

**TITLE: SUSTAINABLE RESIDENTIAL NEIGHBORHOOD
PLANNING, A CASE STUDY OF BURANDOGO VILLAGE
TAVETA CONSTITUENCY**

By

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of Master of Environmental Planning and Management in the School of Environmental
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DECLARATION

This report is my original work and has not been presented for a degree award in any university. No part of this report may be produced without prior permission of the author and/or Kenyatta University.

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DEDICATION

This report is dedicated to Mr. and Mrs. Mwangi and one Mr. Bernard Kibe.

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This report is a product of a research conducted for the Master of Environmental Planning and Management at Burandogo Residential Neighbourhood, Taveta constituency. The report is a result of generous contribution and assistance of a number of organizations, institutions and individuals both within and without Kenyatta University. First and foremost, I give thanks to the Almighty for good health and opportunity to carry out the study. Special thanks also goes to Kenyatta University through the Department of Environmental Planning and Management (EPM) for availing the necessary resources that made it possible to carry out the study and subsequent preparation of this report. Additionally, I wish to express my sincere gratitude to my academic supervisors Dr. Peter K. Kamau and Madam Carol Getao, whose professional advice, guidance and constant encouragement played a vital role in the improvement and perfection of this report. In a special way I would like to thank the Taita Taveta county government and the resident of Burandogo neighbourhood for availing vital information and assistance that assisted in the research project. Last but not least I thank Mr. and Mrs. Mwangi for their support through out my academic process.

ABSTRACT

Urbanisation and population growth have led to impact that increasingly deplete the natural resources and threaten the existence of the ecosystem. This has led to an increased awareness that the development of land use should be well managed in order to be sustainable. Improvement of housing for the Kenyan population is a major concern to the Government. In its commitment to improved housing the Government of Kenya introduced a National Housing Policy that comprehensively addresses the shelter problem.

Given the average household size of 4 persons from the 1999 national Population and Housing Census, there are about 750,000 households in urban areas and 1,500,000 households in the rural areas that need to be housed. With such information the Government aimed to facilitate an annual output of 150,000 housing units in urban areas and 300,000 units in rural areas in the next five years in order to be able to meet that demand (National Housing Policy, 2004). As people were settling in Burandogo there was no planning that was done to ascertain that the neighbourhood has all the social amenities required, this could be due to the fact that some of the residents settled there as squatters a form of informal settlement that does not consider planning aspects. The housing tenure of the area is mostly tenancy and ownership with tenancy being the most common housing tenure system in the area. With tenancy most tenants pay rent which most of them considered the rent charges as being affordable to them.

Some of the physical planning requirements were not adhered to in the neighbourhood for instance the area was not served with an efficient storm water drainage system. The area lacks all weather and well articulated access roads, no properly constructed market place, and poor solid waste management, lacks a sewerage system, lack sufficient and efficient sanitation facilities, security enforcement personnel and schools. The areas that the residents mostly advocated for their improvement include water supply, security, sanitation, storm water drainage and the introduction of a health facility.

The demand of housing still far outstrips supply due to the high rate of urbanization, increased poverty, escalation of housing costs and the lack of a clear government initiative towards the same.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Urbanisation and population growth have led to impact that increasingly deplete the natural resources and threaten the existence of the ecosystem (Marcotullio 2004: Becker 2005). This has led to an increased awareness that the development of land use should be well managed in order to be sustainable (Bebington & Gray 2001). Most approaches in current housing researches concentrate on the physical attributes of single dwelling units and exclude the fact that the dwelling units rarely stand alone in a given physical space (Hulchanski David 1995).

People tend to form communities and communal living patterns since the early ages of the humanity for practical, economical, sociological and psychological reasons. The fact that most of those reasons are still valid in today's society pushes some housing researchers to seek the reasons behind the current trends of settlements disregarding the traditional neighbourhood concept. The neighbourhood as an element of the housing environment has a strong impact on residential satisfaction, and influences the perception of residents' well being (Hulchanski David 1995). A residential area is a land use in which housing predominates, as opposed to industrial and commercial areas.

Housing may vary significantly between, and through residential areas. These include single-family housing, multi-family residential or mobile homes. Housing generally refers to the social problem of insuring that members of society have a home to live in, whether this is a house or some kind of dwelling, lodging or shelter. Residential development is real estate development for residential purposes. Some such developments are called a subdivision, when the land is divided into lots with houses constructed on each lot. Such developments became common during the late nineteenth century, particularly in the form of streetcar suburbs. A village is a clustered human settlement or community, larger than a hamlet but smaller than a town with the population ranging from a few hundred to a few thousand (sometimes tens of thousands). The term neighbourhood is often used to describe the sub-divisions of urban or rural locations such as cities, villages, and towns (Duany and Zyberk, 2003).

A neighbourhood is considered as the physical space of the neighbourhood in relation with the residential environment consists of the following (Hulchanski David 1995):

- The private space of the flat/dwelling,
- The collective space of the residential building complex,
- The public space of the surrounding areas

In previous centuries, residential development was mainly of two kinds. Rich people bought a town lot, hired an architect and/or contractor, and built a bespoke / customized house or mansion for their family. Poor urban people lived in shantytowns or in tenements built for rental. Single-family houses were seldom built on speculation that is for future sale to residents not yet identified. When cities and the middle class expanded greatly and mortgage loans became commonplace, a method that had been rare became commonplace to serve the expanding demand for home ownership (Chicago: Realtors Land Institute, 1999).

Post–World War II economic expansion in major cities of the United States, especially New York City and Los Angeles produced a demand for thousands of new homes, which was largely met by speculative building. Its large-scale practitioners disliked the term "property speculator" and coined the new name "residential development" for their activity. Entire farms and ranches were subdivided and developed, often with one individual or company controlling all aspects of entitlement, land development, infrastructure (utilities and sewage disposal), and housing. Communities like Levittown, Long Island or Lakewood south of Los Angeles saw new homes sold at unprecedented rates—more than one a day. Many techniques which had made the automobile affordable made housing affordable: standardization of design and small, repetitive assembly tasks, advertising, and a smooth flow of capital. Mass production resulted in a similar uniformity of product, and a more comfortable lifestyle than cramped apartments in the cities. With the advent of government-backed mortgages, it could actually be cheaper to own a house in a new residential development than to rent.

As with other products, continual refinements appeared. Curving streets, greenbelt parks, neighborhood pools, and community entry monumentation appeared. Diverse floor plans with differing room counts, and multiple elevations (different exterior "looks" for the same plan)

appeared. Developers remained competitive with each other on everything, including location, community amenities, kitchen appliance packages, and price. Today, a typical residential development might include traffic calming features, such as a slowly winding street, dead-end road, or looped road lined with homes. Some residential developments are gated communities.

The concept of neighborhood unit was evolved due to the advent of industrial revolution and degradation of the city environment caused due to high congestion, heavy traffic movement through the city, insecurity to school going children, distant location of shopping and recreation activities; etc (Clarence Perry 1900s). Hence to create a safely healthy physical environment in which children will have no traffic streets to cross on their way to school, schools which are within walking distance from home; an environment in which women may have an easy walk to a shopping centre where they may get the daily household goods, employed people may find convenient transportation to and from work. It is an environment in which a well-equipped playground is located near the house where children may play in safety with their friends for healthy development of their mind and spirit.

With consideration to all the above physical factors the neighborhood concept was evolved. Clarence A. Perry was the first one to specify the physical form of the neighborhood unit (1872-1944). Clarence A. Perry described the neighborhood unit as that populated area which would require and support an elementary school with an enrolment of between 1000 to 1200 pupils. This would mean a population of between 5,000 and 6,000 people.

The neighborhood unit is bounded by arterial roads or other boundaries, with open spaces, school, community centre and local shops, the latter bring on the circumference. Most importantly there was no through traffic within the neighborhood unit. It continues to be utilized, as a means of ordering and organizing new residential communities in a way which satisfies contemporary "social, administrative and service requirements for satisfactory urban existence".

