".*

Plate 2: Result of Land tenure conflict - Syokimau case 2011

The pictures depict merciless destruction of private properties by Kenyan authorities. Many dreams of owning a home went down in rabble

Source: Citizen TV (2011)

In Nairobi the issue of land grabbing has gone a notch higher; government as well as private land has been grabbed by mighty and powerful some of whom are politically correct. The government had to intervene in the Kiambu – Dandora land issue where many people lost their lives before government intervention (unconfirmed report). Presently most of land in Eastland is occupied by people who are not the rightfully

registered owners (source of information cannot be diverged because of security reasons and the sensitivity of the matter).

The opposition to relocate the Dandora dumpsite to Ruai is a good case of potential land use conflict. The stakeholders especially those in aeronautical industry objected its relocation arguing that it would endanger the aeronautical navigation due to the attraction of birds to the site which is on the flight path. The late Wangari Mathai also protested and prevented the construction of a sky scraper at Uhuru Park and was roughed up by the Moi regime for her stand. She won the struggle and the project was abandoned.

Mbithi (1982) described land as 'a cultural artifact that holds a very significant position for one's orientation towards his or her social and economic wellbeing. While individual owners have sweeping user rights over the land they own, the unique characteristics of land as well as its crucial place in the life of humankind make a compelling case for public intervention into the regime of private land. This necessitates the regulation of the use of such land in the public interest. Five specific grounds justify intervention in the use of land despite its system of ownership. These are: the scarce nature of land; ethical considerations; environmental considerations; land planning needs; and public responsibility for promotion of the public good.

2.2.2. Policy, Legal and Institutional framework of Land use control

2.2.2.1. Policy Framework

- **Kenya Vision 2030**

Kenya Vision 2030 is the country's blue print covering the period 2008- 2030. It aims at transforming Kenya into a newly industrialized middle income country and providing a high quality life to all citizens by 2030.

To realize the socio-economic transformation, the Vision will require that its three pillars be firmly anchored on six foundations: Infrastructure; Science, technology and innovation; Land reform; Human resource development; Security; and Public service

reform. These foundations will be developed to support the Vision and the country's overall development process.

- **Nairobi Metro 2030**

Nairobi Metro 2030 is part of the overall national Kenya Vision 2030. It recognizes the need to develop a strategy for the NMR resulting from the rising urban sprawl due to lack of a comprehensive framework. It further asserts that urban sprawl has rapidly decimated the rural land uses by encroaching into rich agricultural hinterland in Kiambu, Thika and Kajiado areas and so there is need to subvert this.

- .**National Land Policy (2007)**

The policy's vision is to guide the country towards efficient, sustainable and equitable use of land for prosperity and posterity. Its mission on the other hand is to ensure positive land reforms for the improvement of the livelihoods of Kenyans through the establishment of accountable and transparent institutions dealing with land.

- **National Urban Development Policy (2012)**

This policy recognizes planning as the software for delivering urban development as it provides a structured framework for coordinating and integrating sectoral plans and activities, and supports the systematic implementation of urban development programmes. In addition, it provides a platform for mobilization for public participation in urban development while also seeking to optimize resource allocation and utilization. Planning promotes individual initiatives while safeguarding public interest. Moreover, planning is an instrument for initiating, guiding, monitoring and appraising of urban development activities.

The policy further points out that to promote balanced urban development, National and County governments will review criteria for classification and designation of urban areas and cities; review and develop urban land use classification and urban design; promote mixed land use development; identify and classify urban areas on the basis of clearly defined criteria; facilitate the development of at least one municipality in every county; promote the development of the county headquarters to municipal

status; and make urban areas the focal points for delivery of services at national and county levels.

2.2.2.2. Legal Framework

- **The Constitution of Kenya (2010)**

Article 40 (1)

Subject to Article 65, every person has the right, either individually or in association with others, to acquire and own property of any description and in any part of Kenya. This article also states that Parliament shall not enact a law that permits the State or any person to arbitrarily deprive a person of property of any description or of any interest in, or right over, any property of any description or limit, or in any way restrict the enjoyment of any right under this Article on the basis of any of the grounds specified or contemplated in Article 27 (4).

Article 42: Environment

It indicates that every person has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefits of present and future generations through legislative and other measures particularly those contemplated in Article 69 on obligations relating to the environment fulfilled under Article 70.

Article 66(I)

It indicates that the State may regulate the use of land or any interest in or right over any land in the interest of defense, public safety, public order, public morality, public health or land use planning.

Article 184. Urban Areas and Cities

National legislation shall provide for the governance and management of urban areas and cities and shall in particular establish criteria for classifying urban areas and

cities and principles of governance and management of urban areas and cities as well as provide for participation of residents in governance of urban areas and cities.

- **National Land Commission Act (No. 5 of 2012)**

Section 5(1) (h) – Functions of the Commission

Pursuant to Article 67(2) of the Constitution, the functions of the Commission shall be to monitor and have oversight responsibilities over land use planning throughout the country.

- **County Governments Act (No. 17 of 2012)**

An Act of Parliament to give effect to Chapter 11 of the Constitution of Kenya 2010. Section 37 states that a county executive committee shall; monitor the process of planning, formulation and adoption of the integrated development plan by a city or municipality within the county; assist a city or municipality with the planning, formulation, adoption and review of its integrated development plan; facilitate the coordination and alignment of integrated development plans of different cities or municipalities within the county and with the plans, strategies and programmes of national and county governments; and take appropriate steps to resolve any disputes or differences in connection with the planning, formulation, adoption or review of an integrated development plan.

- **Urban Areas and Cities Act (No. 13 of 2011)**

This is an act of parliament to give effect to Article 184 of the Constitution of Kenya. Section 13 and 14 provides for establishment and membership of boards of cities and municipalities. Section (20) gives the functions of the Board, that subject to the provisions of this Act, a board of a city or municipality shall oversee the affairs of the city or municipality; develop and adopt policies, plans, strategies and programmes, and may set targets for delivery of services; formulate and implement an integrated development plan; control land use, land sub-division, land development and zoning by public and private sectors for any purpose, including industry, commerce, markets,

shopping and other employment centres, residential areas, recreational areas, parks, entertainment, passenger transport, agriculture, and freight and transit stations within the framework of the spatial and master plans for the city or municipality as may be delegated by the county government; and promote & undertake infrastructural development and services within the city or municipality; among other functions.

- **Land Registration Act (No. 3 of 2012)**

In Section 3 are the application of the Act while Subject to Section 4, this Act shall apply to registration of interests in all public land declared by Article 62 of the Constitution; registration of interests in all private land as declared by Article 64 of the Constitution; and registration and recording of community interests in land.

Section 16(1) gives power to alter boundary lines and to prepare new editions and states that the office or authority responsible for survey of land may rectify the line or position of any boundary shown on the cadastral map ,based on an approved subdivision plan, and such correction shall not be effected except on the instructions of the Registrar, in writing, in the prescribed form ,and in accordance with any law relating to subdivision of land that is for the time-being in force.

- **Land Act (No. 6 of 2012)**

An Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes.

- **Physical Planning Act (Cap 286)**

The County Governments have the statutory mandate to undertake development planning and control land and building development within their areas of jurisdiction. Section 29 states that subject to the provisions of this Act, each local authority shall have power to control or prohibit the sub-division of land or existing plots into smaller areas; consider and approve all development applications and grant all development

permissions; and formulate by-laws to regulate zoning in respect of use and density of development.

In Section 30(1), no person shall carry out development within the area of a local authority without a development permission granted by the local authority under Section 33. Section 31(a) states that any person requiring development permission shall make an application in the form prescribed in the Fourth Schedule, to the Clerk of the local authority responsible for the area in which the land concerned is situated. While in section 33(1), subject to such comments as the Director may make on a development application referred to him under Section 32, a local authority may in respect of such development application grant the applicant a development permission in the form prescribed in the Fifth Schedule, with or without conditions or refuse to grant the applicant such development permission stating the grounds of refusal.

- **Survey Act (Cap 299)**

Section 22 states that Surveys of land to be conducted under direction of Director for Any survey of land for the purposes of any written law for the time being in force relating to the registration of transactions in or of title to land (other than the first registration of the title to any land made in accordance with the provisions of the Land Consolidation Act (Cap. 283) or the Land Adjudication Act (Cap. 284)) shall be carried out under and in accordance with the directions of the Director.
The Act also gives procedures and regulations governing all survey activities.

- **Environmental Management and Coordination Act (1999)**

The Act, in its second schedule, identifies a number of projects for which Environmental Impact Assessment has to be done before their undertakings. Some of these projects are of the transportation category including construction of all major roads; all roads in scenic, wooded or mountainous areas and wetlands; railway lines; airports and airfields; water transport; and Oil and gas pipelines.

2.2.3. Best practice: Case of Miami lakes

2.2.3.1. Introduction

Miami Lakes is a suburb of Miami, an incorporated town in Miami-Dade County, Florida, United States. According to the United States Census Bureau, it has a total area of 17 km² of which 1.0 km² is water.

The largest land use in the town is residential comprising approximately 40% of Miami Lakes' total land area of 4,363 acres. Other principal land uses are light industrial and office parks comprising 13% of the land area, and lakes and canals which constitute about 11% of the town. The Town is approximately 94% built out, with only a small portion of the land remaining vacant and undeveloped.

In 2000 census, the population was 22,676 with 8,248 households, and 6,111 resident families. The population density was 1,469.0 per km2 as recorded by the U.S. Census Bureau.

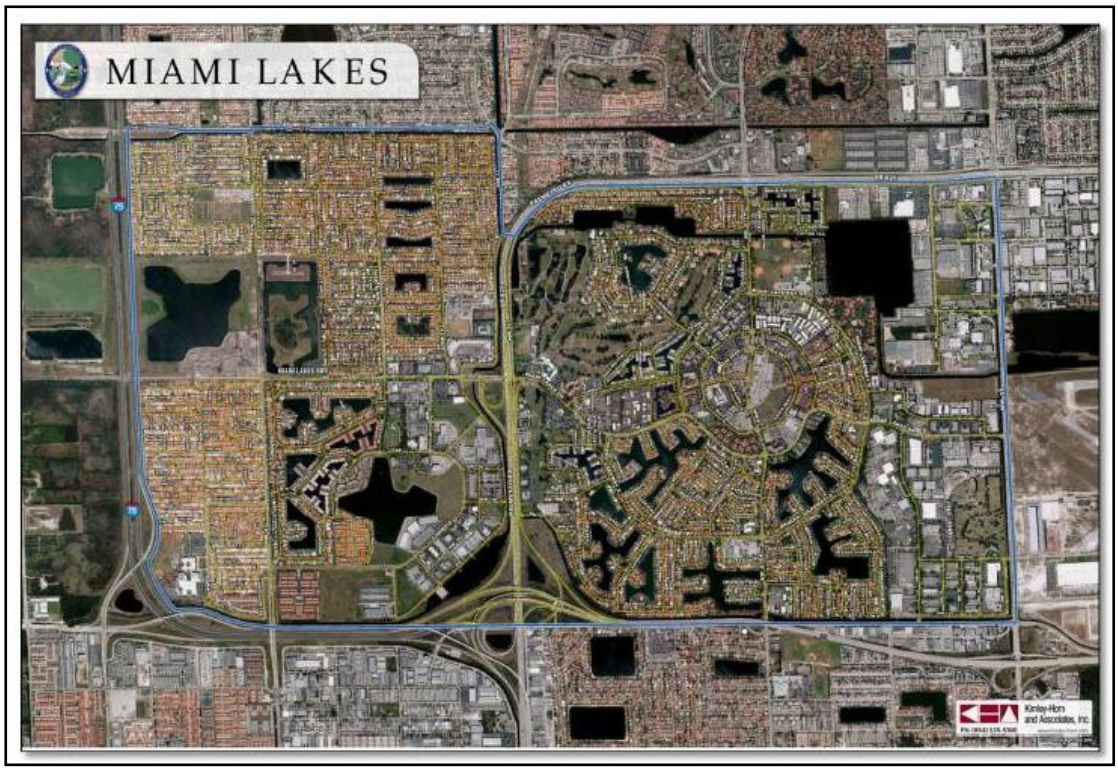
Spatial location

Miami Lakes is approximately 6.8 square miles and located in Northwest Miami-Dade County on both sides of the "big bend" along the Palmetto Expressway, just 16 miles North of Downtown Miami and 10 miles from Miami International Airport (Zoning & Enforcement - Town of Miami Lakes). Figure 7 shows a location view of the town.

2.2.3.2. Concept of Miami Lakes

The original Miami Lakes development was master planned by Lester Collins with curving tree-shaded roadways and numerous curving lakes, which are unusual compared to most surrounding areas with their treeless streets on a square grid and rectangular lakes. The town is an early model of the new urbanism movement with shopping and services located in walking distance of residences as well as narrow walkable streets and plenty of neighborhood parks. It was incorporated as a town on December 5, 2000.

Figure 7: Miami Lakes Location Map



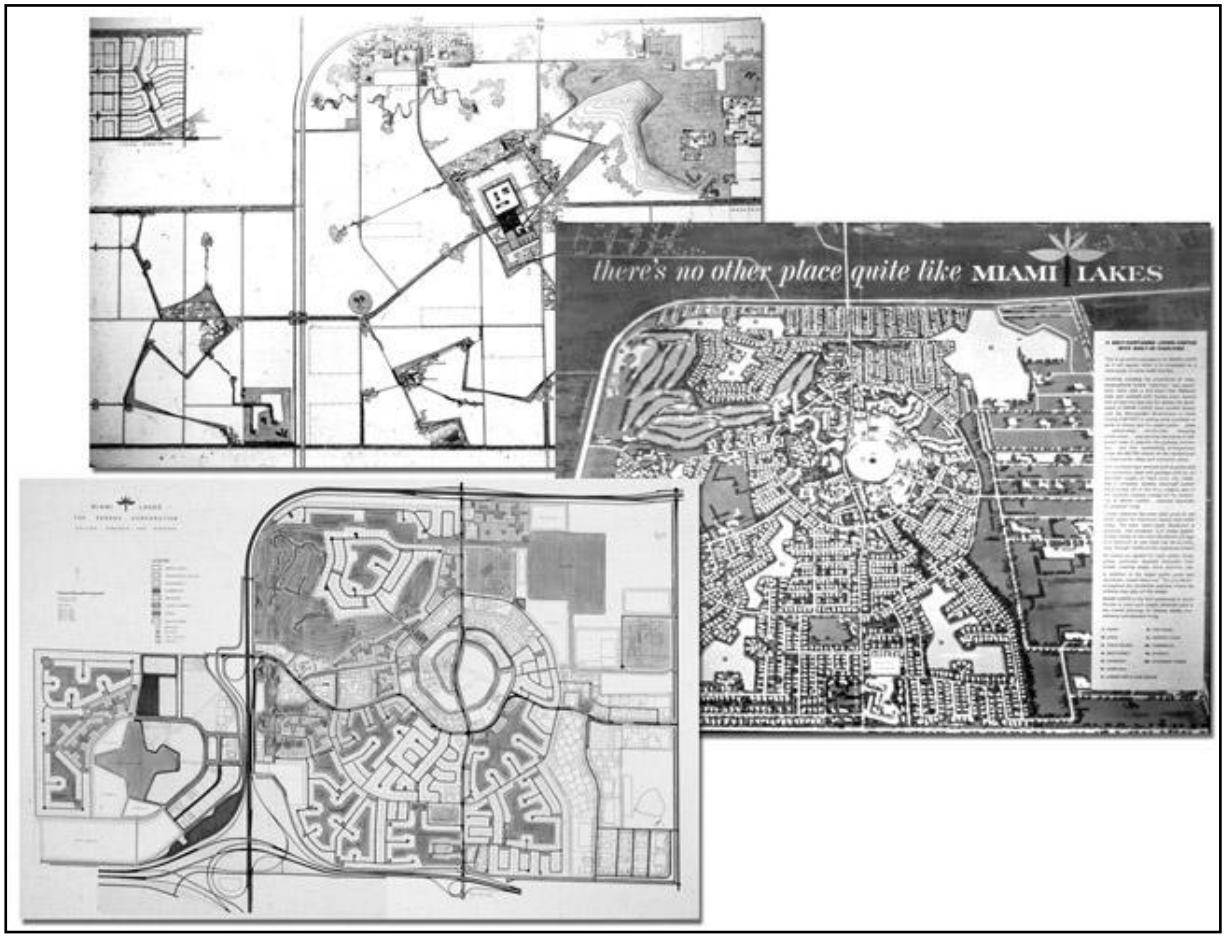
Source: Adopted from Kimley-Horn and Associates, Inc., 2012

2.2.3.3. Master plan

Implementation of the Master Plan began over 50 years ago, when the Graham family began development of what was their dairy farm. Unlike many cities and towns created during the early 1960s, the Grahams decided to create a master plan for the city that would allow for decades of growth, construction, and changing market conditions. Lester Collins, former Dean of the Harvard School of Architecture, was enlisted to create a Master Plan for the area that would become the center of Miami Lakes. Collins laid the foundation for an integrated community, including residential, commercial, industrial and mixed uses.

Figure 8 shows images of the town at different stages of growth as implementation of the Master plan continued to take effect.

Figure 8: Miami Lakes at defferent stages of implementation of her Master Plan



Source: http://miamilakes-fl.gov/

Collins' original concept for the town continues to be incorporated into new planning and development, and has been recognized by national and local media as one of the best examples of community master planning in Florida.

The precise planning and development of the original 3,000 acres of land led to a vibrant and beautiful city with parks, 23 lakes, tree-lined streets, and a hometown atmosphere. It is praised for its winding streets, lush landscaping, generous parks, peaceful cul-de-sacs, and controlled mixed use and exclusive business parks. It has continued to strive for innovation while remaining true to its original founders' vision of providing the highest quality of life for its residents and visitors.

2.2.3.4. Features of Miami Lakes

Quality of Life

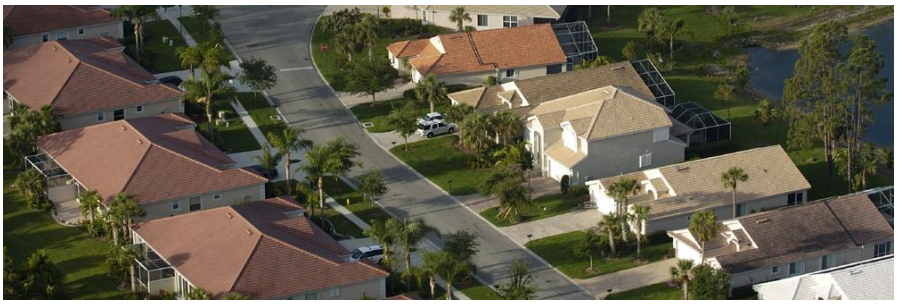
Kimley-Horn and Associates, Inc., 2012 stated that Miami Lakes is known as one of the most beautiful residential areas in South Florida for its tree lined streets, large estate lots, and extremely low crime rate. Residents are provided with friendly and helpful services by the Office of the Town Manager, Office of the Town Clerk, Budget & Administration, Building Department, Community Development Department, Community & Leisure Services Department, Public Works Department and the Police Department.

The Leisure Services Department is responsible for overseeing one of the most unique parks systems in Miami-Dade County consisting of 98 total park locations in a 6.5 square mile area, a park in walking distance of almost every neighborhood in the Town. There are community programmes at all levels that bring residents together.

Over the last 40 years, Miami Lakes has progressed from a dream on paper to a reality. This vibrant community is nationally recognized as one of the best examples of unique and innovative town planning with lakes and canals making up about 11%. The town's main goal is to continue with the enhancement of Miami Lakes' quality of life and unique community feel through visionary land use planning, efficient provision of public facilities and services, protection of neighborhoods, and conservation of those built and natural assets which define the town.

The Town is also recognized for its abundant, beautiful tree canopy, Plate 3. Its exceptional tree management practices were once awarded both the Tree City USA Certification and Growth Award designation which are yearly awards.

Plate 3: **Houses in gated communities in Miami**



Source: Royal Palm Estate

Plate 3 shows a layout of executive houses located in The Private Guard Gated Community of Royal Palm Estate.

Miami Lakes has received the Tree City USA Designation for eight (8) consecutive years and the Growth Award for six (6) consecutive years. These designations are awarded to cities/towns for their excellence in urban forestry management. This award is designed not only to recognize achievement, but also to communicate new ideas and help the leaders of all Tree City USAs plan for improving community tree care. The Tree City USA Growth Award is given to communities that go beyond the standards of Tree City USA and demonstrate improvement and growth of local tree care. It has a comprehensive Tree Management Plan which establishes an organized, proactive tree maintenance program. to ensure "Growing Beautifully." Plate 4 and Plate 5 gives a pictorial view of some of the beautiful features in the town.

The Mayor Wayne Slaton once said *"The beautiful tree canopies in Miami Lakes have long been the signature of the Town, the canopies contribute significantly to the environment, the economy, and the overall well-being of the residents. I am proud of the efforts made by staff to maintain this designation for 8 years in a row."*

Plate 4: Miami homes

Source: Royal Palm Estate

Plate 5: Miami streets

Source: Kimley-Horn and Associates, Inc., 2012

Public Facilities in Miami Lakes

There are thirteen (13) K-12 schools in Miami Lakes, six (6) public schools and seven (7) private schools. The public schools belong to one district, Dade School District. There are six (6) Miami Lakes elementary schools, six (6) Miami Lakes middle schools, five (5) Miami Lakes high schools and twenty (20) Miami Lakes preschool schools. There exist fifty six (56) hospitals in or near Miami Lakes.