1.1.1 The global perception of the residential neighbourhood concept

Since the adoption of the Universal Declaration of Human Rights in 1948, housing has been accepted as an essential part of the right to benefit from a decent standard of living in many countries (Hulchanski David 1995). All local, national, and international authorities have their responsibilities in the housing sector. The governments and local authorities are evaluated

according to their capacity to provide all citizens with dwellings of good quality, at an acceptable cost, in safe neighborhoods, and in pleasant living environments. The World Health Organization (WHO) Regional Office for Europe dedicated a special interest to the neighborhood concept in recent years. The “Housing and Health Program” conducted by the institution found out that the immediate housing environment and the neighborhood represent an everyday-landscape, which can either support or limit the physical, mental and social well being of the residents. Although such impacts are broadly accepted, the concrete relationship between environmental quality and health / well-being has so far not been fully understood.

For many years, the housing environment has been acknowledged as one of the main settings that affect human health. Living and housing conditions are the basis for many aspects that affect residential health (WHO, 2004). With these principles, the program on housing and health launched a project on the immediate housing environment in 2002, looking at the impact of the surrounding area on resident satisfaction. The project paid special attention to sociological aspects and mental well being, and aimed at gaining a better understanding of the various mechanisms through which the physical and social neighborhood environment may affect health both in negative and positive ways. Accordingly, a technical meeting on the immediate environment has been conducted in Utrecht, Netherlands in 30 April 2002. This meeting reviewed a survey tool / methodology designed to collect data on the residential environment and the satisfaction of the residents with their immediate environment. A larger expert meeting that was held in Freiburg, Germany in 14-15 November 2002 followed this meeting, which discussed, reviewed and proposed definitions of the immediate housing environment; suitable methods and factors to be measured in order to assess the quality and the impact of the immediate housing environment.

1.1.2 Kenya’s perception of the residential neighborhood concept

Improvement of housing for the Kenyan population is a major concern to the Government. This concern has been influenced by the fact that the improvement in housing stock is a strategically important social and economic investment. In addition, well-planned housing and infrastructure of acceptable standards and affordable cost when combined with essential services affords dignity, security and privacy to the individual, the family and the community as a whole (Sessional Paper no. 3 of 2004). The investments in the housing sector in Kenya since the

1966/67 Policy have been minimal and sporadic. The demand for housing still far outstrips supply. High rate of urbanization, increasing poverty and escalation of housing costs and prices have made the provision of housing, infrastructure and community facilities one of the daunting challenges in the socio-economic development of the country. Research on low cost building materials and construction techniques has been limited thus not providing viable guidance to the development of the sector. Moreover, stringent planning regulations and high infrastructural standards have been an impediment in the housing delivery system (Sessional Paper no. 3 of 2004).

In its commitment to improved housing the Government of Kenya introduced a National Housing Policy that comprehensively addresses the shelter problem. This Sessional Paper comprises four elements, they are

- One is on policy targets and highlights urban housing, rural housing, slum upgrading and vulnerable groups; and proposes solutions, which include poverty alleviation.
- Two is on main housing inputs and addresses ways of managing the housing inputs namely land, infrastructure, building materials, building technology and finances.
- Three covers estate management and maintenance necessary to ensure long lifespan for housing stock, disaster management, environmental impact assessment for major housing projects, human resource development and monitoring and evaluation.
- Four deals with legislative and institutional framework and assigns specific roles to various stakeholders. Under this element the policy also proposes enactment of a Housing Act to strengthen the role of the Ministry in-charge of housing in regulating housing development (Sessional Paper no. 3 of 2004).

This National Housing Policy is intended to arrest the deteriorating housing conditions countrywide and to bridge the shortfall in housing stock arising from demand that far surpasses supply, particularly in urban areas. This situation has been exacerbated by population explosion, rapid urbanization, widespread poverty, and escalating costs of providing housing.

The shortage in housing is manifested in overcrowding, proliferation of slum and informal settlements especially in peri-urban areas. In the rural areas the shortage manifests itself in the

poor quality of the housing fabric and lack of basic services such as clean drinking water (Sessional paper no.3 of 2004). The policy aims at:

- Enabling the poor to access housing and basic services and infrastructure necessary for a healthy living environment especially in urban areas.
- Encouraging integrated, participatory approaches to slum upgrading, including income-generating activities that effectively combat poverty.
- Promoting and funding of research on the development of low cost building materials and construction techniques.
- Harmonizing existing laws governing urban development and electric power to facilitate more cost effective housing development.
- Facilitating increased investment by the formal and informal private sector, in the production of housing for low and middle-income urban dwellers.
- Creating a Housing Development Fund to be financed through budgetary allocations and financial support from development partners and other sources.

Various interventions and strategies have been introduced in the past to alleviate the housing problems in the country. For instance following the International Year of Shelter for the Homeless in 1987, the National Shelter Strategy to the Year 2000 was formulated to advocate a change in policy. Since the public sector was unable to meet the challenge through direct provision of housing, the solution had to be sought within an enabling approach, where the Government facilitates other actors to invest in shelter. In 1990, the process towards housing policy review was initiated and the same objective was pursued. It has therefore become necessary to have a critical look into present and future performance of the entire housing sector and formulate a new policy and strategies that will guide the preparation and implementation of future housing programs. The review of the housing policy is intended to provide a guide in this direction as Kenya, along with other members of the international community, implements the Habitat Agenda and the National Plan of Action on Shelter and Human Settlements to the year 2020. This policy has adopted an enabling strategy, guided by the principles of partnership and participation by all partners in accordance with their comparative advantages.

1.2 Problem statement

The dwelling occupant satisfaction is related to the efficiency of the combination of numerous factors stemming from the qualitative and quantitative aspects of the various components of the residential environment. Those components exist at a whole scale ranging from an interior space within the housing unit to the whole neighbourhood environment (Hulchanski David 1995). A proper residential neighbourhood should comprise of the following: private space of the flat/dwelling, collective space of the residential building complex, and public space of the surrounding areas.

Based on the 1999 national Population and Housing Census there are about 3 million people in urban areas and about 6 million people in rural areas in urgent need of proper housing. Given the average household size of 4 persons from the census, there are about 750,000 households in urban areas and 1,500,000 households in the rural areas that need to be housed (Kenya Population and Housing Census Report 2004). With such information the Government aimed to facilitate an annual output of 150,000 housing units in urban areas and 300,000 units in rural areas in the next five years in order to be able to meet that demand (National Housing Policy, 2004). This excludes additional housing needs arising from increased household formations as well as housing that will become dilapidated from the existing stock. Considering that it has been nine years since the proposal, the aim of this study is to find out if the Government was able to meet the target in the rural areas as planned and asses if the people of Burandogo live in conducive living conditions.

1.3 Research questions

1. What are the legal and policy frameworks guiding rural residential planning?
2. What is the housing tenure of the residential houses in Burandogo residential neighbourhood?
3. What is the conformity status of the Burandogo Residential Neighbourhood to the physical planning requirements?
4. What are the prevailing environmental conditions of the residential neighbourhood of Burandogo residential neighbourhood?

1.4 Research objectives

1. To assess the rural residential legal and policy frameworks
2. To establish the housing tenure of the residential houses in Burandogo residential neighbourhood
3. To assess the conformity of the Burandogo residential neighbourhood to the Physical Planning requirements
4. To assess the prevailing environmental conditions in Burandogo residential neighbourhood
5. To develop a preferred spatial plan for the enhancement of Burandogo residential neighbourhood

1.5 Research premise

The Government has carried out the plan to facilitate an annual output of 150,000 housing units in urban areas and 300,000 units in rural areas as proposed in order to be able to meet the realized demand which was sparked from the data on the need of housing after the 1999 census (National Housing Policy, 2004).

It is also assumed that the residential neighborhood conditions of Burandogo village are in good condition fit for everyday living.

It is assumed that the residents are the owners of the residential houses or that there is a specified housing tenure in the neighborhood.

1.6 Justification of the study

Taveta constituency has experience a great population increase in the past years. In the 1999 census it had a population of 52,456 and an urban population of 11,495, there was a population increase noted in the census of 2009 where there was a population of 67,665 and an urban population of 19,865 (Kenya Population and Housing Census Report 2004). With this kind of population trend it is important to note if the residential housing that is available is enough to cater for the needs of the resident of Taveta constituency. And evaluate if the residential neighbourhood is in good condition for human use.

Burandogo village was chosen for this study because it accommodates a huge portion of the Taveta constituency population and it will therefore be a significant sample to represent the Taveta constituency.

1.7 Significance of the study

The new constitution entitles everyone to accessible and adequate housing and to reasonable standards of sanitation as a right. The first comprehensive Housing Policy for Kenya was developed in 1966/67 as Sessional Paper No. 5 that advocated for slum clearance and encouraged mobilization of resources for housing development through aided self-help and co-operative efforts. The study will contribute to the body of knowledge through providing information on the residential neighborhood status, residential neighborhood planning, will bring to light the physical planning requirements that a residential neighborhood should have and show the challenges facing residential neighborhood development if any. It will also create awareness on whether the government introduced the proposed 300,000 housing units in the rural areas as per the National Housing Policy, 2004. The study will also give a proposed integrated plan for the study area hence bringing up aspects that are relevant for the residential neighborhood set up.

1.8 Scope of the study

The study will cover the area within the Burandogo's boundary. This therefore means that the target population will only be that which lives within the study area.

The study will examine: the housing tenure of the residential houses in Burandogo Village, the adequacy level of the residential houses, the prevailing conditions of the residential neighbourhood, the conformity status of the Burandogo residential neighbourhood to the Physical Planning requirements.

Aspects that will be captured include: solid waste management, sewer management, sanitation, availability of water.

The study will focus on various acts and policies i.e. the Environmental Management and Co-ordination Act, the Physical Planning Handbook, the National Housing Policy and the Physical Planning Act.

2.0 CHAPTER 2: LITERATURE REVIEW

The aim of this chapter is to link the study to findings by various individuals on the residential neighborhood concept. It focuses on theories on environmental parameters that should be considered in site planning, planning of human settlement and the policy guidelines on spatial planning. It contains the secondary information which has been gathered from different materials. It highlights on what has been studied and some of the complements and views of different scholars with regards to residential neighborhood planning and management.

2.1 RURAL RESIDENTIAL PLANNING LEGAL AND POLICY FRAMEWORKS

There are various legislations that are used in the planning of various resources in a rural neighbourhood.

- **The Environmental Management and Co-ordination Act, EMCA**

EMCA, 1999 provides for the establishment of an appropriate legal and institutional framework for the management of the environment and related matters. It is a framework environmental legislation that establishes appropriate legal and institutional mechanisms for the management of the environment. It provides for improved legal and administrative co-ordination of the diverse sectoral initiatives in order to improve the national capacity for the management of the environment. This is in view of the fact that the environment constitutes the foundation of national economic, social, cultural and spiritual advancement. EMCA provides some regulations that ensure sound use and maintenance of the environment. These include the water quality regulations and the waste management regulations.

Water Quality Regulations

The highlights of water quality management, 2006 (Legal notice No. 121) include:

Water Quality Regulations apply to water used for domestic, industrial, agricultural, and recreational purposes; water used for fisheries and wildlife purposes, and water used for any other purposes. Different standards apply to different modes of usage. These regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources.

The objective of the regulations is to protect human health and the environment. The effective enforcement of the water quality regulations will lead to a marked reduction of water-borne diseases and hence a reduction in the health budget.

The regulations also provide guidelines and standards for the discharge of poisons, toxins, noxious, radioactive waste or other pollutants into the aquatic environment in line with the Third Schedule of the regulations. The regulations have standards for discharge of effluent into the sewer and aquatic environment. While it is the responsibility of the sewerage service providers to regulate discharges into sewer lines based on the given specifications, National Environmental Management Authority regulates discharge of all effluent into the aquatic environment.

The regulations provide for the creation of a buffer zone for irrigation schemes of at least fifty (50) meters in width between the irrigation scheme and the natural water body. Standards for irrigation water are given in schedule nine of the regulations.

All firms or persons discharging effluent into the aquatic environment are required to submit quarterly discharge monitoring records to National Environmental Management Authority (NEMA) regulates based on prescribed procedures of sampling and analysis.

Everyone is required to refrain from any actions, which directly or indirectly cause water pollution, whether or not the water resource was polluted before the enactment of the Environmental Management and Coordination Act (EMCA) gazetted in 1999. It is an offence to contravene the provisions of these regulations with a fine not exceeding five hundred thousand shillings.

Waste management regulations

The Minister for environment and natural resources gazetted these regulations in 2006, IN EXERCISE of the powers conferred on him by Sections 92 and 147 of the Environmental Management and Co-ordination Act No. 8, of 1999. These Regulations may be cited as the Environmental Management and Co-ordination (Waste Management) Regulations, 2006.

Waste Management Regulations are meant to streamline the handling, transportation and disposal of various types of waste. The aim of the Waste Management Regulations is to protect human health and the environment. Currently, different types of waste are dumped haphazardly

posing serious environmental and health concerns. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source.

Highlights of the Waste Management Regulations, 2006 (Legal Notice No.121) include:

Waste Management Regulations are meant to streamline the handling, transportation and disposal of various types of waste. The aim of the Waste Management Regulations is to protect human health and the environment. Currently, different types of waste are dumped haphazardly posing serious environmental and health concerns. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source.

The regulations have classified various types of waste and recommended appropriate disposal methods for each waste type. Under the Waste Management Regulations, NEMA licenses transporters, incinerators, landfills, composers, recyclers and transfer stations. Facilities to be licensed include local authorities, transporters and handlers of various types of waste. The licensing employs a risk-based approach by concentrating on facilities considered to pose a high risk to the environment.

- **National Housing Policy, Sessional paper No. 3 of 2004**

The first comprehensive Housing Policy for Kenya was developed in 1966/67 as Sessional Paper No. 5. At that time Kenya's population was just over 9 million people growing at a rate of 3 percent per annum for the whole country and 5 to 6 percent per annum in the urban areas. The annual housing requirements then were 7,600 and 38,000 new units in urban and rural areas respectively. The policy directed the Government "to provide the maximum number of people with adequate shelter and a healthy environment at the lowest possible cost". The policy advocated for slum clearance and encouraged mobilization of resources for housing development through aided self-help and co-operative efforts. Emphasis was placed on enhanced co-ordination to increase efficiency in programs and projects preparation. Other areas addressed in the policy paper included increased research in locally available building materials and construction techniques, and housing for civil servants through home ownership schemes in urban areas as well as institutional and pool housing schemes in remote stations.

The basic objectives of the policy are: -

- a) To facilitate progressive realization of the right to adequate housing by all;
- b) To promote the development of housing that is functional, healthy, aesthetically pleasant and environmentally friendly;
- c) To earmark and set aside land for public housing development in urban areas;
- d) To facilitate access to land and security of tenure for all socio-economic groups;
- e) To eliminate legal and customary barriers, where they exist, to women's equal access and control of land and finance;
- f) To increase the proportion of the exchequer allocation for housing delivery and human settlements facilitation;

The housing policy stated Rural Housing as one of the major elements under which it was stated that the Government will promote a sustainable process of shelter improvement and maintenance in the rural areas. The Government, together with other partners, will strive to alleviate rural poverty (a major bottleneck being access to credit) and increase rural incomes through the introduction of rural industry and through the establishment of non-agricultural small and medium scale enterprises (e.g. manufacturing of building materials). At the institutional level, the dependency of the rural poor on informal credit mechanisms will be supported by the introduction of innovative ways of mobilizing savings from the communities. This will be achieved by encouraging rural-based Non-governmental organizations to work closely with community based-organizations.