The Storm Water Master Plan

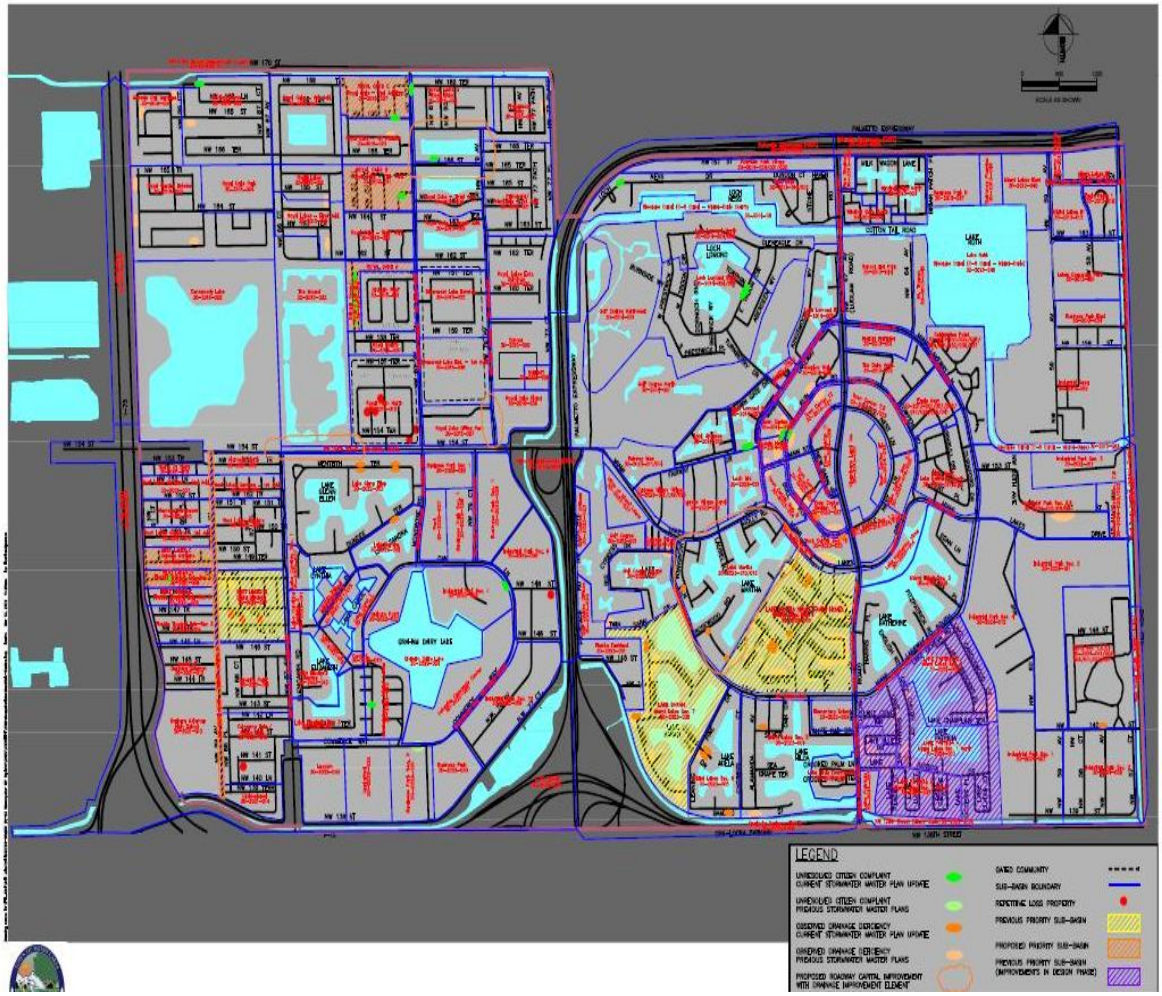
In order to mitigate the negative effects of storm water surface runoff, there are ongoing maintenance program known us Capital Program. The implementation of these projects is evaluated progressively in order to identify additional Capital Improvement Projects for future reduction of flooding and improvement of water quality within the Town of Miami Lakes. Performance of each drainage sub-basin is continuously evaluated and to ensure that drainage improvements meet South Florida Water Management District (SFWMD) and improvements of the Master Plan is done using the evaluation data.

Plate 6: A flooded street

Source: Kimley-Horn and Associates, Inc., 2012

Figures 7 show the kind of GIS done in the town to evaluate flooding from storm water and poor drainage. It is after the analysis that mitigation measures are put in place.

Plate 7: Drainage Deficiencies and Priority Sub-Basins Identified in 2006



Source: Adopted from Kimley-Horn and Associates, Inc., 2012

Catch Basin and Canal Maintenance

Minor Repairs and Improvements such as Pipe flushing and exfiltration trench cleaning are typically performed in conjunction with catch basin cleaning.

Plate 8: Drainage maintenance

Source: Kimley-Horn and Associates

Traffic

Miami Lakes has a Calmed Environment. Angled on-street parking and flared sidewalks, narrow travel lanes, small building setbacks, brick crosswalks, and tree-lined streets are used to calm traffic in its town center. Its residential street network is designed around short segments and T-intersections, and curves have been inserted into its main thoroughfares for the sole purpose of slowing traffic Plate 8.

Plate 9: Image of the Miami streets

Source: Best development practices

2.2.3.5. Implementation and management of Miami Town Plan

Since its incorporation, the Town of Miami Lakes operates under a Council-Manager form of government. The Council-Manager system combines the strong leadership of elected officials with the strong managerial experience of an appointed Town Manager. The Mayor and Council are elected to represent the citizens of the community and to develop policy.

Kimley-Horn and Associates states that Miami governance mission is "to educate the residents and business owners of the Town of Miami Lakes on local code regulations and ordinances, to assist residents and business owners in achieving compliance.

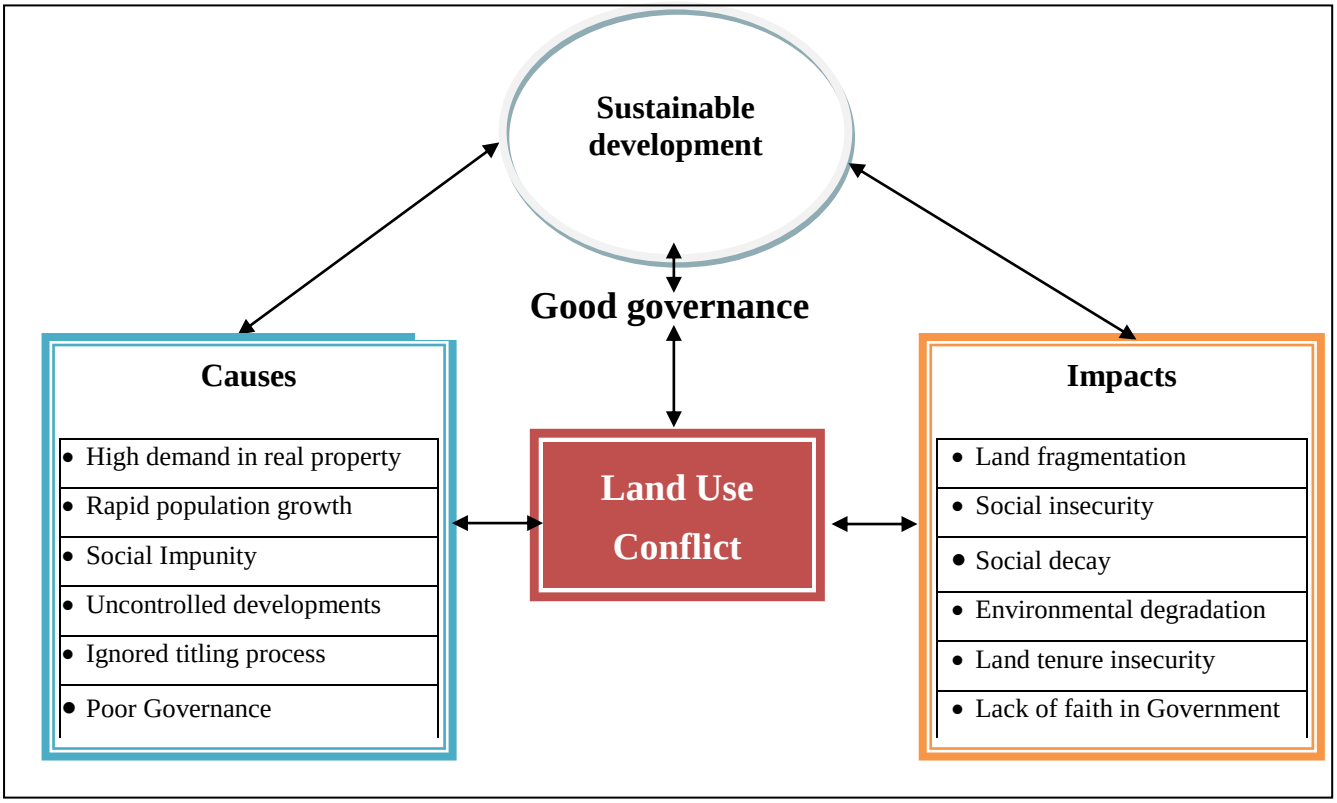
The Neighborhood Services Department is responsible for assuring that all commercial, industrial and residential properties comply with the Town's Code, to ensure that the quality of life and property values continue to rise and the community continues "growing beautifully".

Through proactive patrolling, the Department oversees that residents obtain all necessary permits for construction and alterations to their properties to ensure that the contractors/builders abide by the Florida Building Code which makes for a structurally safe community. There are friendly and courteous staffs that handle questions relating to the code process and complaints are generally investigated within two days. Florida Statutes require all local governments to prepare an evaluation and appraisal report (EAR) assessing the progress in implementing their comprehensive plan. The EAR is intended to serve as a summary audit of the local

government's comprehensive planning process and evaluate the success of a community in addressing community issues (Kimley-Horn and associate Inc, 2012).

2.2.4. Best practice: Case of Miami lakes

Figure 9: Conceptual framework



Source: Author, 2014

CHAPTER THREE: RESEARCH METHODOLOGY

3. 0 Introduction

This chapter basically addresses the methodology employed in the research. Central to this area is the research and sampling design, data needs and their sources, data collection methods, analysis and presentation.

3. 1Research design

A non experimental design is used in the research since there are no control variables and all subjects were interrogated in their natural settings. Survey was conducted in order to collect data on the land tenure conflict.

The collected data is analyzed, conclusions drawn and recommendations given.

A pilot study was conducted prior to the actual study.

3. 2 Key target population

The key target population was:-

- Household/land owners: To understand the origin, nature and effects of land tenure conflict, the target population will be households/landowners in the entire Drumvale sub-location. This population would also bring light on the informality in land subdivision and development.
- Key informers: Local administration, Drumvale cooperative, Private Surveyors and County surveyor will be targeted in order to understand the kinds of conflicts that are reported and the manner in which they are addressed.
- Two specific land use conflict cases were analyzed in order to understand the process of conflict resolution.

3. 3 Sampling plan

Unit of measure

Units of analysis comprised of parcels of land, households/ land owners and key informants in the issue of land use conflict.

Sample Frame

The sampling frame consisted of

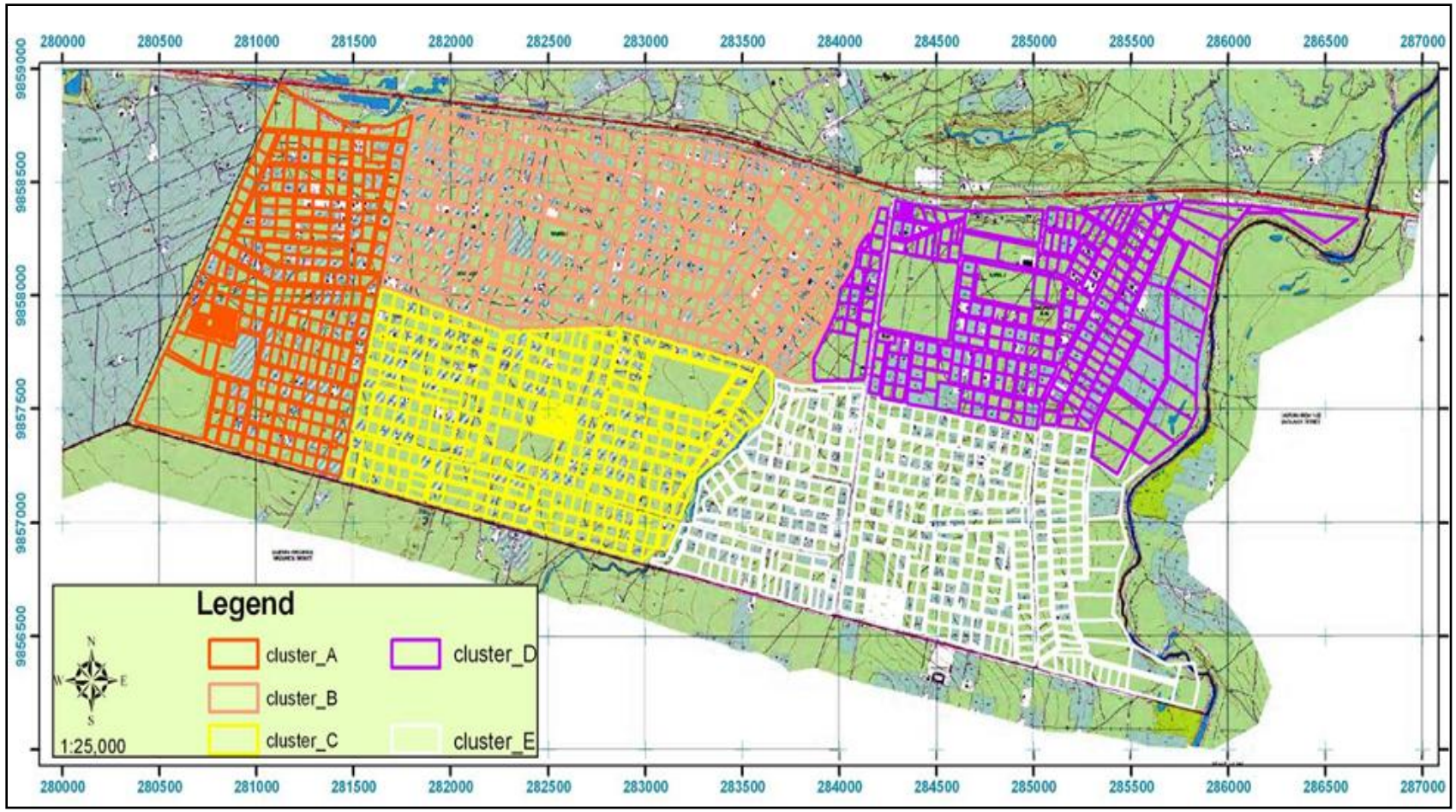
- All registered parcels of land in Drumvale
- All households/land owners in Drumvale Sub-location
- All institutions dealing in land use conflict in Drumvale

Type of Sampling

- **Cluster random sampling**

The sub-location was divided into five cluster regions, Figure 8, by use of existing roads and area size. A simple random sampling was used to select three clusters in which the study was carried. The area was assumed to be homogeneous in relation to land use conflict for the entire region. The remaining two clusters were used for the pilot study to test the data collection methods and the instruments for validity and reliability.

Figure 10: Map showing the cluster regions



Source: Author compiled from SOK data (2014)

- **Simple Random Sampling:**

This was used to obtain samples from the selected cluster regions. The registered land parcels sample frame was established by use of RIM data from SOK. Using the parcel numbers the randomly selected subjects were plotted, using GIS software and a base map compiled, in order to establish their spatial locations for accessibility and planning for an efficient data collection (the map enabled a systematic data collection manner starting from the subjects closest to the starting point of survey).

- **Sample sizes**

Sample sizes were determined with respect to the subject population, finance limitation and the study timelines. Drumvale location has a population of approximately 1600 one acre parcels of land which was used to sample the households. It was not possible to take measurements of the whole population due to the large size of population subject and therefore a representative sample was used in the research. This is supported by Kothari (2004), who orates that the size of a sample should neither be excessively large, nor too small but optimal and further states that an optimum sample size is one which fulfills the requirements of efficiency, representativeness, reliability and flexibility.

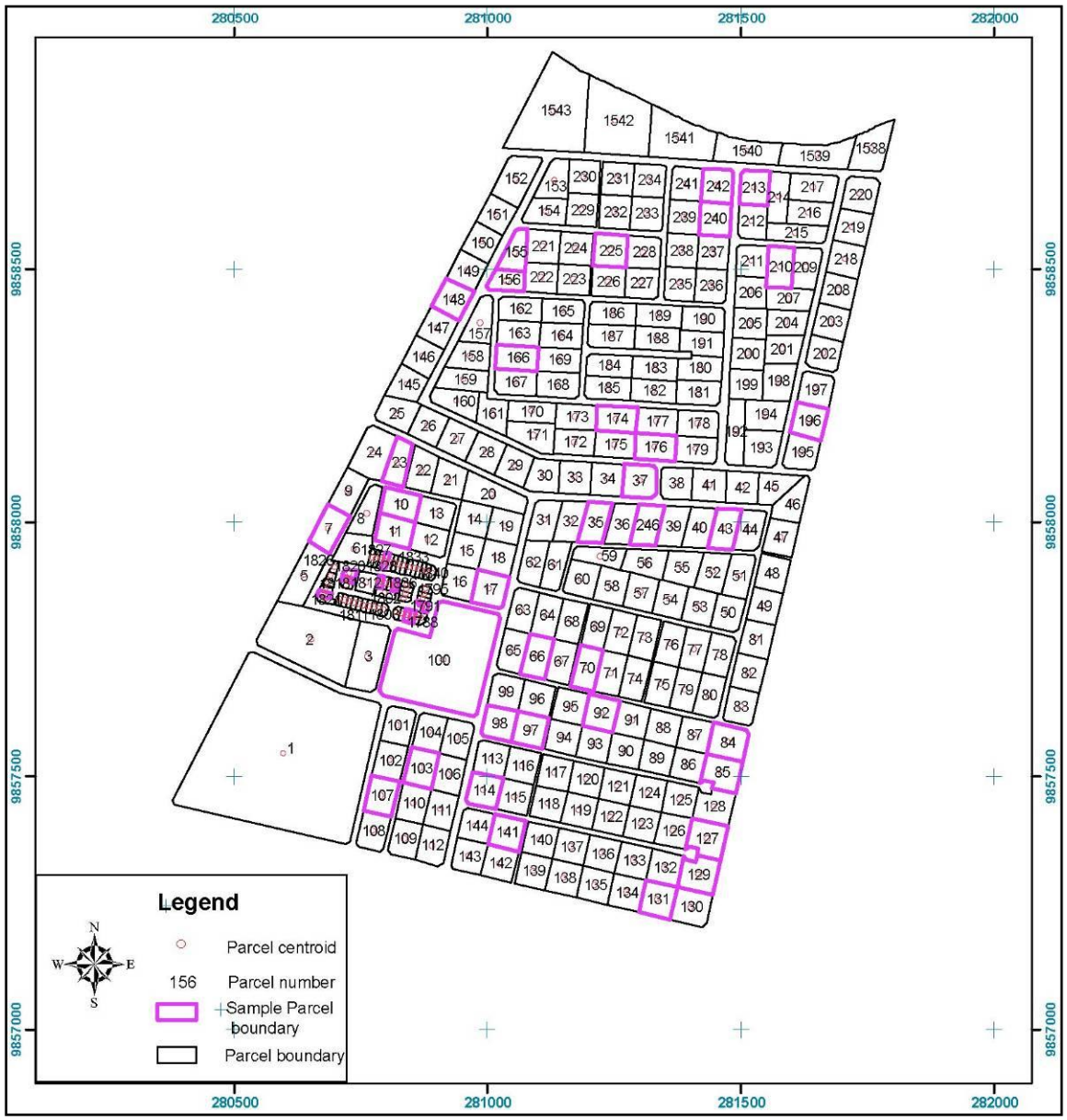
Due to homogeneity of the study area and also according to Mugenda O. and A. Mugenda, (2003), who assert that a sample size of 30 is good enough for a scientific research, the researcher used these as the basis of determining the sample size and in this study a minimum of 30 + 6 elements was used in each of the selected cluster putting into consideration cases of bad responses. Therefore, in this case the sample size for each cluster used is 36 giving a total sample of 108.

Table 3: Sample size matrix for household/land owners

Cluster	Sample unit	**Sample frame**	**Sample size**
A	Household/Land owners	302	36
B	Household/Land owners	400	36
C	Household/Land owners	420	36

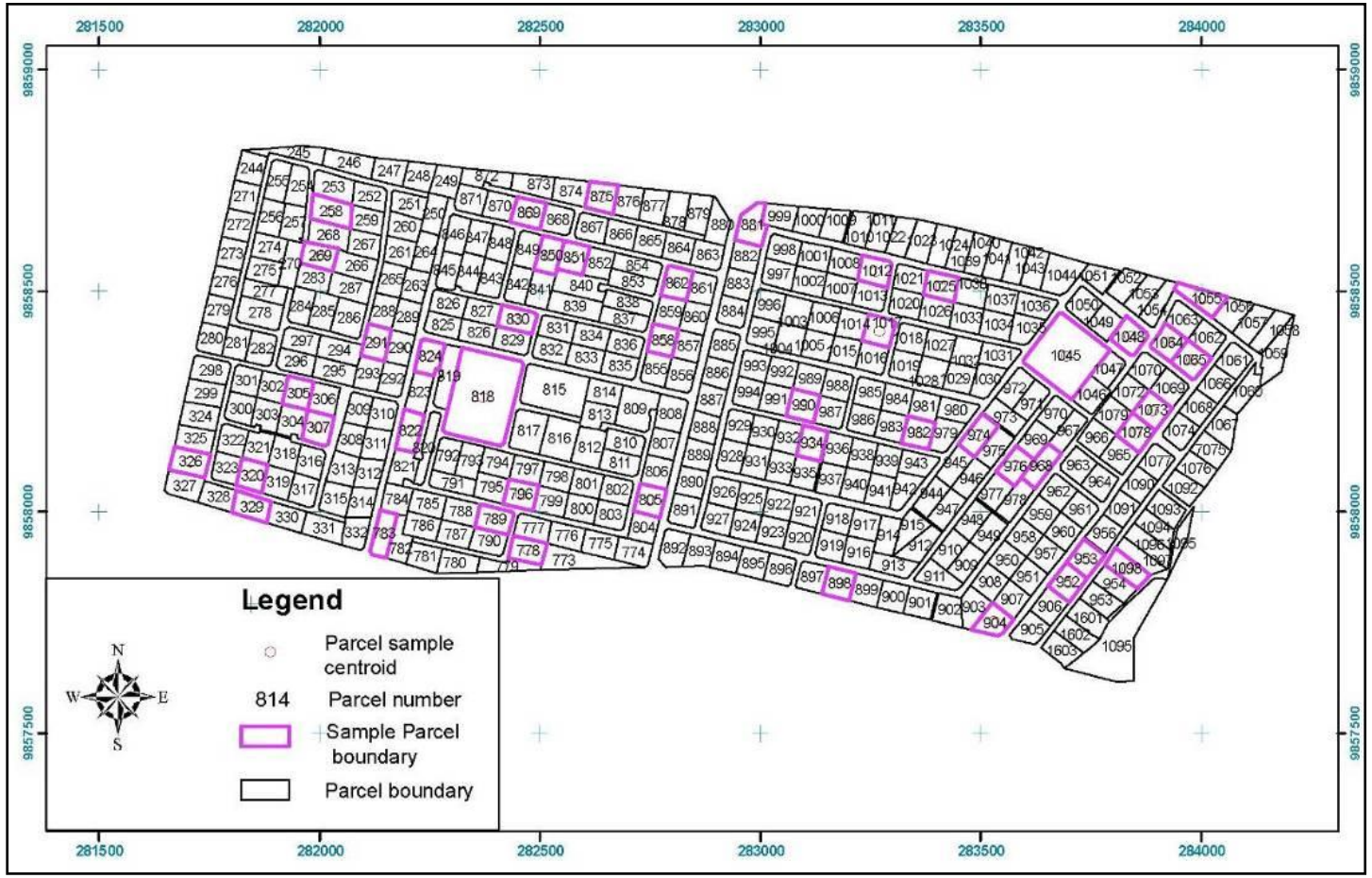
The following Figures (9, 10 1nd 11) are maps illustrating the spatial location of the selected land parcels from the three randomly selected clusters (Cluster ‘A’, ‘B’ and ‘E’) that were compiled from the parcel numbers.