This was after it was noted that rural inhabitants have always provided their own shelter using locally available building materials. In this regard, the use of locally available building materials and the application of appropriate technologies will be aggressively disseminated. This implies publicizing the advantages of using these technologies, utilizing locally produced building materials and encouraging traditional methods of construction, which have been proved to be technologically sound. The enabling strategy, which advocates for the participation of a cross-section of actors in the shelter sector, will be combined with the use of appropriate technologies

and programs in advocating for rural shelter. Therefore, Rural housing construction will be encouraged to adhere to some minimum standards related to ventilation, lighting, sanitation and height.

2.2 THE HOUSING TENURE SYSTEM

Housing tenure describes the legal status under which people have the right to occupy their accommodation. The most common forms of tenure are:

- Home-ownership: this includes homes owned outright and/or mortgaged
- Renting: this includes social rented housing and private rented housing.

In planning local planners use data on tenure to assess neighborhood stability. For instance tenure is one of the integral components used by the U.S. Department of Housing and Urban Development to establish Fair Market Rents for different localities throughout the country (Youqin and William 2001). This information is used to allocate Section 8 and other federal housing program subsidies that assist American families to afford decent, safe, and sanitary housing. This information is used to assess the costs of utilities based on the type of home ownership. Tenure also is used in calculating homeownership vacancy rates and rental vacancy rates that federal and local agencies use to evaluate the overall viability of local housing markets (Youqin and William 2001).

Types of housing tenure

- Owner occupancy– The person or group that occupies a house owns the building (and usually the land on which it sits).
- Tenancy – A landlord who owns an apartment or building rents the right to occupy the unit to a tenant.
- Cooperative – Ownership of the entire building or complex is held in common by a homeowners' association. Individuals have the *right* to occupy a particular apartment by mutual agreement but do not hold exclusive ownership to it.
- Condominium (a.k.a. common-hold and strata title) – Ownership of an apartment or house is assigned to an individual, but common areas (e.g. hallways, heating system,

elevators, exterior areas) are controlled by the homeowners' association. Fees are charged to the condo owners for maintenance of the common areas. These are referred to as "condo fees".

- Public housing – Government-owned housing, whether provided for free or leased at a subsidized rate.
- Squatting – Occupation by non-owner without permission by the owner, if any.
- Land trust – Often used as an alternative to ownership for privacy and legal reasons.

2.3 PHYSICAL PLANNING REQUIREMENTS IN RESIDENTIAL NEIGHBOURHOODS

In Kenya there are various documents that provide physical planning requirements that ought to be adhered to in planning. Land use planning is deciding in advance what to do, where, when, with what, how, on or under the land. It is a thought process that guides land use activities on space. This process has to be guided by a set of rules, regulations and standards. These can be in the form of a Parliamentary statute or a subsidiary legislation. Some of those documents include the Physical Planning Act and the Physical Planning Handbook.

Lack of gazetted planning standards and guidelines have meant that development continued to take place in a haphazard and uncoordinated manner lacking both form and character. There has been no harmonized and detailed planning standards, guidelines, measurement and considerations leading untimely, inaccurate and not uniform land use decision. The repealing of Land Planning Act (Cap 303) and Town Planning Act (Cap 134) into the Physical Planning Act (Cap 286) made it mandatory that physical planning standards and regulations be prepared to guide land use planning.

2.3.1 Rural Access roads

The access roads are also known as frontage roads. They are often used to provide access to private driveways, shops, houses, industries or farms which would be cut off by a limited-access road and connect these locations with roads which have direct access to the main roadway. Frontage roads give indirect access to abutting property along a freeway, either preventing the commercial disruption of an urban area that the freeway traverses or allowing commercial

development of abutting property. Conversely, the existence of a frontage road can increase traffic on the main road and be a catalyst for development; hence there is sometimes an explicit decision made to not build a frontage road.

The access roads have various advantages. These include:

- They separate local traffic from through traffic. When frontage roads are lacking in an urban area, the highway is used as a local road, reducing speeds and increasing congestion.
- Another advantage occurs when the highway is closed or just obstructed. This pushes traffic off the highway. Where an urban area has frontage roads, the traffic can easily bypass the obstruction or closure on the frontage road. Where an urban area has no frontage road, traffic congests local roads searching for that elusive passage around the obstruction or closure, since there is no formal (frontage road) alternative.

Disadvantages include:

- When frontage roads are used without controlling the access to the main road, at every intersection an intersecting road runs from one side to another the number of conflict points increases one fold for each frontage road. This is because each frontage road is itself another intersection.
- Frontage roads also obviously take up large amounts of space and cost more.
- A highway with frontage roads is hard for pedestrians to cross, given the increased width of road, and vehicles in the central carriageways driving at high speeds.

There are various types of access roads that can service a rural neighbourhood (Physical Planning Handbook 2007). These are

(a) International Trunk Roads (Class A)

These are roads linking centers of international boundaries or terminating at international ports. They are provided with a road reserve of 60 – 110 meters. The minimum road of 40 meters should be adopted only when it is necessary for economic, financial or environmental resources

in order to preserve valuable land resources or existing development or when provision of the desirable width would incur unreasonable high costs because of physical constraints

(b) National Trunk Roads (Class B)

These are roads linking national important centres, such as municipalities and/or district headquarters. Since in most cases national trunk roads also constitute international trunk roads, similar road reserves as in (a) above are applicable.

(c) Primary Roads (Class C)

These roads connect or regional/provincial centres to each other or to higher classes roads. For regional development planning purposes it is recommended that all designated urban centres should progressively be linked by means of primary roads as a minimum. They are provided with a road reserve of 40 meters.

(d) Secondary Roads (Class D)

These roads link important local centers to each other or to higher classes roads. In this regard, it recommended that all designated rural centers should progressively be lined by means of secondary roads as a minimum. They provided with a road reserve width of 25 – 30 meters.

(e) Minor Roads (Class E)

These are roads linking local and market centers to higher classes roads. They range between 3 to 5 kilometers and are provided with a road reserve width of 20 – 25 meters.

It is necessary to increase road reserve widths for sections of the above classified roads passing in urban centers. This is in order to allow for parking, segregation of traffic or for controlled accessibility to properties.

2.3.2. Open spaces

Open space is land and/or water area with its surface open to the sky, consciously acquired or publicly regulated to serve conservation and urban shaping function in addition to providing recreational opportunities (Owen and Harrison 2008). From another standpoint public space in general is defined as the meeting or gathering places that exist outside the home and workplace

that are generally accessible by members of the public, and which foster resident interaction and opportunities for contact and proximity.

There are several socio economic factors within the rural population that suggest a real need for a generous provision of green spaces within the rural environment (Physical Planning Handbook 2007). These include:

(a) New urban population

The majority of adult population in urban areas is migrants from rural areas and shows a strong attachment to the land. The rural environment has been a formative influence in their lives.

(b) Low earnings

The majority of the population lack money for all but their basic needs. They are therefore essentially pedestrian and their recreation must be found within walking distance to their homes. They cannot afford much living space and tend to live in cramped overcrowded conditions. Some relief is necessary from the pressure generated by overcrowding.

(c) Population Structure

Majority of the population in major urban areas are under 25 years. Open spaces are therefore necessary for their health physical and psychological development. Overcrowded living conditions, lack variety in the environment and lack of opportunities for independent play and exploration during the early years of children tend to inhibit their intellectual development.

(d) Limitations on Public Expenditure

Public funds are limited and this could result in poverty of the man made environment. A sensible landscaping policy could be one of the cheapest and most effective way of counteracting eyesores in the manmade environment; producing an urban environment in which it is attractive to live and work and providing areas of inexpensive recreational opportunity.

A large epidemiological study in Britain looked at mortality and morbidity among three income levels in relation to their access to green open space. The study examined about 360,000 deaths in a population of about 41 million. While it confirmed that wealthier individuals were generally healthier than those with lower incomes, it made another remarkable discovery: That all groups irrespective of income showed an improvement in health in proportion to their access to green space and that the differences in health status between income groups, who had equivalent access to progressively more green space, shrank favouring the lowest socio-economic group with the highest morbidity. In simple terms, everyone benefited but the lowest income group benefited

the most. These striking results based on an exceptionally large sample confirm unambiguously the health-related effects of green space and suggest its importance as an element in neighbourhood layouts. Not only would it reduce health disparities between incomes but it would also promote general health and well-being.

Other research looked at specific demographic groups such as age, occupation, socioeconomic status and unusual health conditions or symptoms. Though these studies vary in their degree of scientific vigor, they all point to the potential benefits of nearby nature.

Challenges: open space is under strong pressure. Due to increasing urbanization, combined with a spatial planning policy of densification, more people face the prospect of living in less green residential environments, especially people from low economic strata. This may lead to environmental inequality with regard to the distribution of (access) to public green space.

2.3.3 Sanitation facilities

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and feces (World Health Organisation). Inadequate sanitation is a major cause of disease world-wide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities. The word 'sanitation' also refers to the maintenance of hygienic conditions, through services such as garbage collection and wastewater disposal. Sanitation is the hygienic means of promoting health through prevention of human contact with the hazards of wastes as well as the treatment and proper disposal of sewage wastewater. Hazards can be physical, microbiological, biological or chemical agents of disease. Wastes that can cause health problems include human and animal feces, solid wastes, domestic wastewater (sewage, sullage, greywater), industrial wastes and agricultural wastes. Hygienic means of prevention can be by using engineering solutions (e.g. sewage and wastewater treatment), simple technologies (e.g. latrines, septic tanks), or even by personal hygiene practices (Mara, Lane, Scott and Trouba 2010). To avoid such impact, toilets should be provided on every street in all types of centers. In slums/informal settlements, 1 toilet/bathroom block is required for every 100m (Physical Planning Handbook 2007).

Health Impacts of Sanitation

For any social and economic development, adequate sanitation in conjunction with good hygiene and safe water are essential to good health (Mara, Lane and Scott and Trouba 2010). Lack of proper sanitation causes diseases. Most of the diseases resulting from sanitation have a direct relation to poverty. The lack of clean water and poor sanitation has caused many diseases and the spread of diseases. Sanitation is very important in order to keep good health. One of the most significant diseases that arise from poor sanitation is diarrhoea. Deaths resulting from diarrhoea are estimated to be between 1.6 and 2.5 million deaths every year (Mara, Lane and Scott and Trouba 2010). Most of the affected are young children below the ages of five. Other diseases that are caused by poor sanitation include schistosomiasis, trachoma, and soil transmitted Helminthiases.

Poor sanitation accounts for almost 50 percent of underweight child since it has a direct link to diarrhoea. Children suffering for diarrhoea are more vulnerable to become underweight. According to Mara, Lane, and Scott and Trouba, about 26 percent acute respiratory infections occur in children who are malnourished, which has a direct link to diarrhoea. Sanitation is a serious issue that is affecting most parts of the world especially the developing countries. On a global scale, the most affected are children who in most cases lose their lives due to diseases caused by poor sanitation. Major initiatives need to be set up if the MDG goal on sanitation is to be achieved by 2015.

2.3.4 Storm water drainage

Storm water is water that originates during precipitation events. It may also be used to apply to water that originates with snowmelt that enters the storm water system. Storm water that does not soak into the ground becomes surface runoff, which either flows directly into surface waterways or is channelled into storm sewers, which eventually discharge to surface waters. Storm water is of concern for two main issues: one related to the volume and timing of runoff water (flooding) and the other related to potential contaminants that the water is carrying, i.e. water pollution. Storm water is also a resource and ever growing in importance as the world's human population demand exceeds the availability of readily available water (Drainage service Department, Hong Kong 1995).

Storm water runoff as a source of pollution

In addition to the pollutants carried in storm water runoff, urban runoff is being recognized as a cause of pollution in its own right. In natural catchments (watersheds) surface runoff entering waterways is a relatively rare event, occurring only a few times each year and generally after larger storm events. Before development occurred most rainfall soaked into the ground and contributed to groundwater recharge or was recycled into the atmosphere by vegetation through evapo-transpiration.

Storm water flooding

Storm water is a major cause of urban flooding. Urban flooding is the inundation of land or property in a built-up environment caused by storm water overwhelming the capacity of drainage systems, such as storm sewers. Although triggered by single events such as flash flooding or snow melt, urban flooding is a condition, characterized by its repetitive, costly and systemic impacts on communities. In areas susceptible to flooding, backwater valves and other infrastructure may be installed to mitigate losses.

Storm water management

Storm water management includes both technical and institutional aspects, including:

- Control of flooding and erosion;
- Control of hazardous materials to prevent release of pollutants into the environment (source control);
- Planning and construction of storm water systems so contaminants are removed before they pollute surface waters or groundwater resources;
- Acquisition and protection of natural waterways or rehabilitation;
- Development of funding approaches to storm water programs potentially including storm water user fees and the creation of a storm water utility;
- Development of long-term asset management programs to repair and replace aging infrastructure;
- Revision of current storm water regulations to address comprehensive storm water needs;

A system; should provide for the drainage of storm water in major residential areas where annual rainfall exceeds 200mm (Physical Planning Handbook 2007). A minimum of 2 hectares should

be provided for this facility. However, in smaller districts and others of dispersed housing, no storm system needs to be provided. In dry areas where annual rainfall does not exceed 100mm provision of surface drainage in low-lying areas alongside roads and concreted areas will suffice for the flow and drainage of storm water therein.

2.3.5 Neighbourhood market

A market is one of the many varieties of systems, institutions, procedures, social relations and infrastructures whereby parties engage in exchange. While parties may exchange goods and services by barter, most markets rely on sellers offering their goods or services (including labor) in exchange for money from buyers. It can be said that a market is the process by which the prices of goods and services are established.

A market centre should be planned to serve a catchment population of 15,000 to support a primary, a secondary school and a health centre (Physical planning handbook).

The market centre should have the following facilities:

- A public water supply
- post office
- telephone facilities
- a police post
- a local bus service
- Other social commercial and local administrative services.

Market centers should to be served by a minor road as a minimum and should have a residential population of less than 2000 (Physical Planning Requirements).

2.3.6 Sewer system

A sanitary sewer (also called a foul sewer) is a separate underground carriage system specifically for transporting sewage from houses and commercial buildings to treatment or disposal. Sanitary sewers serving industrial areas also carry industrial wastewater. The 'system of sewers' is called sewerage. In the developed world, sewers are usually pipelines that begin with connecting pipes

from buildings to one or more levels of larger underground trunk mains, which transport the sewage to sewage treatment facilities. Vertical pipes, called manholes, connect the mains to the surface. The manholes are used for access to the sewer pipes for inspection and maintenance, and as a means to vent sewer gases. They also facilitate vertical and horizontal angles in otherwise straight pipelines. Sewers are generally gravity powered, though pumps may be used if necessary. The most commonly used sanitary pipe is SDR-35 (standard dimension ratio), with smaller sized laterals interconnected within a larger sized main.

Sewer Collection and Treatment works

It is recommended that sewage collection and sewage treatment plants be considered for all settlements with a population of 3,000 or more having an urban layout. In settlements where an integrated sewage scheme is not provided provision should be made for septic tanks. Care must be taken to ensure that sewage effluent does not infiltrate ground water aquifers in a manner causing pollution of water sources. The treatment plant should be sited as far as is practicable from the boundaries of the master plan area, down-wind of the prevailing wind direction. A surrounding tree belt is desirable both as protection against blows and for environmental purpose. The land requirement for buffer zones for sewered areas is 75 square meters whereas for unsewered areas are 110 square meters.

2.3.7 Designated rural centre

The rural centre should serve a catchment population of 40,000 and accommodate a residential population of 2,000 to 10,000 (Physical planning handbook). This centre should represent the lower end of the urban hierarchy. The following facilities should be provided:

- A secondary school of at least form four standards
- A health centre with maternity facilities
- Development of better shopping facilities
- Markets and Banking facilities
- A piped water supply and sewerage disposals systems
- Electricity and telephone services postal

Rural centers should be planned to have secondary roads.