Figure 11: Cluster 'A' cadastral layout showing sample land parcels



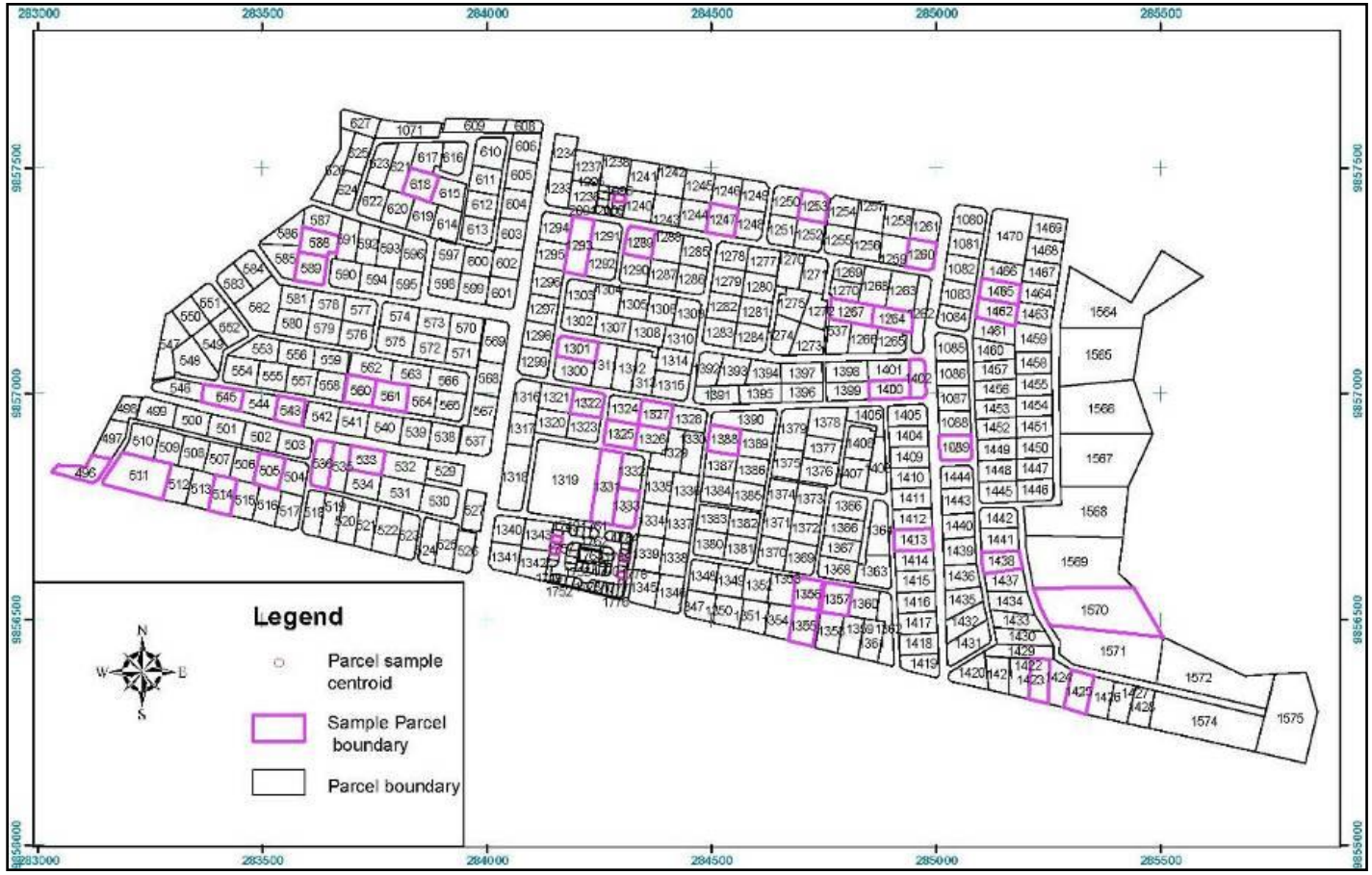
Source: Compiled by the author from sample selection and SOK –RIM

Figure 12: Cluster 'B' cadastral layout showing sample land parcels



Source: Compiled by the author from sample selection and SOK –RIM

Figure 13: Cluster 'E' cadastral layout showing sample land parcels



Source: Compiled by the author from sample selection and SOK –RIM

- **Census**

A census was used in getting responses from the key informants involved in land use conflict issues. These institutions are

- Local administration,
- Drumvale cooperative,
- Private surveyors
- County surveyor
- Company liquidator

- **Purposeful sampling**

This method of sampling was used to select specific cases of land tenure conflict for case studies within the research area. Four types of land tenure conflict have been pointed out from the literature review:-

- Land ownership conflict
- Environmental conflict
- Site development conflicts

Case studies will help in better understanding how different kinds of land tenure conflicts within the area of study have been addressed. In order to prepare for future conflict resolution the actor must understand the past and the present types and land issue. Two case studies were selected.

3. 4Data collection method and instruments

Data collection method used in the study was both primary and secondary data.

Secondary data was from literature review, reported conflict cases, base maps and Registry Index Maps.

Primary data was from the interviews and observations carried out during research survey.

3.4. 1 Instruments

- Interviewing: - Interview schedules were prepared and respondents interviewed. The respondents were the household, landowners and the key informants
- Observation method - the instruments were base maps, images, handheld GPS video and photographs. This made it possible to see the subjects as they appeared in their natural setting and analyzed the data later on in the laboratory.

Data collection was carried out by self assisted by three field assistants. Training of field assistants was done to avoid misinterpretation of questions and to ensure data quality (reliability and validity).

Due to the sensitivity of land use conflict issues, the assistants hired were selected on the bases of maturity, above 30 years and with certificate of good conduct. Two of them were male and one female to enable equal gender parity and avoidance of errors due to gender bias.

3.4. 2 Data cleaning and editing procedures

- Data was cleaned to remove those that have omissions and with bad language
- Data was then coded
- After coding the data, it was keyed in using SPSS and Excel software
- GPS data was downloaded and plotted by use of GIS software

Data cleaning and editing was done by self to ensure quality and integrity

Multiple sources of data and multiple methods of data collection was employed to enable examination and comparison of findings from different sources therefore bolstering the validity of research findings.

3.4. 3 Data input

Quantitative data was input and analyzed using SPSS (Statistical Package for Social Sciences) and also Microsoft Excel programme. Qualitative data on the other hand was input in computers in form of maps, photographs, sketches, illustrations and plans while spatial data was analyzed using GIS software.

3. 5 Data analysis and presentation

A pre-analysis of data was first done. This involved systematic organization of the raw data (from questionnaires, observation guides/checklists and interview schedules) into a manner that facilitated easy analysis. Both qualitative and quantitative techniques were used in the analysis of the obtained data.

Maps and plans created through Geographic Information System (GIS) software or other relevant software and photographs were used to represent qualitative analysis of development in Drumvale estate. On the other hand, tables, charts and descriptive reports were used to represent quantitative data of the respondents‘(residents‘).

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3. 6 Data Reliability and Validity

- **Data Reliability**

This was mainly concerned with consistency, that is, the probability of obtaining the same information if the study was to be conducted again. In this regard, the reliability of data from the questionnaires was enhanced by use of interactional checks through direct observation.

- **Data Validity**

This was concerned with checking the respondents’ account with the situation on the ground. In this connection, validity of the data was enhanced through application of appropriate data collection methods as exemplified in the sampling methods, and also by

use of photographs and observational guides. This data was then compared with that from the respondents.

3. 7 Ethical implications

Subjects were informed of the study prior to data collection; their identity shall be kept anonymous unless they consent, in case the information is to be disclosed. Information is treated with confidentiality.

- A guarantee of anonymity and confidentiality was assured during the study.
- The subjects were told the truth and facts of the research.
- Data sources are acknowledged and research findings are availed.
- Information is treated with the confidentiality it deserves.

Table 4: Data Needs Matrix

Item	Research Objectives	Data Needs	Sources of Data	Data Collection Methods	Data Analysis	Data Presentation	Expected Output
1.	To examine the nature of the land use conflicts occurring in Drumvale? conditions in the area	• Types of land use conflicts • Where do the conflicts originate from • How and why the conflict occur • The frequency of the conflict • Those who are involved • Loss of income • Destruction of property • Legal implications • Money spent • Time factor	• Household • Land owners • Drumvale cooperative • Company liquidator • Private surveyors • County surveyor • Local administration	• Literature Review • Interviews to key informants/resource persons • Interview schedules • Observations	• Content Analysis • Frequency of conflict occurrences • Types of conflicts • Sources of conflict • Conflicts sites	• Reports • Maps on the sites and types of conflicts • Pie charts	• Nature of conflicts • Sources of conflicts • Reported land use conflict • Social – economic factors • Political and cultural factors
2.	To evaluate the underlying causes of land use conflicts in the study area	• Are site developments approved • What legal documents do owners possess • Information flow and availability • Cost factor Time factor • Tenure security • Efficiency in land management process • Possibility of conflict mitigation	• Household • Land owners • Drumvale cooperative • Company liquidator • Private surveyors • County surveyor • Local administration	• Literature Review • Interviews to key informants/resource persons • Interview schedules	• Content Analysis • Roles of the institutions • Frequency of reported cases • Awareness oft • regulations • Time factor • Availability of information	• Reports • Institutional framework matrix	• Roles played by the institutions • Knowledge about existing regulations • The gaps in the institutional framework
3.	To establish the effects of the land use conflicts on development and the general living	• Effects of land use conflicts • Environmental issues • Effects on development • General living conditions	• House holds • Literature • Available maps • Imageries • Key informants	• Literature Review • Interviews to key informants/resource persons • Interview schedules • Mapping	• Content Analysis • Frequency of occurrence • Pollution • Affected subjects • Conflicts sites	• Maps • Charts • Frequency tables	• Levels of effects • Time lost • Affected areas • Photographs of the effects

4.	To propose policy and planning interventions that can be sought to address the conflicts	• What are the existing regulations • Are they effective • What are the gaps • Who are the actors	• Household • Land owners • Drumvale cooperative • Company liquidator • Private surveyors • County surveyor Local administration	• Literature Review • Interviews to key informants/resource persons • Interview schedules	• Content Analysis • Time factor • Costs • Effectiveness of the present titling process • The best practice	• Reports • Institution frame work gaps matrix • Recommendation matrix	• Identified gaps • Recommendations

Source: Author, 2014

CHAPTER FOUR: BACKGROUND OF THE STUDY AREA

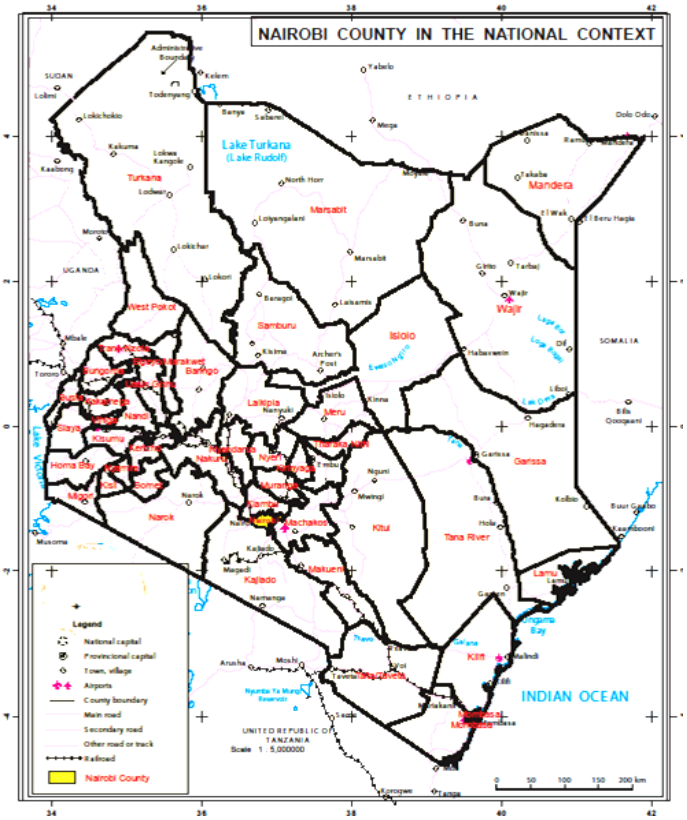
4. 0. Introduction

This chapter looks at the physical location of the study area, its environment, and history of development, population characteristics, land use and looks at its neighbourhood.

4. 1. Physical location

Study area is the entire Drumvale estate that forms Kamulu sub-location of Ruai Location. It is located at the extreme east of Nairobi County bordering Machakos County but on the southern side of Kangundo road. Figure 14 shows the location of Nairobi County in the context of the Republic of Kenya

Figure 14: Map showing Nairobi County in the National context



Source: Compiled from SOK data

Figure 15 and Figure 16 are maps of Drumvale Estate in the context of Nairobi County and topography respectively.

Figure 15: Map showing Drumvale Estate in Regional context of Nairobi County

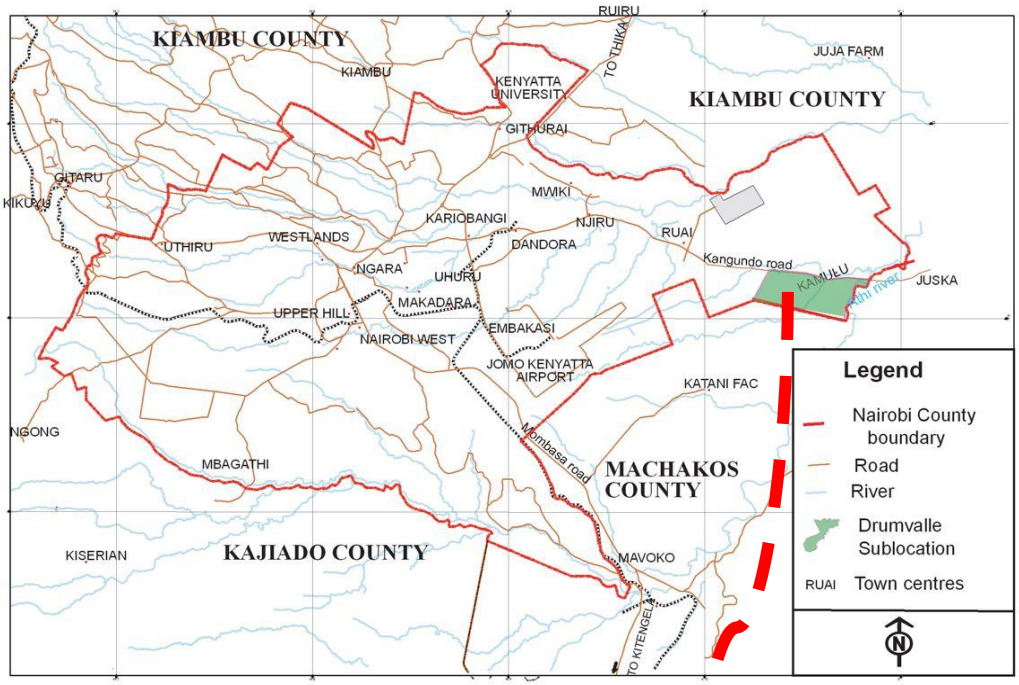
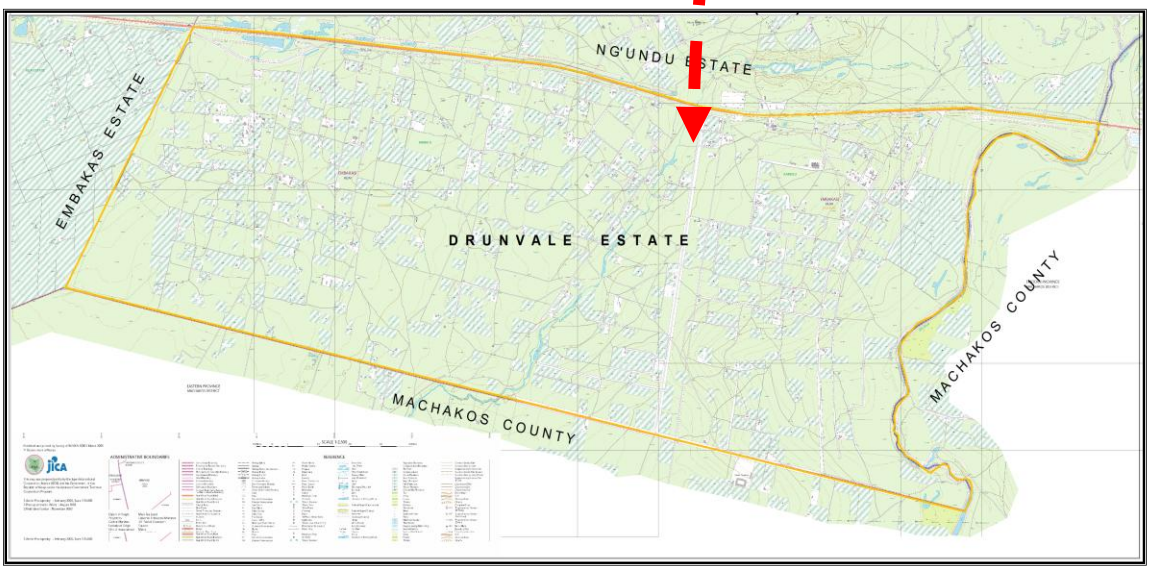


Figure 16: Topographical Map of Drumvale Estate (2005)



Source: Survey of Kenya

4. 2. Physical and Natural Environmental Characteristics

The physical and natural environment gives a view of the nature of the area environment and its suitability in of land use. The soil types dictate the type of structural establishment needed in site development as well as whether excavation is needed in preparation of foundations for construction**.**

4. 2.1 Rainfall and Temperature

The area, which is part of Nairobi, has a bimodal type of rain pattern with the long rains being experienced between April and June. The short rains are received between the months of October-December. Average annual rainfall is about 900 millimetres and the average annual temperature is about 20 degrees centigrade. The temperature ranges from 21^0C to 26^0C, with lowest temperature being recorded in the months of June and July. The highest temperatures occur in the months of January to march (Table 5). This provides suitable warm temperatures for most part of the year which can support long hours of work. The area is grassland with few acacia trees, shrubs and unreliable rains.

Table 5: Precipitation and Rainfall Patterns of Nairobi

Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Average	24.5	25.6	25.6	24.1	22.6	21.5	20.6	21.4	23.7	24.7	23.1	23.4
High ^{o}C (^{o}F)	(76)	(78)	(78)	(75)	(73)	(71)	(69)	(71)	(75)	(76)	(74)	(74)
Average Low	11.5	11.6	13.1	14.0	13.2	11.0	10.1	10.2	10.5	12.5	13.1	12.6
^{o}C (^{o}F)	(53)	(53)	(56)	(57)	(56)	(52)	(50)	(50)	(51)	(55)	(56)	(55)
Precipitation	64.1	56.5	92.8	219.4	176.6	35.0	17.5	23.5	28.3	55.3	154.2	101.0
Mm (inches)	(2.52)	(2.22)	(3.65)	(8.64)	(6.95)	(1.38)	(0.69)	(0.93)	(1.11)	(2.18)	(6.07)	(3.98)

Source: WorldWeather.org, 2008

4. 2.2 Topographical features and Geology

Drumvale is at the lowest altitude of Nairobi of approximately 1,661 meters (5,449 ft) above sea level. Drumvale, like lest of Nairobi, is close to the eastern border of the Rift valley and on a large depression filled with volcanic rocks and sediments of Cainozoic times, which lie on basement complex rocks. In earlier times volcanic activities dominated Nairobi area. The volcanic rocks deposited by the solidification of flowing lavas (Nairobi phonolites) have gentle slope flowing eastwards from the Rift valley. Below the phonolites are series of sediments (upper Athi), which is underlain by lower Athi series. The soils are described as poorly drained, dark grey to black half ripe clay in most of the area which are2-3 feet deep, below where the phonolites of middle Pliocene rocks are found.