2.3.8 Water supply system

Water supply in a region context depends on the sources and existing reticulation systems and infrastructure. Provision of these facilities should consider catchments population to be served and the per capita consumption in the relation to the available water (physical planning handbook 2007). Sources of water within a region can be identified and delineated as those of surface runoff and ground water. The surface sources are springs, streams and rivers. Ground water reserve is equally an important source of water, where hand dug wells and boreholes are dug for water abstraction.

Protection and conservation of this water is critical for sustainable development: Ground water reserves require buffer zones of 100 meter (bore holes). While springs protection will also require a buffer zone of 100meters. Tree planting is therefore encouraged in these areas.

2.3.9 Educational facilities

Information is power therefore when you educate the populace; you empower them to exploit the opportunities at their disposal. Provision of educational facilities therefore is a pre-requisite to the development process (physical planning handbook 2007).

Nursery schools

These are preparatory schools where children between 5-6 years are taught prior to joining primary schools. They may be attached to existing primary schools. These nurseries therefore will follow the pattern of distribution of primary school at 4000 catchment population. The recommended distance is 300-500meters and land requirement of 0.15-0.25hectares (physical planning handbook 2007).

Primary schools

A school should advisably have a catchment of 4000 pupils per school and should be at a distance of 500m-2km. Schools are encouraged to build storied buildings for economy. If accommodation is to be provided for teaching staff another 0.8 hectares should be provided.

Secondary schools

It is advisable that the secondary schools have a catchment of 8000 pupils and be at a distance of 500m-3km. The demand for secondary schools education in Kenya ranges between 20% and 100%. On the basis of an average demand of 60% and taking into account that 10% of the populations are secondary schools age then 1 school of 480 pupils would be required for a

population of 8000. The distribution of secondary schools should therefore be on the basis of school/population ratio of 1:8000.

2.3.10 Health services

The quality of the population will greatly determine the overall productivity of an economy. This quality depends on the availability of health facilities and services plus accessibility to the same. Provision of health facilities therefore will be a prerequisite to the development of a country. As a general rule of thumb, the distribution of health facilities should follow the hierarchy of centers as provided for in the human Settlement Strategy of 1978.

Distribution: Health services are deployed by the central government through a network of provincial, district and sub-district hospitals. At Local Government/Authority level there are health centers, sub-centers and dispensaries. Church missions, industrial health units and private institutions and individuals also provide a variety of health services.

The preferred location for health services should be easily accessible by an ambulance and be provided with basic infrastructural services. Dependent on the level of health service, it is necessary to reserve adequate land for future expansion and for public cemeteries. The latter should be conveniently located relative to the health facility, major open spaces and other compatible public utilities. It is recommended that applications for health facilities should be accompanied with details of site requirements to facilitate reservation of adequate land. However a minimum of the land requirements derived from empirical observations is made as follows:

- ✓ National referral hospital 20 hectares
- ✓ Provincial hospital 8 hectares
- ✓ District hospital 8 hectares
- ✓ Sub-district hospital 4 hectares
- ✓ Health center 3 hectares
- ✓ Sub-health center 2 hectares
- ✓ Nursing Homes 0.4 hectares
- ✓ Veterinary clinic 0.1 hectares

2.3.11 Garbage collection and disposal

Garbage collection sites must be environmentally friendly. They should be located on the leeward side and have a 100m-protection belt (Physical planning handbook 2007).

Garbage disposal systems are of three kinds namely: -

- (a) Garbage collection and burial;
- (ii) Incineration (burning);
- (iii) Collection and transportation units (Garbage Manufacture)

2.4 Environmental conditions in a residential neighbourhood

The environmental conditions that one looks out for include issues like pollution, solid waste management, and the sewer system.

2.4.1 Solid waste management

Waste management is the "generation, prevention, characterization, monitoring, treatment, handling, reuse and residual disposition of solid wastes". There are various types of solid waste including municipal (residential, institutional, commercial), agricultural, and special (health care, household hazardous wastes, sewage sludge). The term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics (Barbalace and Roberta 2003).

There is a wide array of issues relating to waste management and those areas include:

- Generation of waste
- Waste minimization
- Recycling and reuse
- Storage, collection, transport, and transfer
- Treatment
- Landfill disposal
- Environmental considerations

There are various methods that are used in solid waste management worldwide. This includes the use of:

Landfills

Disposal of waste in a landfill involves burying the waste and this remains a common practice in most countries. Landfills were often established in abandoned or unused quarries, mining voids or borrow pits. A properly designed and well-managed landfill can be a hygienic and relatively inexpensive method of disposing of waste materials. Older, poorly designed or poorly managed landfills can create a number of adverse environmental impacts such as wind-blown litter, attraction of vermin, and generation of liquid leachate. Another common product of landfills is gas (mostly composed of methane and carbon dioxide), which is produced from anaerobic breakdown of organic waste. This gas can create odor problems, kill surface vegetation and is a greenhouse gas.

Incineration

Incineration is a disposal method in which solid organic wastes are subjected to combustion so as to convert them into residue and gaseous products. This method is useful for disposal of residue of both solid waste management and solid residue from waste water management. This process reduces the volumes of solid waste to 20 to 30 percent of the original volume. Incineration and other high temperature waste treatment systems are sometimes described as "thermal treatment". Incinerators convert waste materials into heat, gas, steam and ash. Incineration is carried out both on a small scale by individuals and on a large scale by industry. It is used to dispose of solid, liquid and gaseous waste. It is recognized as a practical method of disposing of certain hazardous waste materials (such as biological medical waste). Incineration is a controversial method of waste disposal, due to issues such as emission of gaseous pollutants.

Recycling

Recycling is a resource recovery practice that refers to the collection and reuse of waste materials such as empty beverage containers. The materials from which the items are made can be reprocessed into new products. Material for recycling may be collected separately from general waste using dedicated bins and collection vehicles, a procedure called kerbside collection. In some communities, the owner of the waste is required to separate the materials into various different bins (e.g. for paper, plastics, metals) prior to its collection. In other

communities, all recyclable materials are placed in a single bin for collection, and the sorting is handled later at a central facility. The latter method is known as "single-stream recycling."^{[10][11]}

The most common consumer products recycled include aluminium such as beverage cans, copper such as wire, steel from food and aerosol cans, old steel furnishings or equipment, polyethylene and PET bottles, glass bottles and jars, paperboard cartons, newspapers, magazines and light paper, and corrugated fiberboard boxes.

There are a number of concepts about waste management which vary in their usage between countries or regions. Some of the most general, widely used concepts include:

1. **Waste hierarchy** - The waste hierarchy refers to the "3 Rs" reduce, reuse and recycle, which classify waste management strategies according to their desirability in terms of waste minimization. The waste hierarchy remains the cornerstone of most waste minimization strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste see. The waste hierarchy is represented as a pyramid because the basic premise is for policy to take action first and prevent the generation of waste. The next step or preferred action is to reduce the generation of waste i.e. by re-use. The next is recycling which would include composting. Following this step is material recovery and waste-to-energy. Energy can be recovered from processes i.e. landfill and combustion, at this level of the hierarchy. The final action is disposal, in landfills or through incineration without energy recovery. This last step is the final resort for waste which has not been prevented, diverted or recovered. The waste hierarchy represents the progression of a product or material through the sequential stages of the pyramid of waste management. The hierarchy represents the latter parts of the life-cycle for each product.

2. **Life-cycle of a Product** - The life-cycle begins with design, then proceeds through manufacture, distribution, use and then follows through the waste hierarchy's stages of reuse, recovery, recycling and disposal. Each of the above stages of the life-cycle offers opportunities for policy intervention, to rethink the need for the product, to redesign to minimize waste potential, to extend its use. The key behind the life-cycle of a product is to optimize the use of the world's limited resources by avoiding the unnecessary generation of waste.

3. **Resource efficiency** - the current, global, economic growth and development cannot be sustained with the current production and consumption patterns. Globally, we are extracting more resources to produce goods than the planet can replenish. Resource efficiency is the reduction of the environmental impact from the production and consumption of these goods, from final raw material extraction to last use and disposal. This process of resource efficiency can address sustainability.