Nairobi‘s main drainage follows the regional slope of the volcanic rocks towards the East, while subsidiary internal drainage into the rift region is confined to the western part. The lava plains east of the line Ruiru-Nairobi are underlain by a succession of lava flows alternating with lakebeds, streams deposits, tuffs and volcanic ash. These plains comprising mainly the Athi plains and the Northern section of the Kapiti plain extend West-wards, rising from 4900 ft. (1493m) at the Athi River to 6000fts (1829m) in the faulted region near Ngong. Further East, this valley widens slightly where soft material is being actively eroded (Saggerson, 1991).

Water draining East-ward from the hill area accumulates on the low-lying ground between parklands in the north and Nairobi south estate and cascades to the lowest level eastwards down the rivers, forming a perched table above the Nairobi phonolite. The Kirichwa valley tuffs lying to the east of the highway function like a sponge and the contact between them and the underlying impermeable phonolite thus forms perfect aquifer, so much so that a number of channels containing water occur beneath Nairobi (Ibid).

4. 3. History, Planning and Development of the area

4. 3.1 Historical Development

By 1910, the African population in Nairobi, comprising of cooks, helpers and porters had significantly increased. In 1913, the government set up a Military reserve to the house them to the south of Nairobi, but they were later moved further east along Nairobi River. The area (which forms part of the present Eastlands) was chosen because among other reasons, it was within the walking distance to the Central part of the town (Ibid).

In the mid 1920s, the area east of Race course road eventually became the official African residential area. In 1937, the Kenya-Uganda Railway Corporation constructed Makongeni estate. During the period between 1945 and 1961, the government increased the number of rental housing for African workers in Eastlands through housing schemes.

Over the years, the Nairobi Eastlands has expanded and people have moved to the furthest edge formerly the suburbs. Drumvale is such one area.

Nairobi region eastwards from the eastern bypass were ranches owned by the white settlers. Later on after Kenya gained independent the ranches were bought by land buying companies who then subdivided the land to its members.

Developments within Drumavale started at the beginning of this millennium when people started looking for somewhere they can call home away from the city center. Within the last ten years developments and settlement in the area has sky rocketed. Construction of the eastern bypass also greatly opened up access to the region and the ease in transportation has boosted its growth though it has predominantly developed as a residential estate.

The area is largely a residential zone. The nearest commercial centre is Ruai. Other uses taking up the remaining land include transportation, Public purpose (like churches and schools), public utilities (water and electricity) and light industries. Most land in the Drumvale estate environs is in private hands and there is very little public land available

for the development of public institutions and recreation. The continuing increase in land value is encouraging sub-division and changes of user from residential to commercial or institutional use are on the rise.

The planning approach taken by the physical development planners is based on the premise that the dominant land use in the area is middle-density residential. Other uses, including high density residential, hotels, public purpose, educational or commercial institutions will only be permitted as required to support the dominant user. All new developments are expected to conform to environment standards that will reinforce dominant use ensure for the area and not only respect but enhances the area's natural environment and scenic beauty.

4. 3.2 Population Characteristics

The larger area (Ruai) of the study area has a total population 25455 people and 8485 households with an average household size of 3 people. According to the 2009 population census (Table 6), over 61% of this population is between18 to 65 years (the labor force). The population growth rate for the study area and Nairobi at large is 3.8% (G.o.K, 2009)

Table 6: Projection Statistics for the Study area

2009	2010	2015	2020	2025	2030	2035	2040
25455	26422	31839	38366	46231	55708	67128	80889

Adopted and modified from KNHPC Report (2009)

4. 3.3 Roads and Transport System

The main road is Kangundo road which is the only tarmacked road serving the eastate. Others are feeder roads and footpaths, with a few murramed_all weather and others dry weather roads. The volume of car traffic in the area is significant and high during weekends. It is channeled to the CBD and other parts of the Metropolitan region. The public transport system modes on the Kangundo corridor constitutes of 25-60 seater buses and mini-buses, 14-seater matatus, the three-wheelers, motorcycles and taxis.

Traffic jams have become a major phenomenon in Nairobi City and its environs especially during the rush hours (peak periods) where roads are usually congested with private and public service vehicles moving at a snail's speed. Much time is lost on the roads and vehicles consume extra fuel leading to heavy losses to the economy. With rapid expansion of the Nairobi City's peri-urban centers the majority of roads leading from the city have heavy traffic. The construction of eastern bypass has seen increase in Kangundo road traffic and more people buying land in Drumvale due to increased accessibility from the CBD and other Metropolitan centers.

CHAPTER FIVE: DATA FINDINGS, ANALYSIS AND SYNTHESIS

5.0 Introduction

This chapter elaborates on the findings of the study in response to the questions that the researcher endeavored to dig deep into. The findings are further analyzed to enable a deeper comprehension of the nature of problem under inquiry. The analysis further makes it possible to think of and articulate the planning implications of the findings which when well spelt out, becomes possible to provide appropriate planning policy recommendations.

5.1 Socio-Demographic Characteristics of the Respondents

House hold respondents revealed socio-economic characteristics summarized in Tables 7 and Table 8 as well as by Figure 17 below.

Table 7: Relationship of Respondents to Household (HH)

Relationship with HH		
Type of relationship	**Percent**	**Cumulative Percent**
Household head	35.2	35.2
Spouse	13.0	48.1
Daughter	1.9	50.0
Son	0.9	50.9
Worker	8.3	59.3
	0.9	60.2
No response	39.8	100
Total	100.0	

Source: Field survey, 2014

Table 7 shows that out of the 60.2 % of the positive response, 84.6 % were house hold nuclear members. Therefore they understand well issue related to their land.

Table 8: Age Characteristics of respondents

Age of respondent		
Age	**Percent**	**Cumulative Percent**
18-20 Years	7.4	7.4
Above 61 Years	1.9	9.3
21-25 years	14.8	24.1
26-30 Years	12.0	36.1
31-35 Years	25.0	61.1
36-40 Years	13.0	74.1
41-45 Years	12.0	86.1
46-50 Years	4.6	90.7
51-55 Years	6.5	97.2
No response	.9	98.1
56-60 Years	1.9	100.0
Total	100.0	

Source: Field survey, 2014

Table 8 shows that 86.1 % of the respondents were those below the age 45 years. This being the age of childbearing population, the population will be expected to grow from within. This populace will have a high number of school going children who shall require adequate services such as learning and recreation facilities.

Table 9: House hold size

Household size	Frequency	Frequency Percent	Cumulative Percent
1	8	7.4	7.4
2	9	8.3	15.7
3	17	15.7	31.5
4	25	23.1	54.6
5	28	25.9	80.6
6	5	4.6	85.2
7	5	4.6	89.8
8	4	3.7	93.5
9	1	.9	94.4
No response	5	4.6	99.1
N/A	1	.9	100.0
Total	108	100.0	

Source: Field survey, 2014

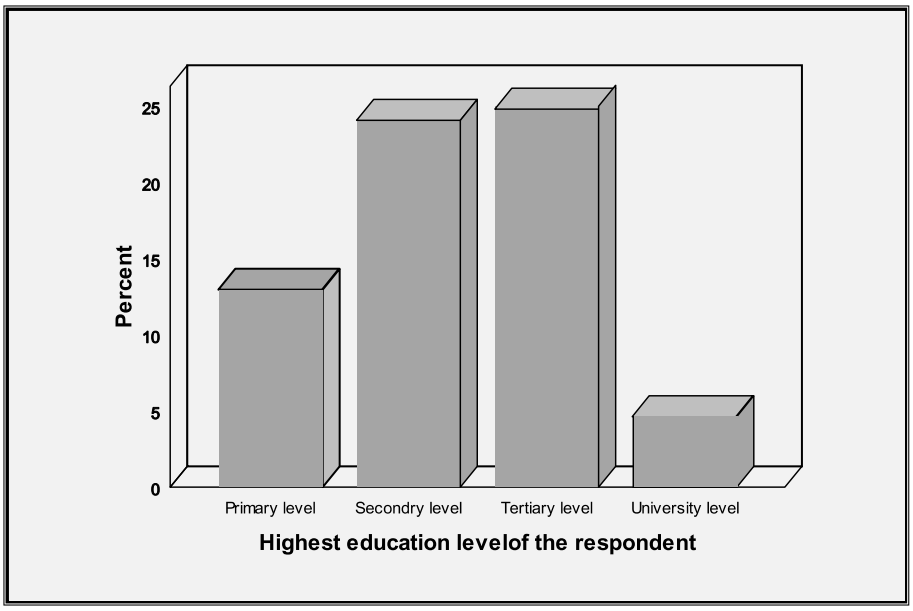
Table 10: Average HH size

`Descriptive Statistics					
Number of valid HH	**Total number of persons in this HH**	**Minimum**	**Maximum**	**Mode**	**Mean**
102	423	1	9	5	**4**

Source: Field survey, 2014

Tables 9 and 10 indicate that 62.9 % of respondent households were of between 4 and 9 members while the average household size was 4 members. Therefore, if an acre of land is subdivided into 8 parcels (Tables 12), the estimated population per acre would be 4*8 = 32 persons giving population density of about 7907 persons per square Km which require provision of services such as good roads, water, sewer, hospital and commercial centre.

Figure 17: Education level of the respondents



Source: Field survey, 2014

All the respondents had a certain level of education, Figure 15, therefore they could easily understand and respond to the questions administered to them hence giving the researcher a satisfaction of answers given and a level of validity.

5.2 General understanding of the area

Different residents had different levels of understanding about Drumvale depending on the period of stay. Those respondents who have a longer stay have enriched understanding of the area compared to those with shorter periods of stay. Therefore, each of the respondents was asked to indicate their duration of stay in the area - Table 11. The highest number (37.1%) had lived in the area for a period of between 1-3 years while 63.7 % of the respondents have between 0 and 5 years of stay. Only 10.3% of them had lived in Drumvale for over 10 years. This means that the estate has rapidly grown in the past five years. Going by these findings it is clear that the rate of populating increase will continue rising.

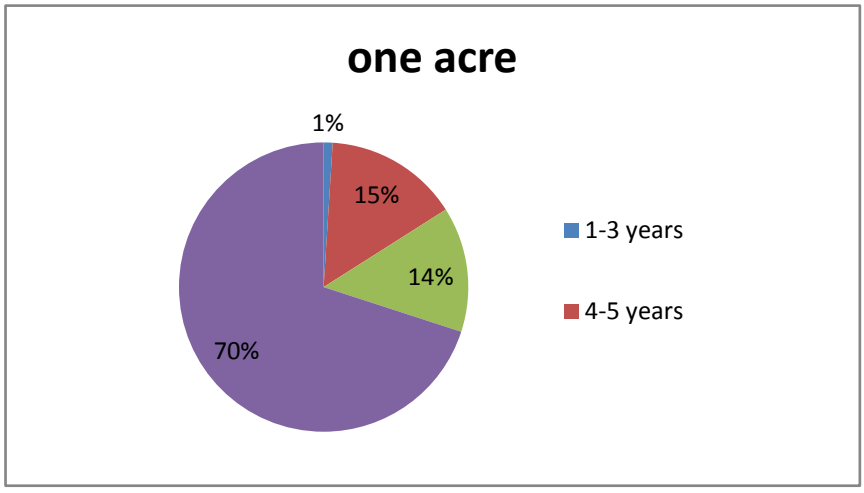
Table 11: Duration of stay in Drumvale Estate

Period of stay				
Less than 1year	**1-3 years**	**4-5 years**	**6-10 years**	**Above 10 years**
10.1	37.1	16.5	26	10.3

Source: Field survey, 2014

From house hold responses, 70% of the respondents who have lived in Drumvale for more than 10 years own one acre parcels of land, Figure 18, while 75 % of those who have lived for less than 5 years own less than one acre of land, Figure 19. The implication is that majority of land owners who have recently owned land within the area, own less than one acre hence an increase in the rate of subdivision.

Figure 18: Land size relative to number of years stayed in the study area

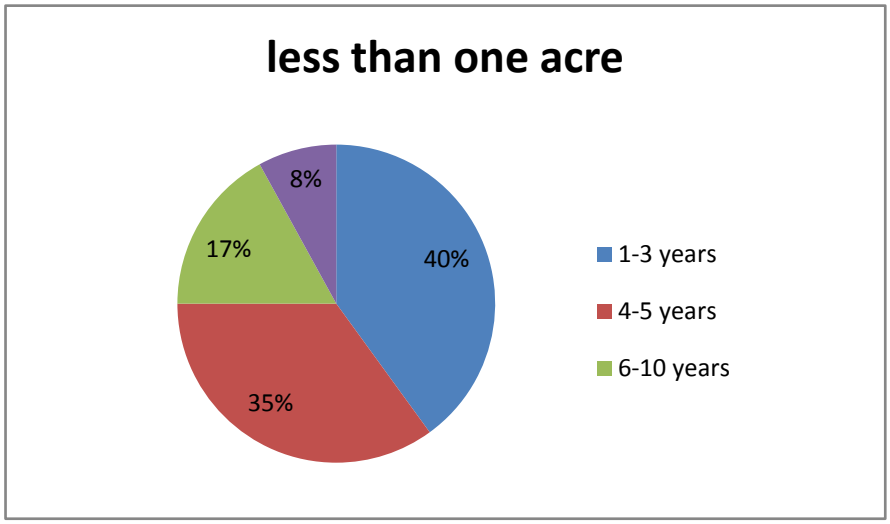


Source: Field survey, 2014

The rapid population increase require proper planning to allow for provision of basic services such as health institutions and roads. Increase in population demands for more

housing and if left unchecked, its activities degrades the environment by the waste it produces and also through uncoordinated human activities such as having incompatible human activities located in the same place such as commercial and residential land uses.

Figure 19: Land size relative to number of years stayed in the study area

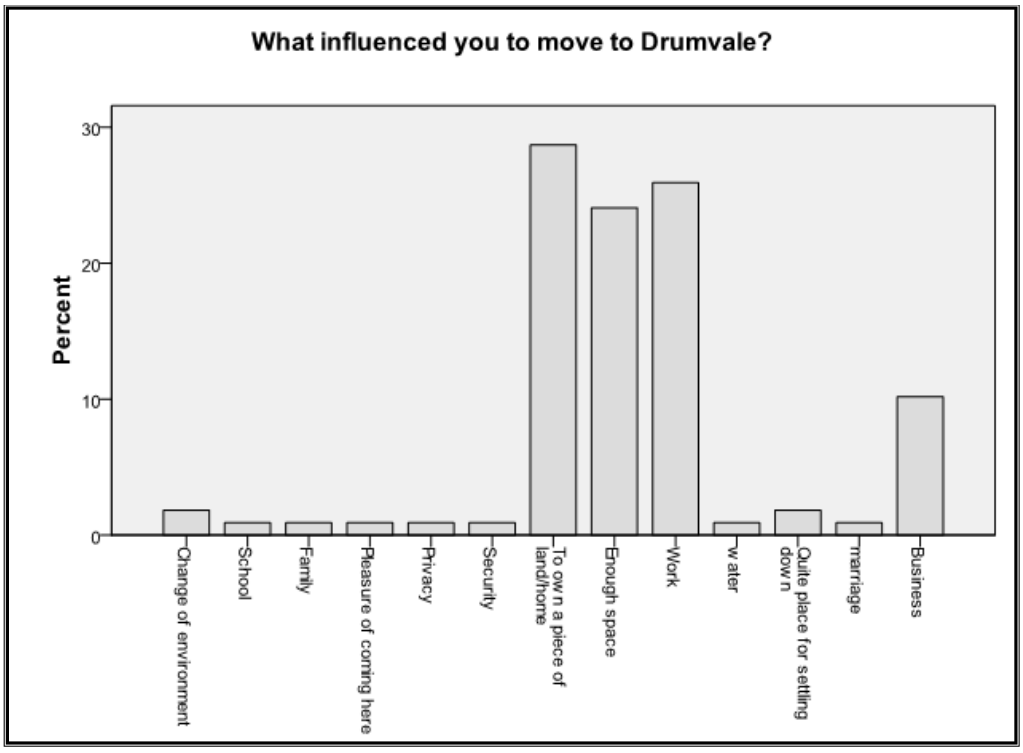


Source: Field survey, 2014

Furthermore, different factors influenced the people to settle in Drumvale, Figure 20.

From the Figure, 53 % of the respondents were influenced by the dream to own a home and have enough space. Field data indicates that the area is predominantly residential zone. The urge to own a home confirms what was stated by Pretoria University Law Press, 2011, that in Kenya, the land owning ethic has taken a central stage whereby everyone dreams of owning land. Also Wakhungu et al, 2008 aired the same view that land has been the crux of economic, cultural and socio-economic change in Kenya intensifying conflicts over its access and control.

Figure 20: Factors that have influenced people to settle in Drumvale



Source: Field survey, 2014

5.3 Underlying causes of land use conflicts in Drunvale Estate.

The following are the major causes of land use conflicts:-

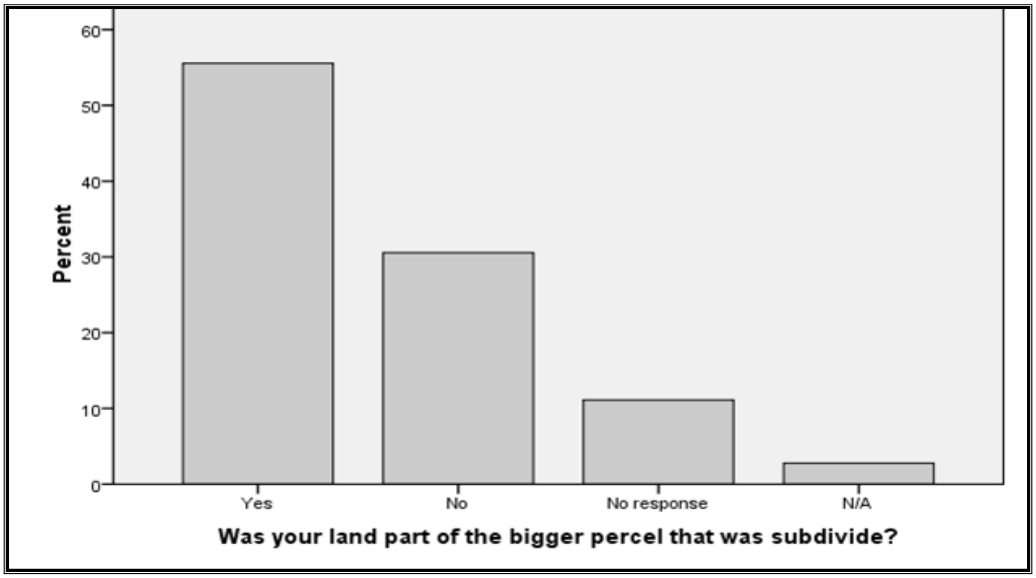
- **Illegal land subdivision**

Land in Drumvale estate was first subdivided into one acre parcels of land in 1994 for Drumvale cooperative members. In the plan, land was set aside for public use such as schools, hospitals and public utility. However, field study indicated that there is rampant fragmentation of the original subdivision of land that contravenes the laid down regulations, not only due to its procedural informality but also by the sizes. Table 14 shows that 35.2 % of respondents own land parcels of sizes 40 ft x 60 ft (0.02 ha) far

below the requirements from county planning department (size 0.05 ha on sewer and 0.1 ha. if not on sewer).

The researcher sought to find out the level of land sub-division in the area. Up to 55.6% of the respondents confirmed that the land they lived in was part of an originally bigger land while 30.6% said there was no sub-division, Figure 21. This again indicates that the level of land sub-division in the area is significantly high.]

Figure 21: Land sub-division levels



Source: field survey, 2014

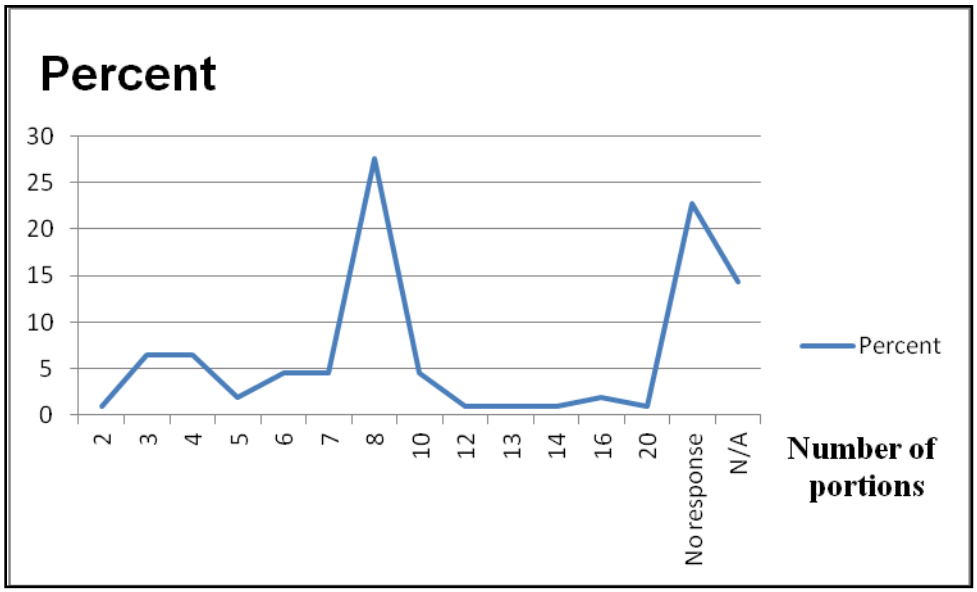
Table 12 further shows the number of parcels into which one acre parcel of land has been divided. Evidently, the rate of subdivision is very high given and sometimes land has been subdivided into as many as 20 portions. The highest percentage of respondents (27.6%), Table 12 and Figure 22, has had their one acre land subdivided into 8 portions. Again, these portions are of different sizes – Table 14.

Table 12: Subdivision of one acre parcel of land

Number of portions into which land has been subdivided		
Number of portions per One acre parcel of land	**Frequency (%)**	**Frequency cumulative (%)**
2	.9	.9
3	6.5	7.4
4	6.5	13.9
5	1.9	15.7
6	4.6	20.4
7	4.6	25.0
8	27.6	52.6
10	4.6	57.2
12	.9	58.1
13	.9	59.1
14	.9	60.0
16	1.9	61.9
20	0.9	62.8
No response	22.8	85.6
N/A	14.4	100.0
Total	100.0	

Source: Field survey, 2014

Figure 22: State of Subdivision



Source: Field survey, 2014

The non availability of sewer provision provides that the minimum parcel size should be 0.1 ha as per the planning regulations-Table 1. It was found that 97 % of respondents use pit latrines for sanitary waste disposal (Table 13), however due to the small plot sizes, there is likelihood of contaminating shallow water wells used as source of domestic water supply.

Table 13: Sanitary waste disposal

Method of sanitary waste disposal			
	Frequency	**Frequency (%)**	**Cumulative Frequency (%)**
Septic tank	11	10.2	10.2
Pit latrine	97	89.8	100.0
Total	108	100.0	

Source: Field survey, 2014

Plate 10: An aerial view of land development in Cluster 'C' of the study area

Source: Field survey, 2014

Plate 10 is aerial view of part of the study area showing high levels of land fragmentation and development. Also Figure 23 gives a current comparison between the map record from SOK and the ground situation as observed from field survey and as viewed by aerial satellite.

Figure 23: Map of informal land subdivision and satellite imagery overlay (same site)

Source: Field survey, 2014

Table 14: Size of plot of residence

Size of the plot of residence		
Area in Ha	**Frequency (%)**	**Cumulative Frequency (%)**
1	2.8	2.8
0.8	0.9	3.7
0.4	16.7	20.4
0.2	7.4	27.8
0.1	2.8	30.6
0.09	1.9	32.5
0.05	25.9	58.4
0.03	2.8	61.2
0.02	35.2	96.4

Size of the plot of residence		
Area in Ha	**Frequency (%)**	**Cumulative Frequency (%)**
0.01	0.9	97.3
No response	2.7	100.0
Total	100.0	

Source: Field survey, 2014

From Table 14, only 16.7 % of households own an acre of land while 76.9% of the residents own less than an acre, thus frequent subdivision of land.

i. Lack of land ownership documents

Table 15 shows that that the majority (97.2 %) of the respondent owns the land they live and Table 16 shows that 91.7 % of them purchased the land while only 4.6% inherited the land they reside on.

Table 15: Ownership of the land of residence

Do you own the land on which your HH resides?		
Ownership (Y/N)	**Frequency (%)**	**Cumulative Frequency (%)**
Yes	97.2	97.2
No	2.8	100.0
Total	100.0	

Source: Field survey, 2014

Table 16: Method of acquisition of land owned

Mode of acquisition	Frequency (%)	Cumulative Frequency (%)
Inheritance	4.6	4.6
Cooperative Shares	.9	5.6
Purchased	91.7	97.2
N/A	2.8	100.0
Total	100.0	

Source: Field survey, 2014

It is a matter of concern that though 97.2% of the respondents own land, 60.9 % of them do not have lease or title to their land. Table 17 indicates that only 35.3% have legal title deeds/lease.

Lack of land title/lease documents curtails development approvals and revenue collection for service provision such as road construction and public health facility among other public services. Tenure insecurity results to land conflicts and has been identified as one of several increasingly serious threats to urban security and safety (UN-Habitat 2007: 4 in Lombard, 2012).

ii. Spatial location of plots

The land owners were also asked if they engaged surveyors in their land transactions. A majority 93.5% said they did (Figure 24). This professional engagement does not correspond to the expected services from qualified persons. Details the local chief, city planners and surveyors were of the view that 90% of land resulting from subdivisions whose area is less than 1/4 acre has not been carried out professionally neither the reestablishment of parcel location. This proves Robert (2010) right when he stated that the source of boundary disputes is found quite often within the realm of the surveyor's

expertise and are mostly caused by either inadequate, erroneous legal descriptions, obscure or ambiguous conditions on the ground.

The subdivisions have no approval from planning department and don't conform to the Physical Planning Act (1996), hence are illegally carried out. Such resultant land development have no legal backing and hence prone to human abuse such as double selling of the same properties to different buyers, and conflict in boundary location of the said parcels.

Table 17: Ownership documents possessed

Ownership documents possessed		
Ownership document	**Frequency (%)**	**Cumulative Frequency (%)**
Title deed	27.0	27.0
Lease	8.3	35.4
Temporary acquisition License	.9	36.3
Land buying Company Certificate	56.3	92.6
Letter of allotment	4.6	97.2
N/A	2.8	100.0
Total	100.0	

Source: Field survey, 2014

Details in Figure 24 show that respondents without titles had various reasons for not getting one. From table 17, more than 50 % have only company certificates which have no legal redress.

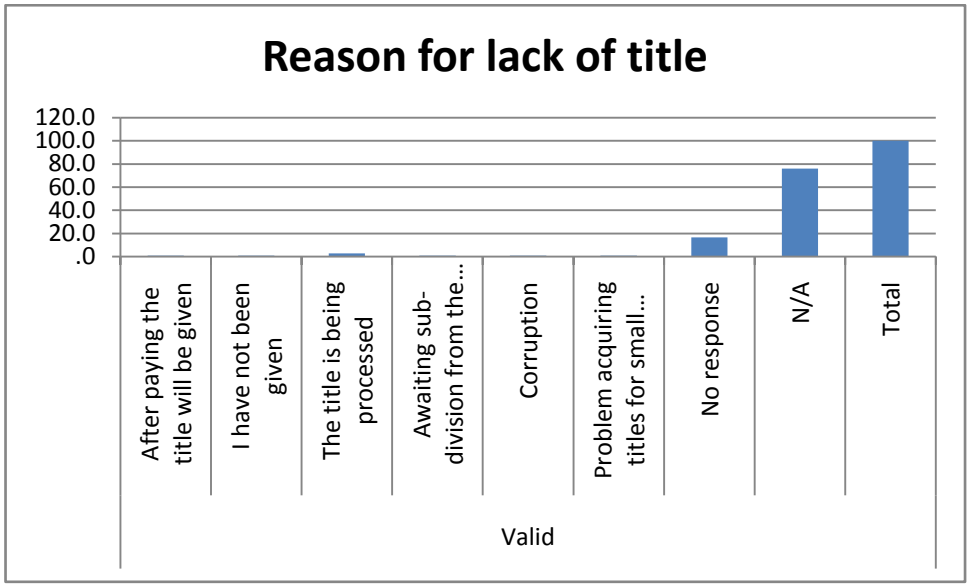
The study pointed out that almost 95 % of all subsequent subdivision of original one acre land is informal. Owners are in possession of company certificates (Plate 11) as ownership documents from unregistered companies which cannot replace the need for a statutory ownership certificates.

Plate 11: A sample certificate issued as land ownership document


MBUKONI HOLDINGS LIMITED
P.O. Box 31081-00600, Nairobi-Kenya
Certificate No. 1957
Certificate
This is to certify that JOHN MBURU NDUNGU
holder of Identity Card No. 11336151
Is the owner of Plot No. (1) as per
the proposed sub-division scheme of L.R. 118/989
at NAIROBI district.
Notes:
a)The Company shall not interfere with inter-party sales or transfers of plots
b)a spouse cannot witness his/her other spouses signature.
C)No transfer of plot shall be registered unless accompanied by this certificate
Dated this 2ND day of APRIL 20 08
Director

Source: Field survey, 2014

Figure 24: Reasons for lack of title deeds by land owners

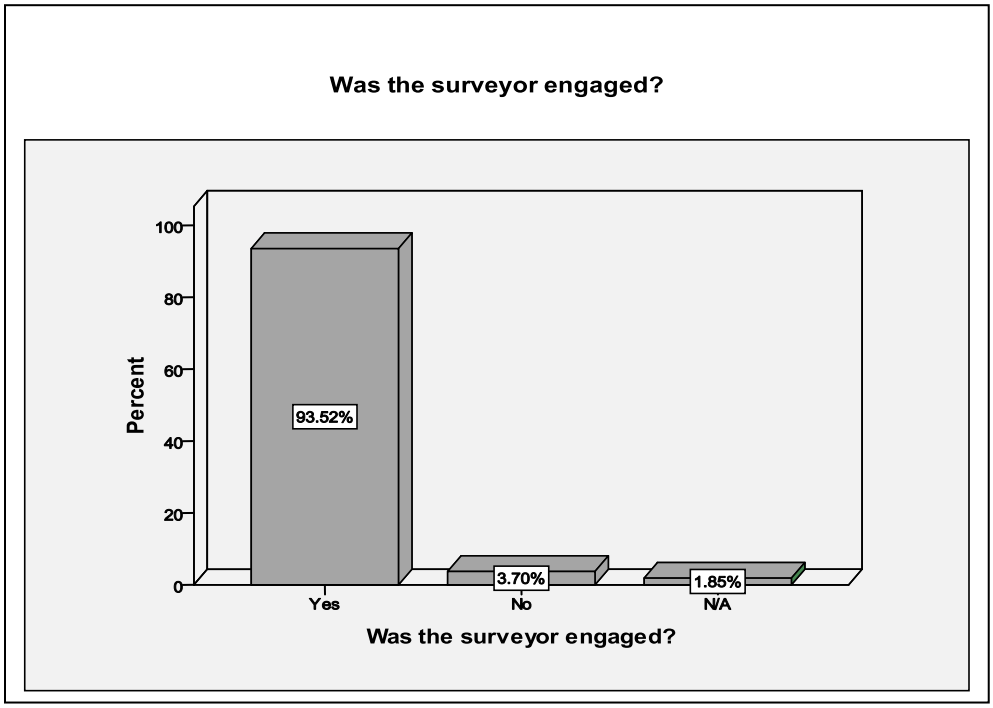


Source: Field survey, 2014

Majority 75.9 % thought the question for having no title was not applicable because there deemed that the company certificate they held was statutory and enough to prove land

ownership. This is proved by Table 17 which indicates that only 27 % have title to their land.

Figure 25: Involvement of surveyors in Land transactions



Source: Field survey, 2014

Figure 25, indicates that majority (93.52 %) involved a surveyor for identification of their land parcels. This seems to be questionable when the findings are compared with the informal land transactions which is rampant in the estate.

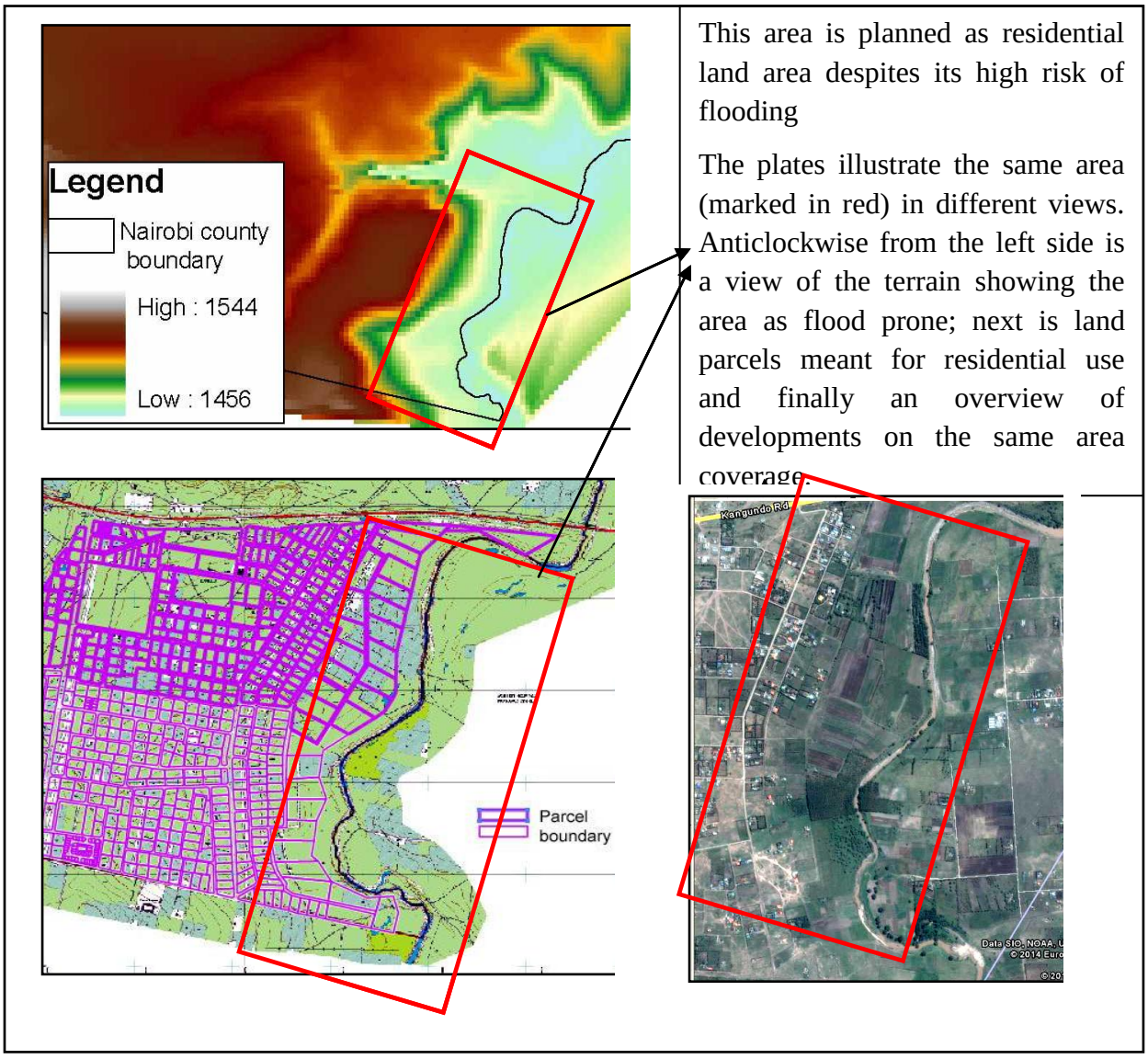
iii. Inadequate planning

Factors that have contributed to loss of life and property are mostly attributed to inadequate planning procedures. Those who planned the study area overlooked the issue

of the topography and the natural drainage. Residential plots were placed on flood prone areas have to be evacuated during rainy seasons.

The high inundation areas are as shown in Figure 26. Settlement in this places put residents in the path of natural drainage causing conflicts in drainage. The area would serve well if left as water catchment area or planned for recreation parks and nature walks.

Figure 26: Map of same area in different views for comparison



Source: Field survey, 2014

iv. Non implementation of planning regulations

Drumvale estate was part of land that initially was in Machakos County. When Drumvale cooperative bought the land and subdivide it to its members, a section of it was ceded out to form part of Nairobi County. All developments are monitored and controlled by Nairobi County Government, unfortunately majority (60.9 % - Table 17) of land owners owning less than one acre of land do not have any legal ownership document which can be used to approve building plans.

From the overlay of the existing RIM records and satellite imagery, Figure 23 and Figure 32, it is disturbing to note that those who subdivide their land do not submit subdivision plans to the planning department for approval and thus the subdivisions are informal. Due to this informality, building plans cannot be approved due to lack of legal ownership documents are available.

The major challenges facing implementation of development control is laxity of the implementers. Most of the developments have taken place with the full knowledge of the authorities who seem to have no powers in enforcing law and order. City planning officers usually play hide and seek game with developers encouraging illegal site developments to go on unabated. Due to these loopholes more developments are carried out without approvals hence non adherent to development control. However site developments on original un-subdivided parcels of land are usually approved, though few (5-10 % of all site developments in the entire Drumvale estate).

The County has introduced regularization programs for both subdivision and developments which have already taken place, but with penalty cost of Kenya shillings 100,000.00 for the already developed sites.

Owners are being encouraged to submit the plans for approvals using the original mother titles and development plans. This is a way of legalizing the informal land subdivision and developments, however, most of the developments cannot meet the required standards therefore each case should be dealt with separately. Some cases may never be

approved such as those with multiple residential and commercial units on small parcels of land where there are higher levels of land use conflict. Lack of sewer and drainage services is a major factor contributing to environmental degradation, loss of life and properties.

Interview with city planning department indicated that, initially, the county had tried to put some order by encouraging submission of proposed development plans which would then be received and the owner gets a stumped document proving submission for approval but the developments could not be approved due to lack of proper land ownership documents. The land owners would then continue to build regardless of non approval of their proposed development plans. This provision opened a paradox box of non adherence to planning regulation making developments control get out of hand. The council has also introduced online application for development approval which has father worsened the situation because the people have not embraced it.

Drumvale estate was owed by Drumvale corporative now under liquidation. The liquidator main duty is to wide up the society, deliver allotment letters to the owners, settle pending bills and dispose of assets. The office still holds letter of allotments for members 5 full files spring of allotment letters who have never come to collect them. The firm also holds letters of allotment to public utility land such as Open space: schools, hospitals, public utilities, church, other business, petrol station, police, mostly boreholes.

v. Little or no professional policing

Professional ethics and policing was found to be wanting. If ethics are upheld the rate of land grabbing would be few. Professional policing would also mitigate the levels of illegal subdivision and planning implementation procedures.

vi. Inadequate planning awareness

The local chief was of the opinion that ignorance and lack of knowledge on land matters was a major concern. It prevents prospective land buyers from carrying out legal search of the land they want to buy, and are thus exposed to fraud.

Figure 27 shows that 91.7% of the respondents were not aware of planning requirements. This is one of the explanations behind the conflicts earlier mentioned.

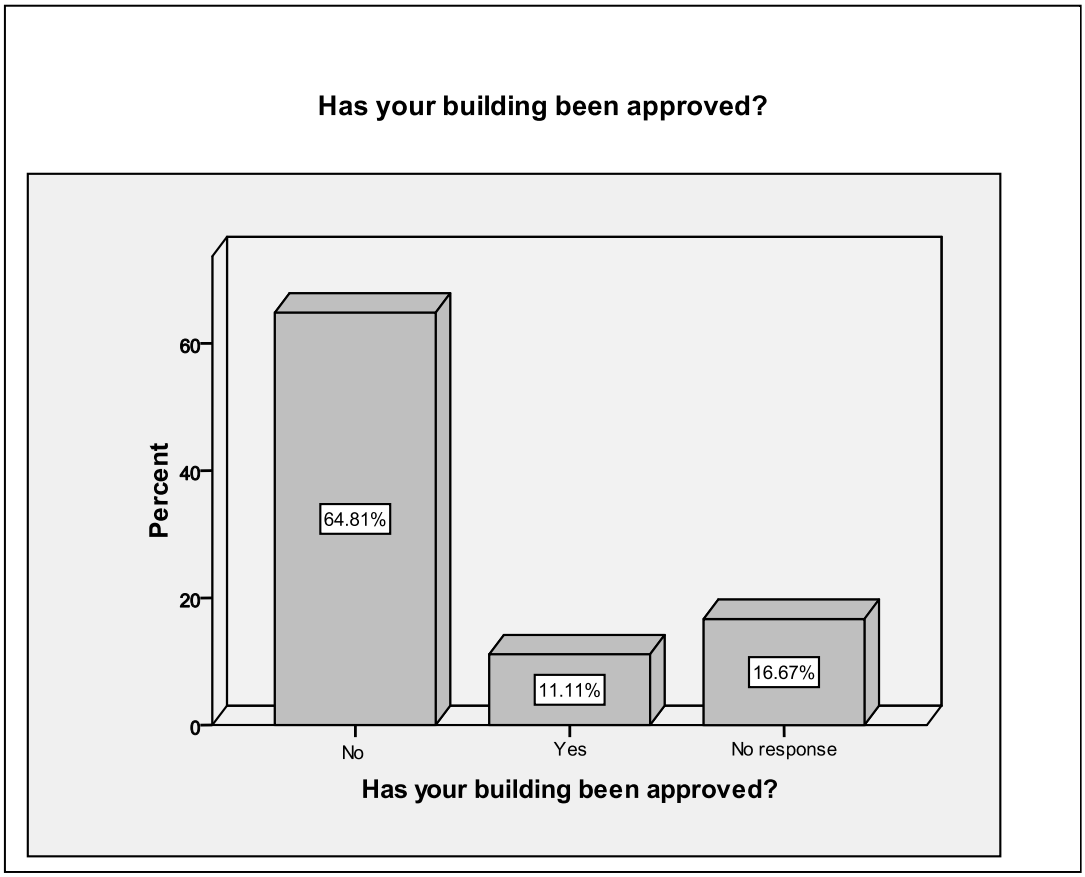
Figure 27: Awareness of planning requirements

Source: Field survey, 2014

Furthermore, up to 64.81% of the people had not approved their developments, Figure 28. This validate the response from county planning department office, who indicated the

seriousness of non implementation of development controls and the illegality of the subdivision of land in the study area.

Figure 28: Approval developments



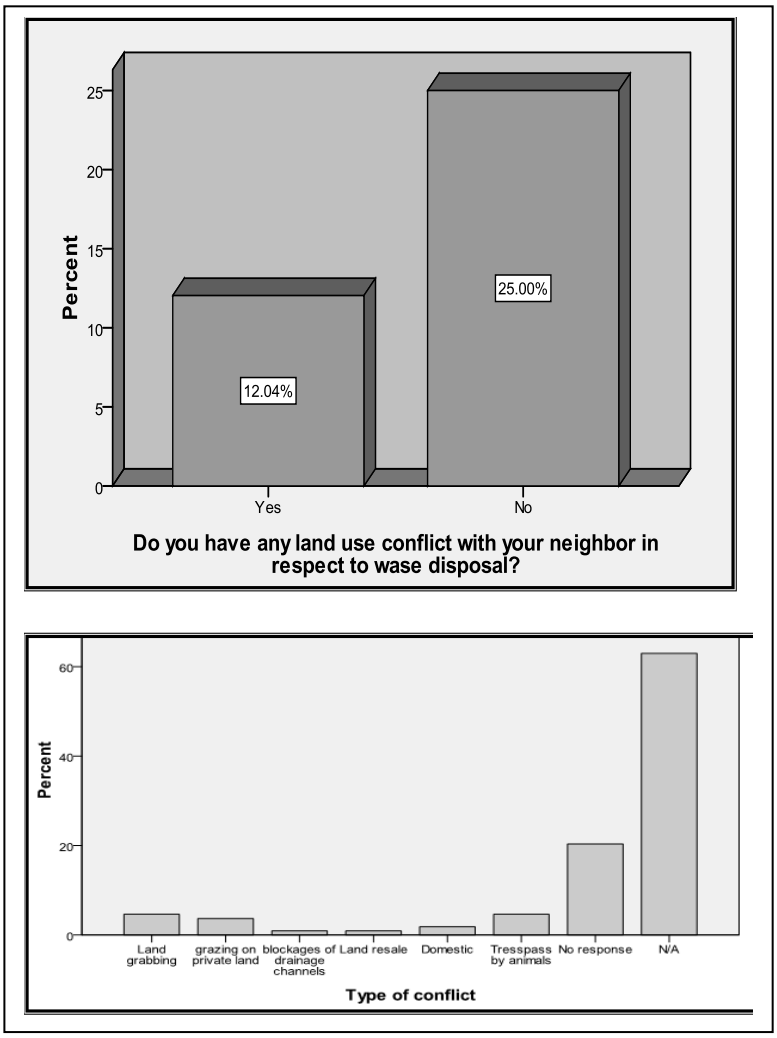
Source: Field survey, 2014

Enforcement of development controls and involvement of people to internalize the essence for development controls is a possible way of reducing land use conflicts.