Polluter pays principle - the Polluter Pays Principle is a principle where the polluting party pays for the impact caused to the environment. With respect to waste management, this generally refers to the requirement for a waste generator to pay for appropriate disposal of the unrecoverable material.

2.4.2 Sewer system management

A sanitary sewer (also called a foul sewer) is a separate underground carriage system specifically for transporting sewage from houses and commercial buildings to treatment or disposal. Sanitary sewers serving industrial areas also carry industrial wastewater. The 'system of sewers' is called sewerage. In the developed world, sewers are usually pipelines that begin with connecting pipes from buildings to one or more levels of larger underground trunk mains, which transport the sewage to sewage treatment facilities. Vertical pipes, called manholes, connect the mains to the surface. The manholes are used for access to the sewer pipes for inspection and maintenance, and as a means to vent sewer gases. They also facilitate vertical and horizontal angles in otherwise straight pipelines. Sewers are generally gravity powered, though pumps may be used if necessary. The most commonly used sanitary pipe is SDR-35 (standard dimension ratio), with smaller sized laterals interconnected within a larger sized main. All sewers deteriorate with age, but infiltration/inflow is a problem unique to sanitary sewers, since both combined sewers and storm drains are sized to carry these contributions. Holding infiltration to acceptable levels requires a higher standard of maintenance than necessary for structural integrity considerations of combined sewers. A comprehensive construction inspection program is required to prevent inappropriate connection of cellar, yard, and roof drains to sanitary sewers

It is very important for a neighbourhood to have an efficient sewer system to ensure that sanitation is maintained within the neighbourhood at all times. This will help in the prevention of waterborne and other contagious diseases by the residents.

2.5 THEORETICAL FRAMEWORK

The theory that will be used and will apply to this study is the Rational Comprehensive Theory or the Synoptic Theory. The development of this theory can be traced back to Auguste Comte in 1798-1857. Comte applied the methods of observation and experimentation to the field of sociology and believed that persistent social problems might be solved by the application of certain hierarchical rules and that with the aid of science sociology mankind will progress towards a superior state of civilization. These key ideas introduced by Comte were adopted by Max Weber and Talcott Parsons, the main proponents of rational comprehensive theory that gained ground in the 1950's and 1960's. Max Webber argued that the process of rationalization, once unleashed upon the world, transformed social life forever and for the better and that rationalization led to the new practices that were chosen based on their efficiency. In the early 1970's Andrea Faludi came into play. He provided important contributions towards clarifying the procedural aspects of planning. He viewed planning as a decision making process aimed at solving some of the varied problems which planners face. He argued that planning should be rational by evaluating comprehensively all possible action in the light of their consequences and ensuring that these considerations include alternative goals and that planning should also respond flexibly to situations.

The rational planning model is the process of realizing a problem, establishing and evaluating planning criteria, creating alternatives, implementing alternatives, and monitoring progress of the alternatives. It is used in designing neighbourhoods, cities, and regions. Rational decision-making or planning follows a series of steps detailed below:

Verify, define, and detail the problem: this step includes recognizing the problem, defining an initial solution, and starting primary analysis. Examples of this are creative devising, creative ideas, inspirations, breakthroughs, and brainstorming. The rational decision making model is a group-based decision making process. If the problem is not identified properly then we may face a problem as each and every member of the group might have a different definition of the problem. Hence, it is very important that the definition of the problem is the same among all group members. Only then is it possible for the group members to find alternate sources or problem solving in an effective manner.

Generate all possible solutions: this step encloses two to three final solutions to the problem and preliminary implementation to the site. This activity is best done in groups, as different people may contribute different ideas or alternative solutions to the problem. Without alternative solutions, there is a chance of arriving at a non-optimal or a rational decision. For exploring the alternatives it is necessary to gather information. Technology may help with gathering this information.

Generate objective assessment criteria: this step contains secondary and final analysis along with secondary solutions to the problem. Examples of this are site suitability and site sensitivity analysis. After going thoroughly through the process of defining the problem, exploring for all the possible alternatives for that problem and gathering information this step says evaluate the information and the possible options to anticipate the consequences of each and every possible alternative that is thought of. Optional criteria for measuring the success or failure of the decision taken needs to be considered at this point.

Choose the best solution generated: this step comprises a final solution and secondary implementation to the site. At this point the process has developed into different strategies of how to apply the solutions to the site.

Implement the preferred alternative: this step includes final implementation to the site and preliminary monitoring of the outcome and results of the site. This step is the building/renovations part of the process.

Monitor and evaluate outcomes and results: this step contains the secondary and final monitoring of the outcomes and results of the site. This step takes place over a long period of time.

2.6 CONCEPTUAL FRAMEWORK

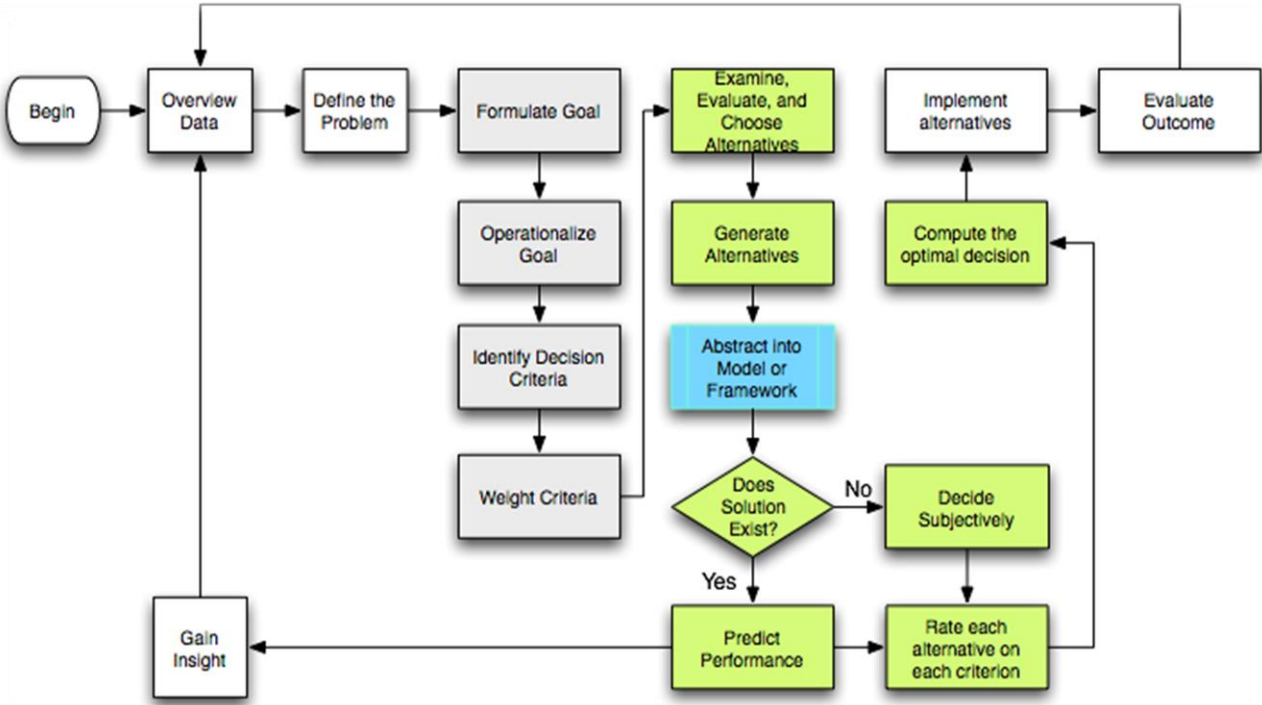
The Rational planning theory refers to planning processes for selecting and implementing the best possible plan from a number of all possible plans. It represents what planners believe is rational or to plan with reason. It looks at a problem from a systems point of view in order to come up with a suitable and sustainable way forward. In planning, reasons should be used to guide choices and should always be systematic in that a suitable and efficient sequence is followed throughout the planning process. For one to come up with a solution to a problem, they

should first look at the problem and be able to evaluate exactly what the problem is, prioritize the issues and hence come up with solutions.