5.4 The nature of the land use conflicts in the study area.

The respondents pointed out a number of land and land use conflicts including land grabbing, and grazing on other peoples' land, Figure 29. Interview with the liquidator of Drumvale estate revealed that most of the land which was set aside for public use is in private ownership. This hinders provision of public services such as schools and health causing disharmony between development densities and service provision, hence inadequacies in provision of services like physical and social infrastructure resulting to human suffering.

. Figure 29: Land use conflicts in the study area



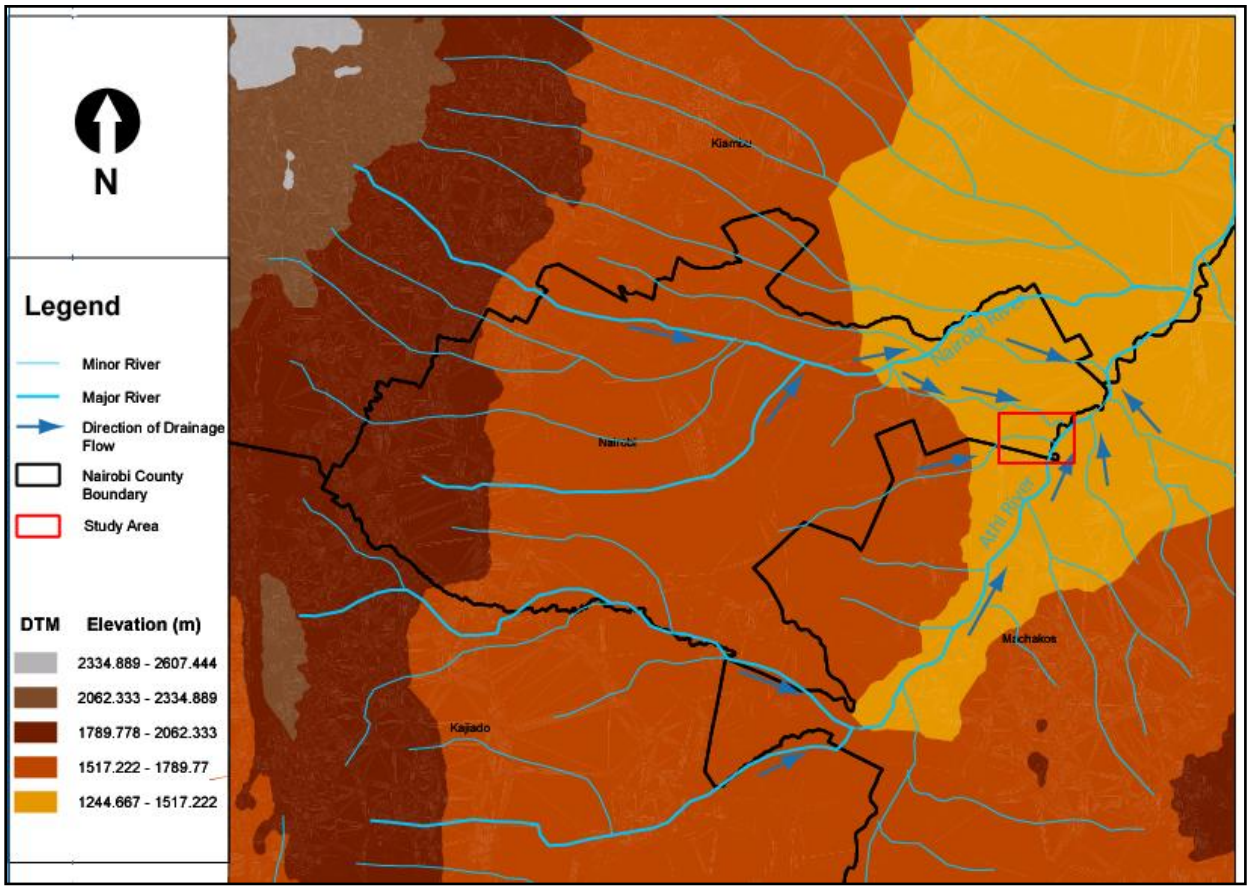
Source: Field survey, 2014

i. Blockage of drainage routes

From observation and mapping of the area terrain, flooding during the rainy season is a major occurrence. The study area has the lowest altitude within Nairobi County. When it rains in Ngong area the flood water drains into River Ngong and River Athi and snakes its way towards the study area. Likewise when it rains in Kiambu area especially Ruiru region the water collects into Kasarani and Nairobi Rivers. Storm water draining from the two directions collects in the study area causing River Athi to break banks creating a big but temporary lake which cause havoc to the lower side of Drumvale estate as shown in Figure 30 and Figure 31.

A recent flush flood in the area left one dead, destroyed properties and left several domestic animals drowned- Plate 12.

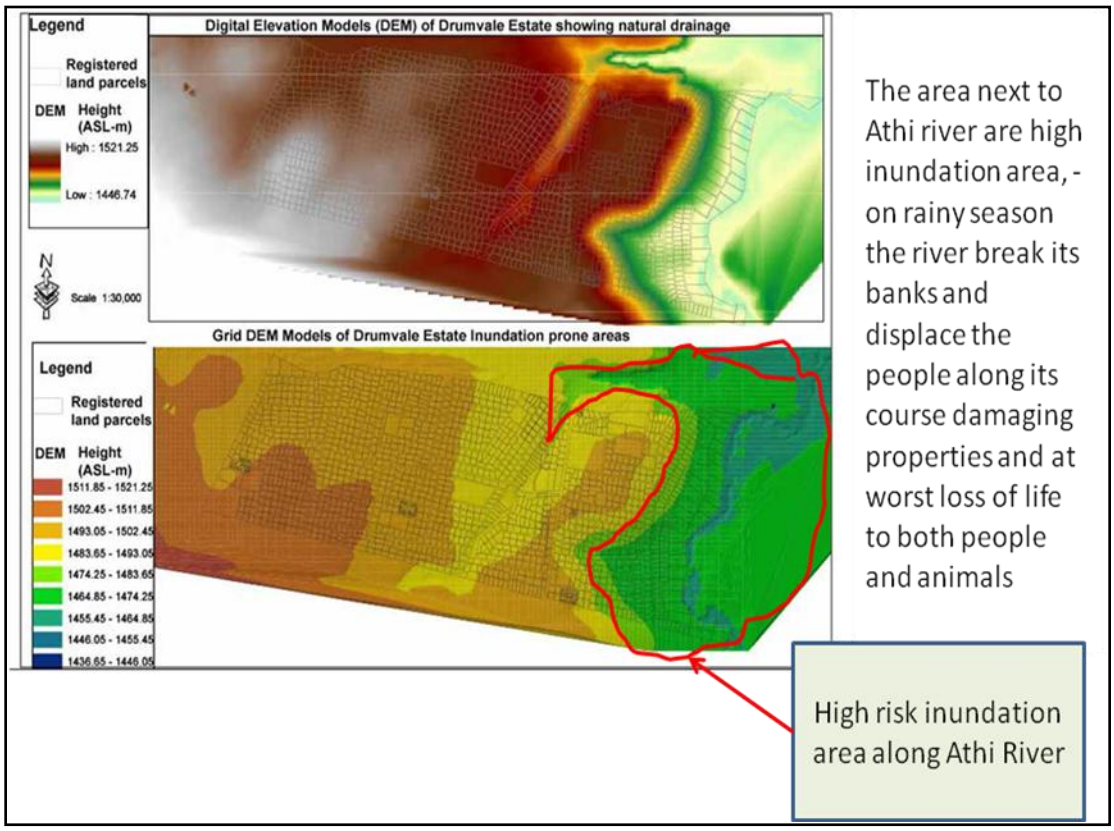
Figure 30: Map of Nairobi County's terrain



Source: Author data compilation, 2014

Therefore the planned residential land use along the high inundation region is in perpetual conflict with the area's natural drainage system and of great risk to residents.

Figure 31: Digital terrain Model of the study area



Source: Compiled from DEM data from SOK, 2014

On the 26th March 2014, flush floods killed a middle aged man and destroyed properties within the research area. The aftermath is illustrated by Plate 12. Adequate planning process and policies should help to intervene and mitigate such calamities.

Plate 12: Aftermath of flush floods – 26th March 2014

Source: Field survey, 2014

Human activities (Plates 13, 14 and 15) have also affected the natural drainage where people dump excavated soils on the river beds and riparian reserves. Site developments along drainage routes without construction of drainage system have also aggravated the drainage issue. Smooth flow of storm water is curtailed thus creating unnecessary dams which are breeding ground for mosquitoes and other pathogens that cause malaria and waterborne illnesses.

There is need for provision of an efficient drainage system to ensure proper drainage of surface water runoff during rainy seasons and mitigation of calamities due to inadequate drainage systems.

Plate 13: Soil damped on a riverbed

Source: Field survey, 2014

Developers hazardously dump excavated soils on riverbeds, drainage routes (Plate 13 and Plate 14) and road reserves (Plate 16) causing environmental pollution, flooding and lack of aesthetics

Plate 14: Illegal blocking of drainage routes

Source: Field survey, 2014

Plate 15: Illegal development on riparian reserve

Source: Field survey, 2014

Plate 17 shows a progressing construction on a dry river bed which is a seasonal river. When it rains the water cannot have a smooth flow therefore causing flooding upstream.

ii. Degradation of access roads

Plate 16 shows illegal dumping of soil on road reserve. These not only block the roads but also make them impassable during the rainy season. Excavated Black cotton soils at the time of setting out buildings are dumped on empty spaces especially on river beds, road reserves and unoccupied land.

There should be designated areas, such as abandoned quarries, where such soils should be deposited. Developers should uphold soil dumping regulations and be compelled to allow the rules of the land. High penalties imposed and meted to those who flout such laws.

Plate 16: Soil dumped on road reserve

Source: Field survey, 2014

Table 18 Shows that majority 30.6 % of all positive response (64.8 %) preferred to have road developments projects. All access roads to the estate are dry weather roads thus impassable during rainy seasons. The community has initiated their own community based groups, where they raise funds to improve roads and accessibility. The funds are used to buy quarry chips to grade the roads to make them all weather.

There are no road construction standards followed the only objective of such projects is to ensure that the residents access their homes when it rains. The service providers (county Government) should construct good roads for the area residents.

Table 18: Preferred Developments

Preferred development projects			
Type of Project	**Frequency**	**Frequency (%)**	**Cumulative Frequency (%)**
Roads	33	30.6	30.6
Public schools	1	.9	31.5
11	1	.9	32.4
well	1	.9	33.3
Security	5	4.6	38.0
Rearing of livestock	2	1.9	39.8
Garbage collection	1	.9	40.7
Bio gas	1	.9	41.7
Piped water	12	11.1	52.8
Play fields	2	1.9	54.6
Drainage channels	5	4.6	59.3
No response	3	2.8	62.0
Health centers	3	2.8	64.8
N/A	38	35.2	100.0
Total	108	100.0	

Source: Field survey, 2014

iii. Land encroachment

Encroachments were reported during from the questionnaires and also noted from field measurements. Likewise boundary related conflicts were found to be frequent, with the area chief indicating that they are at least ten cases reported to his office on weekly basis.

KPLC power lines and electric poles, Plate 17 and Plate 18, have been placed in the middle of the roads endangering lives of the motorists. Likewise private properties encroach on road reserves and neighbour's properties causing social conflict.

An interview with Land surveyors revealed that many of the control points, required for boundary reestablishment, within the area and its neighborhood are missing due to human interference and uprooting. Thus there is need to create and densify control points

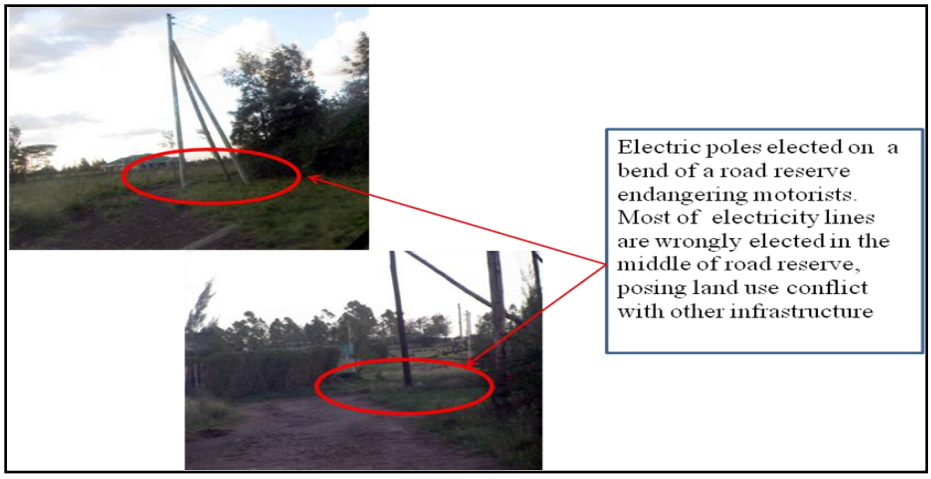
for present and future boundary reestablishments. The surveyors should ensure proper establishment of property boundaries and help to minimize such cases.

Modern and well established Survey Control Points by SOK would ensure accurate subsequent re-establishment of land parcel boundaries as per the Survey Act.

Plate 17: A caption on a boundary issue

Source: Field survey, 2014

Plate 18: Encroachment of properties and services on road reserve



Source: Field survey, 2014

iv. Land ownership conflicts

The chief, the liquidator and land surveyors of the study area indicated that they deal with at least three cases per week on matters related to double allocation, wrong occupation of land parcels as well as family issues on land succession where some family members exclude others during sale of property. They were of the view that these issues originate from lack of ownership documents making it possible for multiple sales of same plot to different people using fake selling land certificates. There are cases where land on road reserve has been fraudulently sold to unsuspecting buyers especially those from Diaspora.

They were also concerned with the existing rampant land grabbing of both public and private land parcels. Land which was set aside for public use has been transferred to private ownership that illegally subdivides and sells the subsequent plots. Private land of those owners who don't check or fence their land usually finds it subdivided and sold to unsuspecting buyers resulting to insecurity of tenure and conflict which was identified as one of several increasingly serious threats to urban security and safety alongside disasters and violence (UN-Habitat 2007: 4 in Lombard, 2012).

Land owners should ensure processing of legal ownership documents and high penalties for land grabbers should be imposed to prevent loss and destruction of properties as witnessed in Kenya in the Syokimau (2011) and Lang'ata road (2013) property demolitions. Also lengthy court cases which are time consuming coupled with strained relationships should be avoided at all cost.

In Drumvale, ownership dispute of land parcel number NRB Blk 118/1415 went before the high court of Kenya at Nairobi Milimani law courts, ELC Case No. 362, 2012, thus

'……. *before the court it is apparent that the plaintiffs purchased parcels of land from the defendants on the basis of ownership certificates that the defendants held which they claimed had been issued to them by Drumvale Farmers Cooperative Society Ltd from whom they claimed to have purchased the land. The defendants state the Firm of M/s Congo & Company Advocates represented the said Cooperative Society in the*

sale transactions. On the other hand the interested party ……. replying affidavit that she purchased the suit property from Drumvale Farmers Cooperative Society way back in 1992 and that she paid for the title processing fees and she had her title processed and she is now the registered proprietor of Title Number Nairobi/Block 118/1415 as per the certificate of lease annexed and marked as "HMK1" in her replying affidavit'

The land was said to have been illegally sold by a lawyer, the buyer then subdivided the land and later sold the subsequent land parcels by presenting to the perspective buyer's certificates of ownerships however the legal owner was in possession of genuine certificates of lease. Those who bought the plots have constructed their homes on the said land and the rightful owner was threatening them with demolitions.

In another issue, eleven people formed a self help group and elected their officials. They bought a piece of land six years ago and so far they have not received any legal document to show land ownership. Their officials insist that they never got any transfer documents neither ownership documents from the seller that could be used in registration of the land they bought. Most of the members have retired and gone back to their rural homes thus wanting their offspring to be heirs to the said land. Others have constructed houses on the said parcel though they have not petitioned it.

Some of the members have petitioned the official to appear before the local chief and explain the where about of ownership documents. They wanted the chief to guide them on the way forward. In his arbitration the chief directed the parties to seek the services of a surveyor of which they agreed, though without legal documents the case is had to handle.

Therefore there is need to control the land buying companies through company registration and to educate people on matters related to land transactions.

v. Unregulated site developments

The city planning department deals with regulation and control of developments within the study area. One of the officers interviewed indicated that planning controls are hardly followed in site developments within the area, hence are in conflict with city planning controls.

Table 19 shows an abstract of development control standards from the city planning department for the study area.

Table 19: Land and development control in Ruai

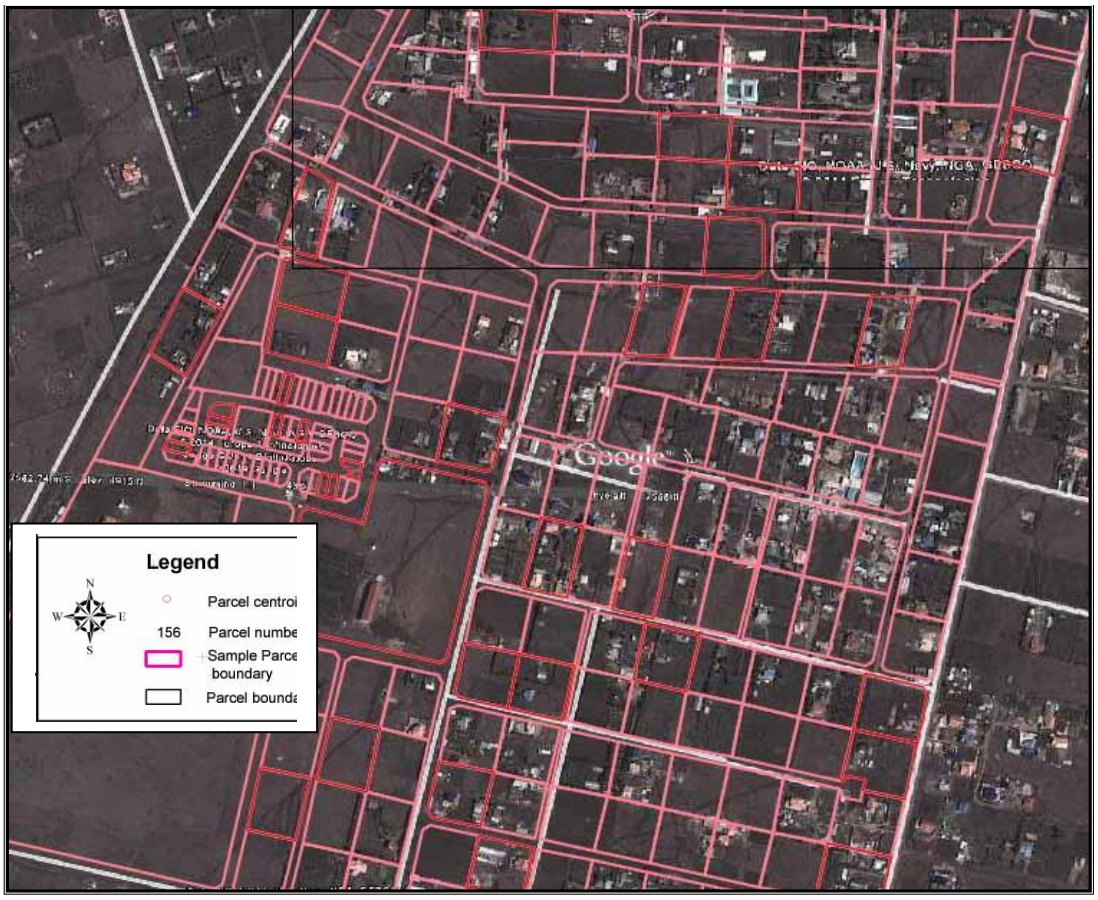
ZONE	**AREAS COVERED**	GC	PR	**Dept Ref. Map**	**TYPE (S) OF DEVELOPMENT ALLOWED**	**MIN. AREA** (Ha.)	**REMARKS/POLICY ISSUES**
18	**Kasarani**				□ Agricultural □ Residential Mixed Development	• 2.0 • 0.05 on sewer • 0.1 ha. if not on sewer lower min. size if land buying company	Area has potential for residential developments (invasion by land buying companies and land speculators) Industrial not attractive here
	Ruai	25	25	CP/FP/XX			

Source: A guide Of Nairobi City Development Ordinances and Zones

The minimum land parcel area size from the table is 0.05 Ha where there is sewer and 0.1 Ha if no sewer. Ground coverage and plot ratio on site development is set at 25%. Figure 32 shows contrary site development within the study area. Development controls are not followed while enforcement of the same is minimal.

Though the County Planning Department has tried to put alternative measures such as encouraging use of conservancy tanks in sanitary waste management, the measures are short lived and cannot take care of multiunit residential establishment.

Figure 32: Orthophoto - Cadastral map (Cluster 'A' - extent of developments)



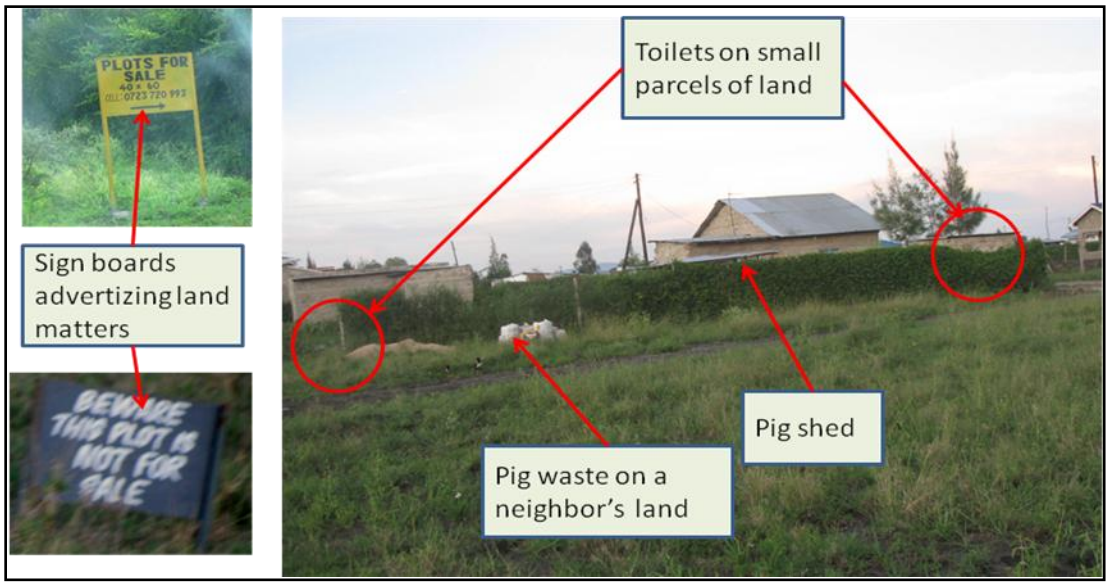
Source: Map compiled by author from SOK data and Google imagery, 2014

The overlay, Figure 32, shows developments within the parcel boundaries of one acre plots. Ground observations validated the levels of land subdivision into very small parcels (e.g 40 x 40 ft or 0.015 Ha) below the set minimum size of 0.1 Ha since there is no sewer. Legal survey records (RIM) as overlaid (parcel boundaries in red) indicates intact one acre parcels of land. This is already a conflict in legal records and ground

situation. Thus Government survey records which are available for planning do not tally with ground situation making it difficult to offer services and projections for future needs.

vi. Environmental degradation

Plate 19: Environmental concern



Source: Field survey, 2014

Table 20: Domestic water source

Water Source	Frequency	Frequency (%)	Cumulative Frequency (%)
Rain water	15	13.9	13.9
Well	66	61.1	75.0
Borehole	9	8.3	83.3
Piped	1	.9	84.3
water Vendors	3	2.8	87.0
No response	2	1.9	88.9
N/A	12	11.1	100.0
Total	108	100.0	

Source: Field survey, 2014

Plate 19 shows a small land parcel congested with various land uses which should be sited far apart. Pit latrines are placed next to the house. Pig shed is also close to the house and its waste is dumped on an adjacent plot. Pigs and pit latrine generate foul smell that pollutes the air while the latrine can contaminate shallow water wells within the neighborhood. Table 20 shows that majority – 61.1 % of the respondents use shallow wells for their domestic requirements, therefore the wells should be protected from contamination. There is need for Nairobi Water Company to provide for clean water to the area residents since the water from the wells has high levels of fluoride, about 8 ppm (from Government Chemist) which exceeds the WHO maximum contaminant level goals (MCLG) for fluoride is 4.0 mg/L or 4.0 ppm.

Advertizing boards mess with the beauty of the environment and one of them (plate 19) gives the idea of the presence of land grabbing vice in the area.

vii. Conflict in commercial land use

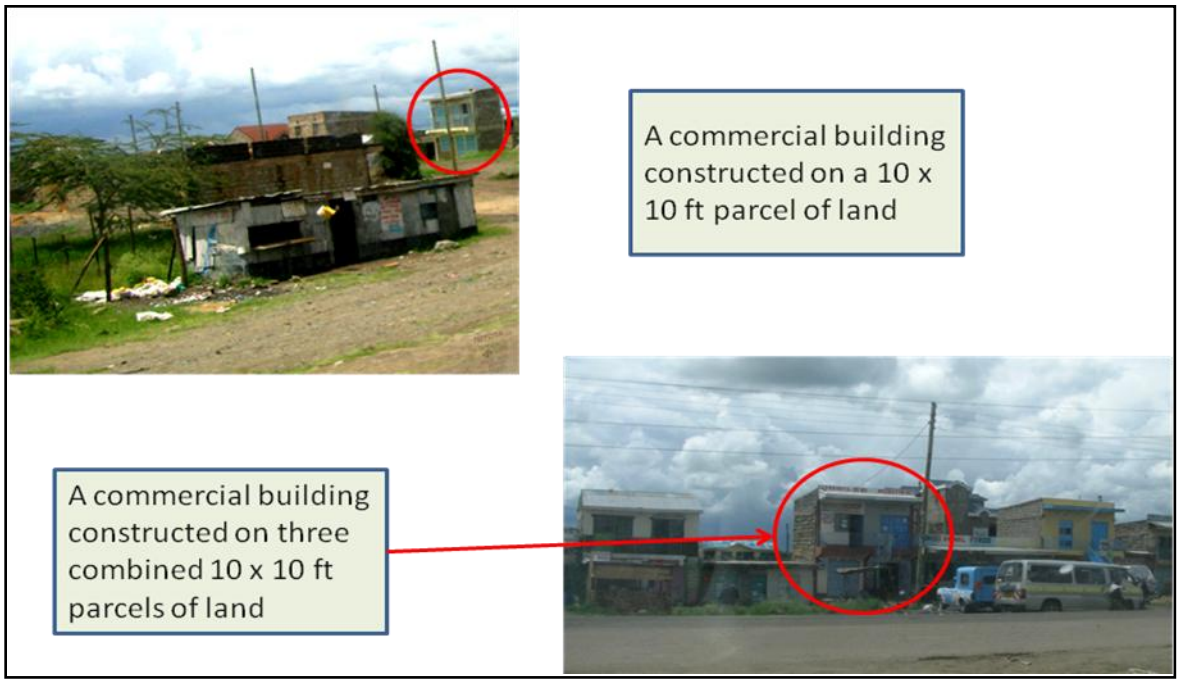
This study area was initially planned for mixed land use but biased on low density residential area of minimum land sizes of one acre of land. Field observation revealed a different ground situation whereby multi-unit commercial buildings dot the estate. Plates 20 and 21 show some of the upcoming developments composed of multiple commercial units, majority of which have not been approved by the county planning department. These calls for stringent land use control and implementation process from the concerned authorities.

Plate 20: upcoming multi-unit commercial buildings in residential area

Source: Field survey, 2014

Through observation and interview with an officer from the city planning department, it come out that there are several alcohol dispensing points next to residential units. Also too many of them are located in the commercial centers compared to the size of the centre causing noise pollution, increased insecurity and moral decay.

Plate 21: Uncontrolled development on a commercial within the study area

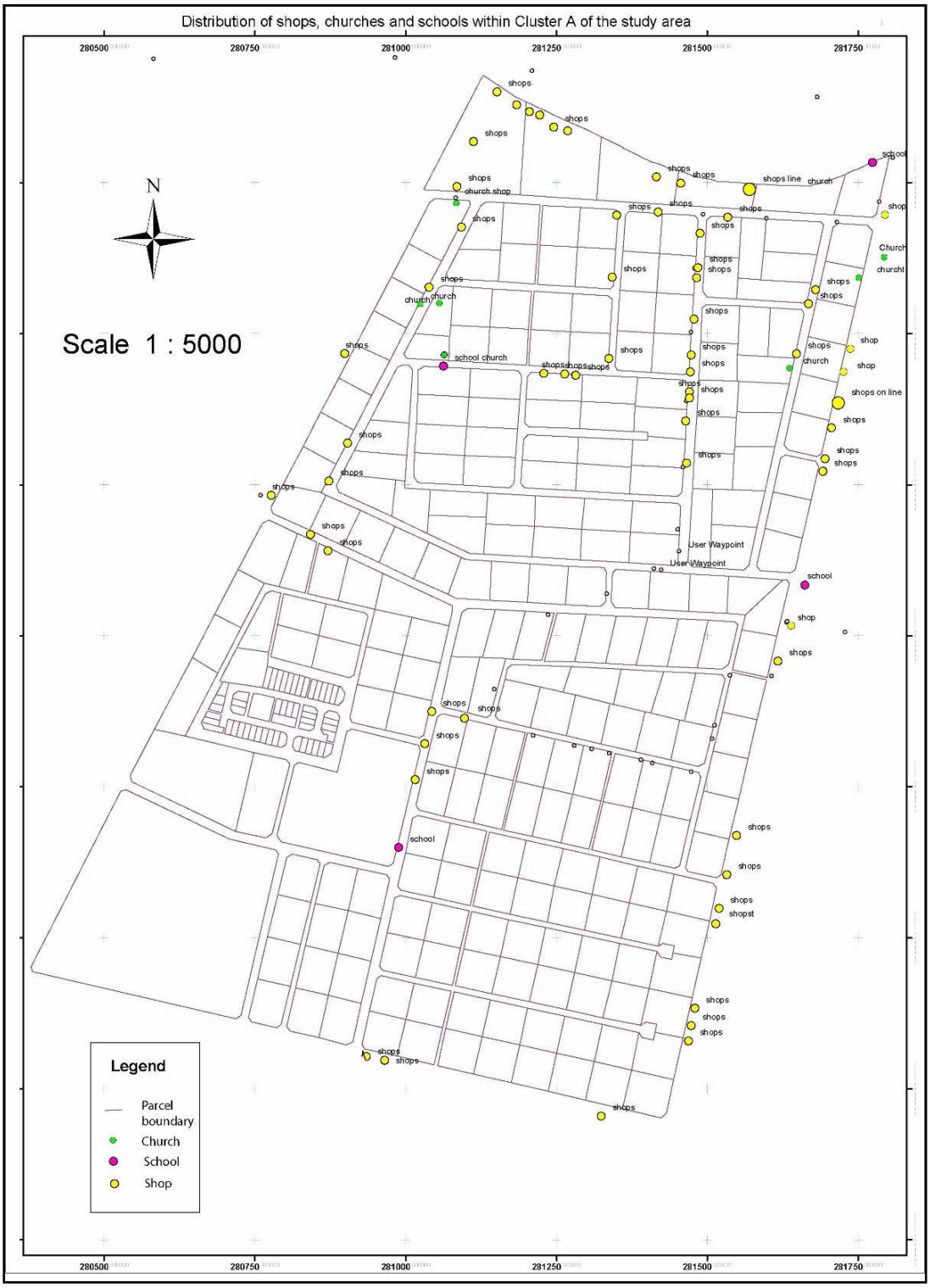


Source: Field survey, 2014

Figure 33 shows shops, churches and private academies distributed everywhere within Cluster A region of the study area. Roads along the most developed areas have been turned into commercial areas conflicting with residential land use. This implies that the residents are in need of a commercial center where these commercial activities can be agglomerated.

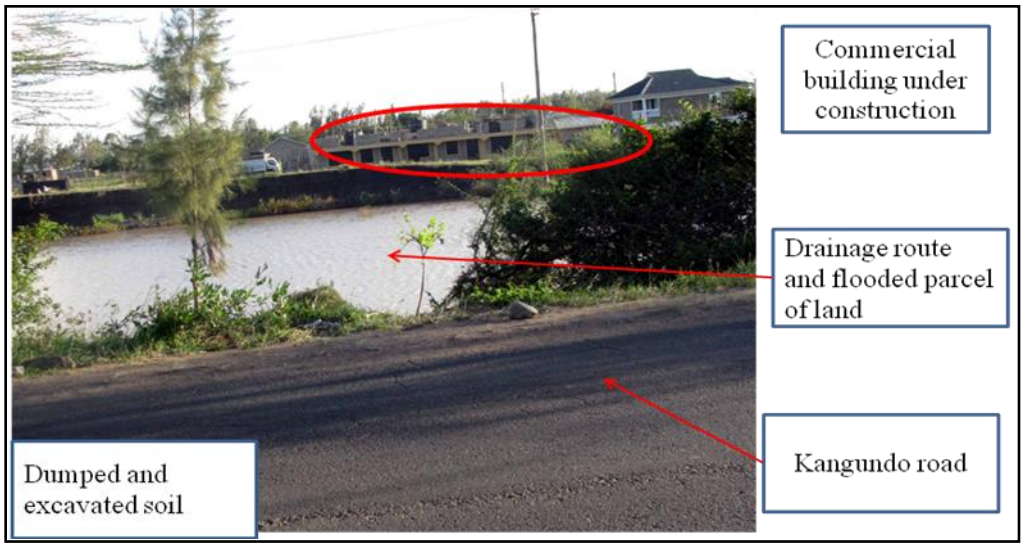
From the interview with officers from Nairobi County Planning department, the number of alcohol dispensing units within Drumvale are distribute everywhere within radius of less than 500m from each other. This was proved from field observation during the study period.

Figure 33: Map of the scattered distribution of shops and other services



Source: Compiled from GPS survey data, 2014

Plate 22: Multiple land use conflicts



Source: Field survey, 2014

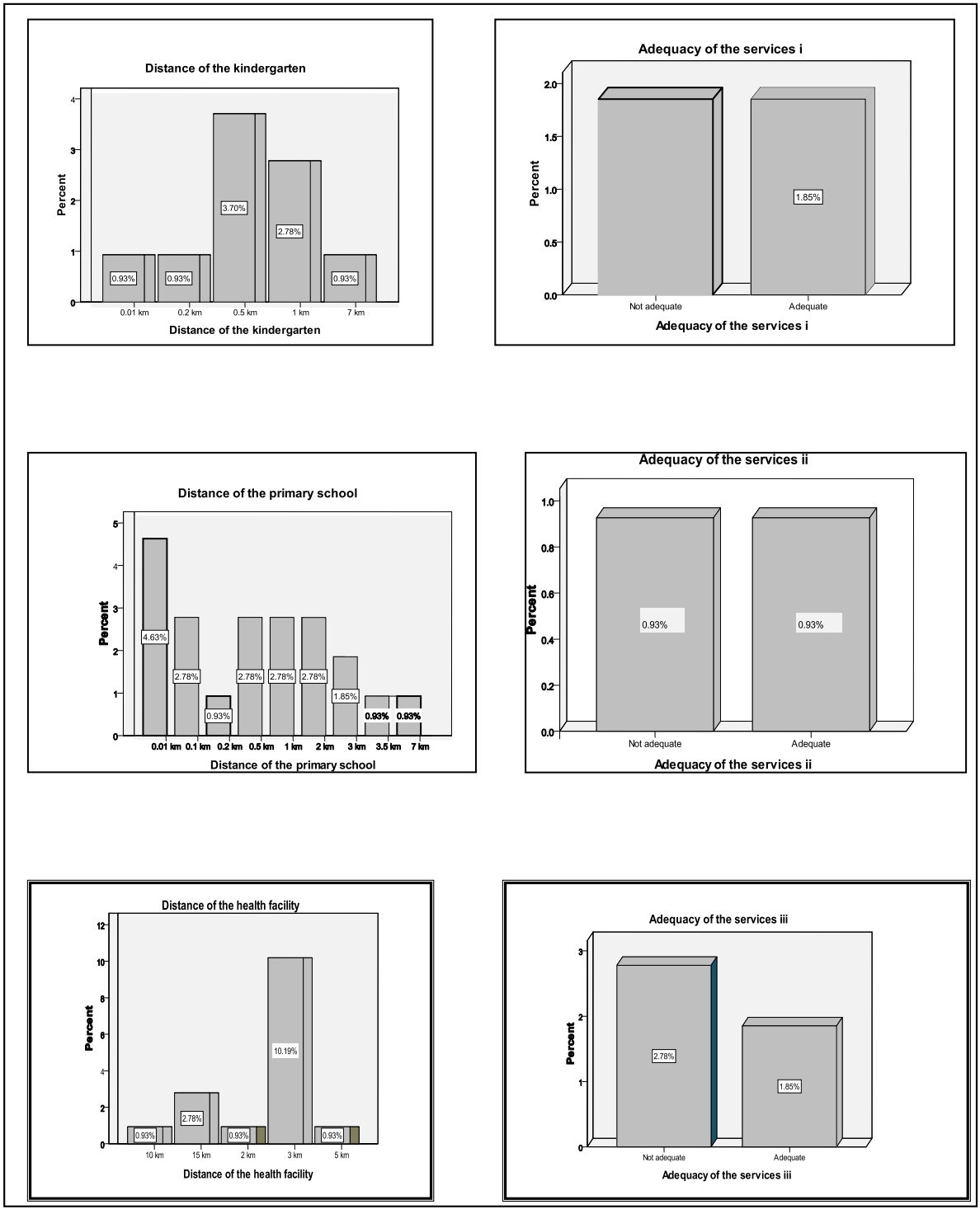
Plate 22 shows a case of conflicting land uses where by a multi unit residential cum commercial unit is located next to residential single units. The building is adjacent to an excavated pond area indicating drainage conflict. The flooded area is next to a tarmac carriage way and if nit addressed it will weather away the road posing danger to road users.

viii. Adequacy and Conditions of facilities in the area

As noted earlier, the rate of immigration into Drumvale and subsequent land developments has been significantly high. It was therefore necessary to find out if the level of services was proportional to the densities of development in the area.

From the Figure 34, the distances to facilities are on average 3km away from the places of residence. Furthermore, the majority said they are not inadequate but are in fair conditions. This means that while developments have increased in the area, service

Figure 34: Distance to and adequacy of services



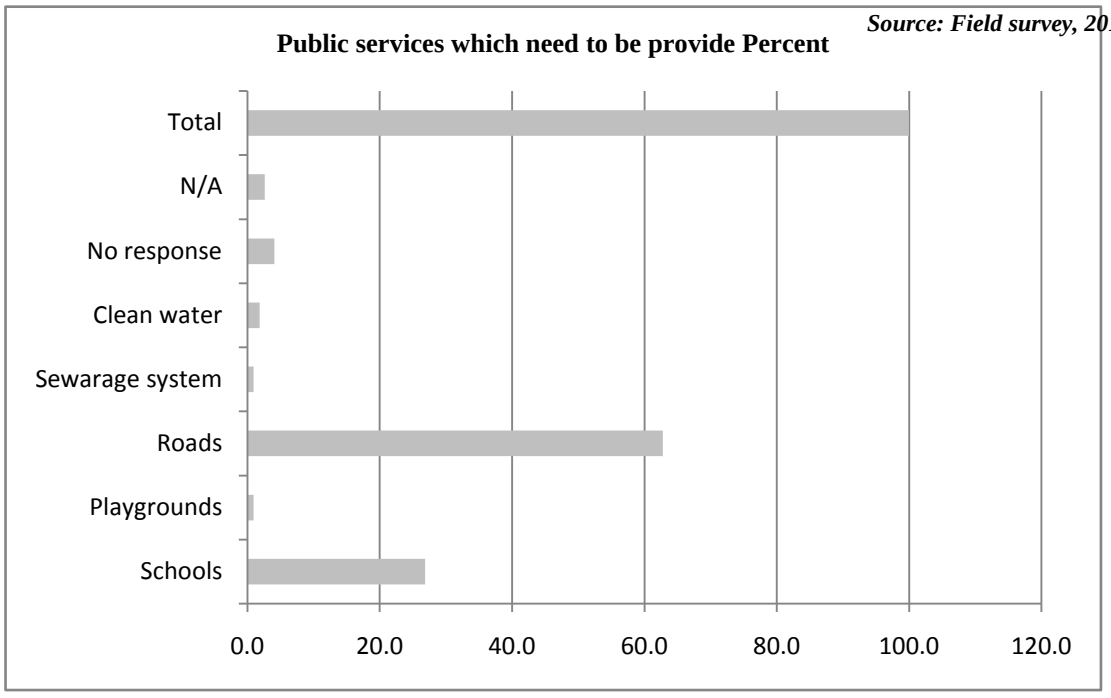
Source: Field survey 2014

provision has not been at the same pace. This is further confirmed by the fact that people have pointed out so many services that should be provided, Figure 35, and roads and schools were given the most prevalence.

The entire estate is served by only one public (community) secondary school and likewise only one public primary school exists. There is no single public health facility provided in the study area.

Majority of basic needs are provided by the private sector while the community initiates those activities which they feel are important for public goods such as raising funds to improve on the accessibility of the area and initiating construction of the two schools in the area.

Figure 35: Public services to be provided



Source: Field survey 2014

5.5 The effects of the land use conflicts

Blocking of the natural drainage routes by human activities have resulted into serious flooding of the study area causing loss of life and property. This has been proved by the aftermath of flush floods, 26th March 2014, which resulted into loss of life and destruction of properties.

Land encroachments and ownership conflicts have resulted into length court cases with waste of finance and time as found out during this study. These also cause strained neighborhood relationships, underdevelopment and delayed justice.

Access roads have not been spared by illegal damping of excavated cotton soils and encroachment causing pain and frustration to the residents.

The rampant uncontrolled site developments expose the residence to conflicts with little legal redress especially in cases of ownership conflicts. Sustainable development cannot be achieved where planning controls are not implemented. Likewise, service delivery especially for the common good (such as schools, health and recreation) is rendered almost impossible.

Lack of implementation of land use controls has greatly affected the area and it would be impossible to have sustainable developments thus resulting to pollution and low standards of living. This is seen in the rampant distribution of incompatible land uses (such as raring of animal – pigs and chicken; and churches next to residential units; and alcohol dispensing joints) is common which in itself affect the whole well being of the society.

Grabbing of land set aside for public use hinders provision of merit goods to the public which affects the well being and the fabric of the society.

5.6 Propose policy and planning interventions

The research proposes development of policies that would guide implementation process of land control for sustainable development.

Public sensitization programmes should be initiated especially by the professional bodies. This would enlighten the people on basic knowledge especially on planning and environment. Promotion of social integrity would greatly improve the development of the study area as well as achieve a sustainable development.

Non-implementation of rules and regulation governing physical development and land transactions should be enforced. Processes of land subdivision, land transactions, boundary re-establishments and development procedures have to be adhered to. These would result to minimization of land use conflicts in Drumvale and optimization of developments in social, political and economic dimensions while taking care of the environment.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

This is the last chapter of this research document. The study sought to assess land use conflict in the peri-urban area of Nairobi, Drumvale estate in Ruai location. This chapter provides a summary of the research findings inferred from the stated objectives in chapter one. The conclusions and recommendation are guided by the objectives of the study and informed by chapter five's findings, analysis and synthesis of the information collected from the study area.

6.1 Summary

Causes of land use conflicts

Informal land subdivision is the major cause of land use conflict in the area. These have lead to informal land transactions where there is no guarantee of land tenure. This study found out that 48.9 % of all respondents own land below the set minimum size of 0.1 Ha for parcel sizes for areas without sewer services. The other causes are inadequate planning, non implementation of planning regulations and development controls as well as lack of provision of basic services such as sewer, storm water drainage and soil dumping sites which worsened the issue of land use conflicts. Also there is little or no professional policing, inadequate planning awareness and uncertainty of spatial location of plots.

The existing free market economy driven by the land market where 0.4 Ha, 0.05 Ha, and 0.02 Ha of land goes for Ksh. 4.5 million, between Ksh. 800,000 – 900, 000 and between Ksh. 500,000-600,000 respectively is supported by informal land transactions. Wehrmann (2008) observed that not even a perfect, economically efficient land market can prevent land conflicts as land market forces alone do not lead to socially and

ecologically optimal land use patterns. Authenticate land transaction documents statutory required in all land transaction are not a prerequisite for consideration by the prospective land buyers rather they feel that they have secured their land rights by actual occupation of land. This in itself is a wrong assumption since all land rights are guaranteed by statutory registration. These have to be regulated to optimize land use and reduce land use conflicts.

Nature of the land use conflicts

This research revealed that there exist land ownership dispute where both public and private land has been grabbed. A lot of flooding has been witnessed in the area due to lack of storm water drainage system and blockage of natural drainages by soil dumping and illegal construction. The estate has a lot of degraded access roads from soil dumping and non construction of the carriage ways. Land encroachment and unregulated site developments have, also, not only increased land use conflicts but greatly degrades the environment resulting in pollution of both air and water. Basic services such as health and schools are inadequate and economic activities such as shops and light industries are scattered all over the estate.

Effects of land use conflicts

Grabbing of land set aside for public use hinders provision of merit goods to the public which affects the well being and the fabric of the society.

Lack of implementation of land use controls has greatly affected the area and it would be impossible to have sustainable developments thus resulting to pollution and low standards of living. This is seen in the rampant distribution of incompatible land uses (such as raring of animal – pigs and chicken; and churches next to residential units; and alcohol dispensing joints) which are spatially scattered all over the estate.

There has been loss of life and properties, lengthy court cases, strained relationships between neighbours, lack of aesthetic and a lot of time and money wasted in solving land

use conflicts. The residents are also socially affected by the inadequacy of the basic services.

Policy and planning interventions

Though policies exists in land use issues need to be readdressed because as is the case observed in the study people are not responsive to the laid down planning laws and regulations There is need to relook at the existing planning and development policies to understand the their sort coming. Also new policies and implementation institutional framework need a redress to cater for the provision adequate infrastructure, utility-services and amenities to serve the rising population.

6.2 Recommendations

Conflict resolutions

- Professional omissions and commissions have been the origin of land use conflicts resulting from encroachments, informal subdivisions and land transaction, election of power lines in the middle of roads and rampant land grabbing of both public and private lands is a serious omission or commission of professionals dealing with land related matter. There seem to be no coordination of land processing between different land discipline such as the planning and registration sectors.

  This research recommends proper coordination of all disciplines (planning surveying and land registration), policing of professionals and observation of ethics in land related matters.

  Interviews to the local chief, city planners and surveyors were of the view that 90% of land resulting from subdivisions whose area is less than 1/4 acre have not been carried out professionally.

Therefore, surveyors, planners, registrars of land, lawyers and land buying companies should work together to clean and mitigate land use conflicts that are being experienced in Drumvale. They should be high penalties for impersonators and professionals who abet corruption in land related matters.

- An interview with Land surveyors revealed that many of the control points, required for boundary re-establishment and re-affirmation, in the area and within its neighborhood are missing due to human interference and uprooting. Thus there is need to create and densify control points for present and future boundary reestablishments. The surveyors should ensure proper establishment of property boundaries and help to minimize such cases.

  Director of Surveys, the custodian of spatial data, should establish geodetic control points to ensure accurate subsequent re-establishment and re-affirmation of land parcel boundaries as per the Survey Act.

- The research found out that land owners are not keen of processing ownership documents because of the lengthy and bureaucratic land registration processes. The study recommends that Cabinet Secretary, Ministry of lands, housing and Urban Development ought to establish state of the art land information system where owners and perspective land owners can easily verify ownership and spatial information of land. This should be accompanied by an efficient land transaction processes.

- Due to rapid increase in population from intra and extra region there is a great demand for more public services such as schools, hospitals, better roads and sewerage.

  Nairobi County, Physical planning department and water and sewerage company ought to establish a sewer system soonest possible to cater for the rapid developments in the area. This would be the long term intervention for sanitary waste disposal away from the current pit latrine method.

Implementation of planning and development controls regulations

- According to the study, planning regulations and development control of Drumvale estate rests principally in the hands of the city county government. As such the county government has in past not been able to effectively implement these regulations and controls. Consequently, the people have been left to carry out land transactions and procedures without control and against the laid down rules and regulations, hence subjecting the estate to land use conflicts and hazardous developments. This has also deprived the residents' basic services such as good roads and efficient waste disposal systems which if not addressed will cause unsustainable development. In this view planning and development control should not only rest in the hands of the city county government but also with the residents of the estate and therefore this research calls for a public- private partnership between the Nairobi County Government and the landowners of upcoming estates.

- The study pointed out that almost 95 % of all subsequent subdivision of original one acre land is informal. The site developments within these subdivided parcels are also not approved and hence no development control is being carried out. Evidently, the high rate of subdivision to small parcels below the set up minimum size has greatly contributed to land use conflicts. This calls for enforcement on implementation of the laid down regulations.

  Director of Physical planning ought to put punitive measures in place to deter land owners who subdivide land and sell it without seeking approvals from respective authorities and ensue no development takes place without approval.

- Land use and zoning standards rules and regulations should be fully implemented for sustainable development. Accessibility standards, site development standards, zoning standards, density standards, site development standards and environmental controls (including lighting and ventilation Safety standards) must be followed in order to reduce land use conflicts in our society. As stated by

(FAO, 1993) in Sifuna (2009), land planning entails not only deciding where to put which development but also the preparation and implementation of physical development plans for orderly management of human activities which is not the case in this study area. Thus efficient and sustainable management that mitigates the adverse effects of unplanned development activity as well as unsustainable land use forms and practices is not ensured.

- Majority of the residents are not aware of planning and development controls. Therefore, a policy on involvement of communities in planning and implementation processes such as control of subdivisions and site developments is recommended. Civic education should be conducted to enlighten the people and make the nation a planning society right from the early age of human development.

  The physical planners should understand that the people they plan for understand their needs better and majority feel helpless when there is no control. They should be involved in all decision making areas at all levels of planning as provided in the Kenya Constitution 2012 and as proposed in the Rio earth summit, Agenda 21.

Adequate planning

- It was found out that population density of the estate is about 7907 persons per square Km coupled with the rapid population and development growth require adequate planning to allow for provision of basic services such as good roads, water, sewer, health institutions and commercial centre.

- Planning of residential land use in the path of natural drainage is an overview which needs agent measures. Subdivision of land into small parcels below the minimum set sizes requires provision of sewerage services and construction of storm water drainage system to cater for sanitary waste and surface runoff respectively.

- Dumping of excavated soils on road reserve must be stopped. The planning department should provide designated dump sites, such as abandoned quarries, for these soils and enforce the developers to adhere to dumping regulations. High penalties imposed and meted to those who flout such laws to deter non adherence.

- There is need for Nairobi Water Company to provide adequate and clean water to the area residents since the water from the wells has high levels of fluoride, about 8 ppm (from Government Chemist) which exceeds the WHO maximum contaminant level goals (MCLG) for fluoride is 4.0 mg/L or 4.0 ppm.

- There is free market economy driven by the land market where 0.4 Ha, 0.05 Ha, and 0.02 Ha of land goes for Ksh. 4.5 million, between Ksh. 800,000 – 900, 000 and between Ksh. 500,000-600,000 respectively and supported by informal land transactions where legal backing is absent. These has to be regulated to optimize land use as was observed by Wehrmann (2008) who stated that not even a perfect, economically efficient land market can prevent land conflicts as land market forces alone do not lead to socially and ecologically optimal land use patterns. In Kenya today, informal land transactions is an urgent matter in land equation which has to be socially addressed, Cabinet Secretary, MLHUD and City physical planners ought to protect land ownership rights and regulate land developments.

A paradigm shift is necessary to move away from today's norm where people do not respond to the laid down planning and development regulation. People take risks to buy and occupy land which has no tenure guarantee such as without ownership documents. Non implementation of these regulations goes on unabated thus negating the purpose there were supposed to serve. The driving force of owning a home and everyone dreaming of owning land (Pretoria University Law Press, 2011) should not be an end to justify the means. There should be some precautions in investment and observation of the rules of the land.

6.3 Conclusion

This study recognizes that there is need to minimize and mitigate land use conflicts through adequate planning, implementation of planning regulations and standards, observation of ethics in execution of service delivery to the people. Drumvale estate has a potential to be a well planned estate offering optimal and best utilization of resources with minimal conflicting land uses. Immediate implementation remedies would restore the estates' lost growly.

This also requires total cooperation between the stake holders. The National government, Nairobi City County Government, the Business community and land users have their part to play to ensure harmony in land use, land transactions and sustainable development. The planners as a custodian of planning ethics and implementation should offer their best to the residents of Drumvale and also educate them on the importance of planning and planning regulations. They should help the residents to work towards achieving the estate they envisage.

Legal ownership documents will help in implementation of planning and proper development controls. The issuance of such documents should be fast tracked to ensure security of tenure. A good and efficient land information system will reduce land grabbing, double allocation and land ownership conflicts.

From the field survey it emerged that, Drumvale estate, despite its high level of land use conflicts, has some potential of renewal. This conclusion was reached after looking at areas where there are predominant single residential units and the occupiers of the subdivided plots make the layout look like a gated community by putting gates on their access road.

Plate 23: A sample of gated resident units

The red lines are the block boundaries detailing the road of access to parcels within an acre of land with a single entry point from the main road.
The number of single-unit residential houses may be between 8 and 20 units depending on the number of subdivisions

In the urban setting they are development standards and land parcels are set aside for provision of public services such as health institutions and schools. Grabbing of public land by individuals has negatively affected this provision which can be achieved by repossessing the land and restoring it to the use it was planned for.

In case of drainage conflicts all is not lost. If sewer and proper drainage systems are provided flooding and loss of life and property will be a thing of the past. Drainage problems can be solved when a planner chips in to ensure that there is adequate planning to open up ways for natural drainage are opened up and adequate man made drainage systems are provided.

6.4 Area for further research

This research has essentially assessed the types, nature, effects and planning mitigation measures of existing land use conflict in Drumvale estate. Consequently there should be an understanding of the social-economic side of the laid down policies and more so the factors contributing to the non responsiveness of people to the institutional frameworks. This would be an enlightening step to the planners to understand why planning regulations and developments controls are hard to implementation in urban regions and specifically Nairobi.

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Appendix 1: Household Questionnaire

University Of Nairobi

Department of Urban and Regional Planning

Master of Arts Planning 2012/2014 Thesis Field Research

"An Assessment Of Land Use Conflict In Peri-Urban Area Of Nairobi County

Case Study: Drumvale Sub-Location – Ruai"

Declaration: *The information obtained will be treated with confidentiality and it will be used purely for academic purpose only.*

Nairobi County	Kasarani Constituency
Kamulu Location	Drumvale Estate
Name of interviewer…… Tel No……	
Date of Interview ……Start time…… ….. End Time……	

QUESTIONNAIRE NUMBER_____

SECTION 1: RESPONDENT'S INFORMATION

1. 1 Name of Respondent (Optional)

……

1. 2 Relationship with

HH……

1. 3 Age (should be over 18 Years)……

1. 4 Sex

Male ☐
Female ☐

SECTION 2: DEMOGRAPHIC CHARACTERISTICS OF MEMBERS OF HOUSEHOLD:

2. 1 What is the household size?

	HH member	Sex	Age	Relationship with HH	Occupation
1					
2					
3					
4					
5					

SECTION 3: MIGRATION TRENDS

Immigration

3. 1 Have you lived in Drumvale since birth? (1) Yes (2) No.

3. 2 (a) If no, where did you reside before you came to Drumvale?……

(b) How long have you lived in Drumvale since you came?.....

(c) What influenced you to come to Drumvale?

Employment ☐ Business ☐ Marriage ☐ Others (specify)…….

SECTION 4: LAND TENURE

4. 1What is the size of the plot you reside on? ……

4. 2 Do you own the land in which the household resides? Yes ☐ No ☐

4. 3 a) If yes, how did you acquire the land?

Method of acquisition	**Tick**
Inheritance	
Allocation by Government	
Cooperative shares	
Purchased	
Others (Specify)	

b) Do you have any ownership document? Yes ☐ No. ☐

c) If yes, which one?

Document	**Tick**
Title deed	
Lease agreement	
Temporary Occupation License	
Company certificates	
None	

d) If no, why?

……

……

4.4 (a). If you purchased this land, did you engage the services of a surveyor to assure plot location? Yes ☐ No ☐

(b) If no, how were you assured that the location shown is correct?

…….....

.....

..

4.5 Was your land part of a bigger parcel that was subdivided? Yes ☐ No. ☐

4.6 If yes, provide the following

Initial size of land	**Mother Title No.**	**Subdivided into how many portions**	**Size of the portions**	**Price**

SECTION 5: INFRASTRUCTURE FACILITIES AND UTILITY SERVICES

5. 1Which public services do you think need to be provided?

Services	Tick as Appropriate	**Reason**	
Kindergarten			
Primary school			
Secondary school			
Health facility			
Security /Police post			
Social hall/youth centre			
Recreational facilities/ public park			
playing field			
Water services			
Sewer			
Electricity			
Other			

5. 2Where do you get water for your domestic and other uses

Source	Distance
1. Rain water	
2. River/stream	
3. Well	
4. Borehole	
5. Piped	
6. Water vendors	

5. 3What are the challenges in accessing clean water?

.....

.....

5. 4How are your access roads? 1) Dry weather 2) All weather

5. 5Road status. 1). Very good 2). Good. 3). Fair 4). Poor

5. 6How do you dispose waste from the house?

Method		**Tick as Appropriate**
5.7 a) solid waste	**1.** Bury	
	2. Burn	
	3. Compost pit	
	4. Garbage collection	
	5. Other (specify)	
5.8 b) Sanitary waste	1. Septic tank	
	2. Pit Latrine	
	3. Other (specify)	
5.9c) Liquid waste	1. Water closet to sewerage system	
	2. Pit latrines	
	3. Septic tank	
	4. Open drain	
	5. Others (specify)	

5.10 What is the main source of energy you use?

Energy type	**Use**		**Provider/source**	**Efficiency** **1. Efficient 2. Not efficient**
	Lighting	**cooking**		
Electricity				
Solar				
Firewood				
Charcoal				
Paraffin				

SECTION 6: LAND USE CONFLICTS AND RESOLUTION

6. 1Have you experienced the following?

Conflicts	Tick as Appropriate
1. Solid waste disposed on open field	
2. Land encroachment	
3. Boundary dispute	
4. Stray animals destroying your crops	
5. Land grabbing	
6. Double allocation	
7. Others	

6. 2What effects do these conflicts have on :-

a Development of this area?

……...

b Individuals……

6. 3(a) Who assists residents in land conflict resolution locally?

.....

(b) Are they effective in resolving conflict? (1) Yes (2) No

c) Give reasons

.....……..... ....

.....

.....

...

6.4 (a) Do you have any land use conflict with your neighbor (1) Yes (2) No

(b) If yes, state

.....

.....

.....,,.....

6.5 (a) Are you aware of physical planning requirements in property development?

(1) Yes (2) No

(b) If yes, what do you know?

……

……

6.6 (a) Are you aware of subdivision and development regulation?

(1) Yes (2) No

(b) If yes explain

.....

.....

SECTION 7: ENVIRONMENT & RESOURCES

7.1 a. Are there environmental concerns in the area? Yes [ ] No [ ]

b. If yes, state them

Challenge	Most frequent	Frequent	Least frequent	Non-occurrence
1. Pollution (water, air and noise)				
2. Polythene disposal				
3. Land excavation				
4. Soil disposal				
5. Others (specify)				

7.2 a. Are there challenges in solid waste disposal in the area? Yes [ ] No [ ]

b. If yes, state

……

……

7.3 a. Are there challenges in liquid waste disposal in the area? Yes [ ] No [ ]

b. If yes, state

……

7.4 have you experienced the following? (***Tick category)***

Effect	Most frequent	Frequent	Least frequent	Non-occurrence
Water and airborne diseases				
Flooding and siltation				
Blocking of water ways				
Aesthetic				
Family and communal conflicts/ feuds				
Others (specify)				

7.4 What are intervention measures put in place to mitigate the above environmental challenges?

……
……
……

7.5 a. Which Agencies/ stakeholders are involved in environmental conservation in this area?

……
……

b. How are they involved

……
……

7.6 Any other comments on land use conflicts in this area

……
……

ASANTE

Appendix 2: Interview Schedule for Drumvale Cooperative:

University Of Nairobi

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Name of Respondent (Optional)……

Name of Interviewer…… Time of interview……

Date……

---

1. How many corporate members do you have? .....
2. Do you have uncollected letters of allotment?

   Yes ☐ No ☐
3. If yes, what is the reason of members not collecting their allotment letters?

   _____

   _____

   _____
4. What types of land conflicts are reported in your office?

   _____

   _____
5. What are the causes of such conflicts?

   _____

   _____

   _____
6. How do you resolve them?

   _____

   _____

   _____

7. What is the current minimum plot (size) in the estate?

_____

_____

_____

8. Do land owners adhere to subdivision and building regulations?

_____

_____

_____

9. Were there land parcels set out for public services (1) Yes 2) No

_____

_____

10. If yes, how have they been utilized?

_____

_____

11. Who hold the titles to such properties?

_____

_____

12. What are the major land challenges in this estate?

_____

_____

_____

Appendix 3: Interview Schedule for NEMA Regional Officer:

University Of Nairobi

Department of Urban and Regional Planning

Master of Arts Planning 2012/2014 Thesis Field Research

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Name of Respondent (Optional)……

Name of Interviewer…… Time of interview……

Date……

---

1. What are the major environmental issues in the estate,

   _____

   _____

2. What are the impacts of upcoming developments on environment?

   _____

   _____

3. Are there environmental concerns from

   a Waste water disposal?

   _____

   _____

   b Solid waste disposal?

   _____

   _____

4. What are the proposed mitigation measures?

_____

_____

Appendix 4: Interview Schedule for Nairobi county planning department

University Of Nairobi

Department of Urban and Regional Planning

Master of Arts Planning 2012/2014 Thesis Field Research

"An Assessment Of Land Use Conflict In Peri-Urban Area Of Nairobi County Case Study: Drumvale Sub-Location – Ruai"

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Name of Respondent (Optional)……

Name of Interviewer……Time of interview…….

Date……

---

1. Do you monitor developments in Drumvale estate?

   _____

   _____

2. What is the percentage of approved buildings in this area?

   _____

   _____

3. Are the developers aware of planning and building regulations in the area?

   _____

   _____

4. What are the challenges in implementation of planning and development controls in the area?

   _____

   _____

5. What plans do you have in place to mitigate the challenges?

   _____

   _____

6. What are the major development challenges in the area?

Appendix 5: Interview Schedule for County surveyor and Private surveyors:

University Of Nairobi

Department of Urban and Regional Planning

Master of Arts Planning 2012/2014 Thesis Field Research

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Name of Respondent (Optional)……

Name of Interviewer…… Time of interview……

Date……

---

1. What types of land conflicts are you called upon to resolve in Drumvale?

   _____

   _____

   _____

2. What is the frequency of land subdivision?

   _____

   _____

   _____

3. Which survey procedure do you use to resolve the issue?

   _____

   _____

   _____

4. For subdivision survey, do you seek approvals from concerned authorities?

_____

_____

5. Have you ever handled court cases in respect to land conflict? If yes, explain?

_____

_____

6. What are the challenges in conflict resolution

_____

_____

_____

7. Which mitigation measures would you suggest to reduce the conflicts?

_____

_____

_____

Appendix 6: Interview Schedule for Local Chief and Police

University Of Nairobi

Department of Urban and Regional Planning

Master of Arts Planning 2012/2014 Thesis Field Research

"An Assessment Of Land Use Conflict In Peri-Urban Area Of Nairobi County Case Study: Drumvale Sub-Location – Ruai"

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Name of Respondent (Optional)……

Name of Interviewer…… Time of interview……

Date……

---

1. What types of land conflicts are you called upon to resolve?

   _____

   _____

2. How many cases do you receive per month?
3. How do you resolve them?

   _____

   _____

4. How are social and resource conflicts managed in the estate?

   _____

   _____

5. Has any land conflict resulted to violent? If yes explain

   _____

   _____

6. What challenges do you face in carrying conflict resolution?

   _____

7. How can these challenges be addressed?

   _____