In a residential neighborhood there are various social issues facing the residents from time to time. In order for one to come up with a suitable plan that will serve the residents they have to first identify the problem if any, define the problem vividly and then start primary analysis on the issues on the ground. If one is working with a team they should ensure that there is uniform definition of the problem. This will help in the generation of possible solutions to the problem. With the identification of the problem one is able to come up with objectives that when attained one will be able to reach a solution. With all the solutions provided one should choose the best solution criteria then implement them after which they are required to monitor and evaluate the implemented solutions over a long period of time.

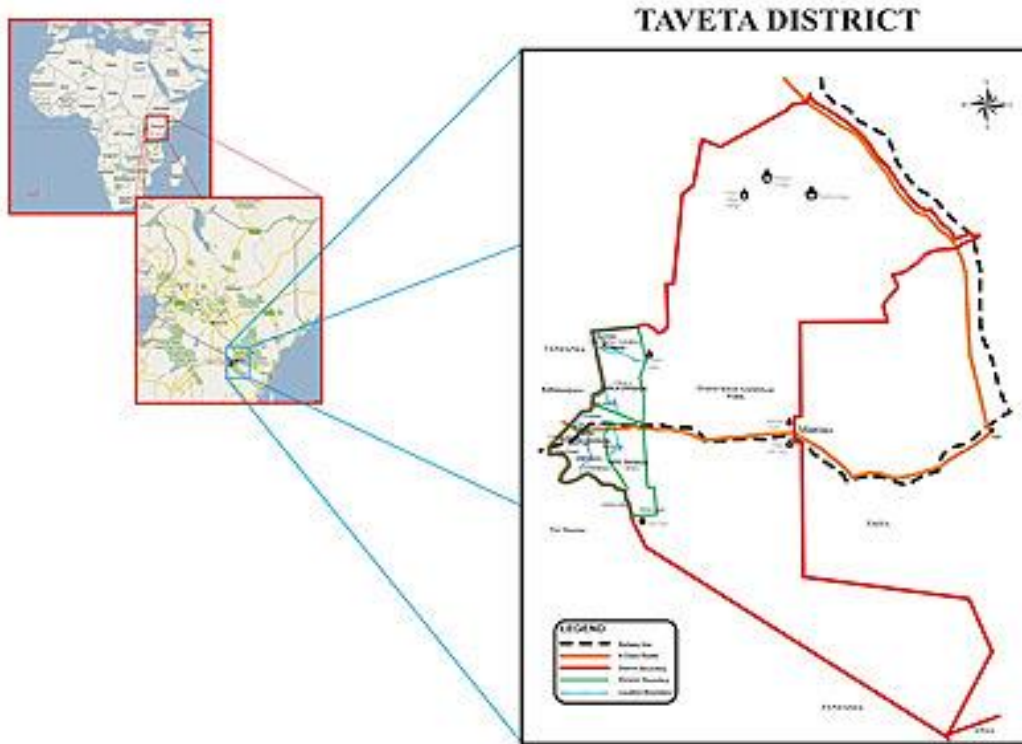
This way one will be sure that they understand the issues in a neighbourhood from the bottom, i.e. they will know what exactly is on the ground instead of using assumptions on the issues on the ground. They will therefore be able to come up with effective, acceptable, and sustainable solutions.

Figure 1: Conceptual Framework



Source: Adapted from Andrea Faludi, 1986.

3.0 CHAPTER 3: Study area



Plates 1: Map of Taveta in the African and Kenyan context

Source: field study 2013

3.1 Location

Town Council of Taveta Headquarters is about 102km North from Voi via Nairobi - Mombasa Road and is the main commercial and administrative centre of the newly created Taveta District. It's situated in the South Western part of Kenya and in the Southern part of Coast Province. It lies between latitude $3^{\circ} 16'$ and $4''$ south and longitude $39^{\circ} 5'$ and $40''$ west. The Council covers entire Taveta district and hence covers 4,205.6 KM² under which 605KM² is settled and 3,560.6KM² under Tsavo West National Park on the South. The Council borders County Council of Taita Taveta to the East, the Republic of Tanzania to the West, County Council of Olekejuado to the North and County Council of Kwale to the South.

3.2 Physical Features

3.2.1 Geology and soils

Taveta is generally considered as part of the piedmont plain between the Pare Mountains and Mt. Kilimanjaro. Isolated hills such as Riata, Eldoro, and Salaita rise above the plain. The residuals are directed NNW, parallel to the regional structural trend of the basement system rocks and the Pare mountains as well as the Chyulu range. The area close to the Chyulu range and Mt. Kilimanjaro are covered with quaternary lavas, pyroclastics and debris flow deposits and fluvial and lacustrine volcanic sediments (Omenga, 1993, Toya et. al. 1973). Some of the lava flows originate from Mt. Kilimanjaro while others erupted from several parasitic cones that are related to the mountains. The rocks are mainly basalts, phonolites and tuffs. Fertile soils developed on volcanic rocks and ashes.

The lowlands are characterized by erosional and sedimentary plains. They are occasionally interrupted by residual hills and inselbergs and pedimental slopes. The extensive plateau gently slopes coast-wards ranging between 1000m and 300m. It is underlain by the Precambrian basement system of rocks consisting mainly of crystalline limestones, gneisses and schists. The plateau surface is an erosion surface covered by recent and Pleistocene weathered soil and calcareous crustal deposits.

The drainage pattern in the district also consists several rivers and springs. The springs provide sufficient water for drinking and irrigation. These springs are usually permanent in nature since they are fed by the hydrological system that emanates from the foot of Mount Kilimanjaro. Land has continued to be a major development challenge in the district with a squatter population that stands at 40%. Three settlement schemes of Lake Jipe, Taveta squatter and Lumi-timboni have however assisted in the settlement of most of the squatters.

The soils in the district are predominantly black cotton and clay which exhibits the characteristic of hardening and cracking during the dry seasons and water logging during the rainy season. The Low Mid land 4 zone is the marginal cotton or sisal zone at the foot slopes of the mountain, North West of the district. The Low Mid land 5 is the livestock or horticulture zone, north and central of the district.

3.2.2 Climate and Hydrology

The annual average rainfall in Taveta is 350 mm to 750 mm. The temperature ranges between 21 to 38⁰ c and potential annual evaporation is 1950 mm. Taveta has a high ground water table. There are several springs – Salaita, Little Lumi, Njoro Kubwa and Kitobo. Several of the springs and the perennial river Lumi drain into Lake Jipe. Ruvu River springs from Lake Jipe and flows towards Tanzania. Lake Challa and Jipe are the two freshwater lakes in the district and are located right on the border to Tanzania.

The lowlands receive a maximum of between 450 – 750 mm annually and rainfall is more unreliable in amount and distribution. The lower parts are hot with mean temperatures of about 30⁰ c. The potential annual evaporation rate is about 1800mm. There is therefore a net water deficit. All the rivers flowing through the lowlands are intermittent, with the exception of the Athi, Tsavo and Galana rivers.

3.3 The Burandogo Residential Area

This neighbourhood was chosen for this study because it has one of the largest populations in Taveta. People settled in Burandogo as squatters and formed an informal settlement which has grown a lot over the years.



Plates 2: Satellite image of Burandogo Neighbourhood

Source: Google Earth 2014

2.4 CHAPTER 4: Methodology

4.1 Introduction

This chapter discusses the type and sources of data, methods used in data collection, the sample size and frame, sampling procedures, analysis and presentation of data.

4.2 Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data (Kothari, 2004). The study assumed a descriptive design which employed the following approaches: preliminary studies, field work, review of relevant documents, data collection, analysis and interpretation. The study aimed at evaluating the status of the residential neighbourhood of Burandogo village, Taveta constituency. It aimed to look at the housing tenure system, the rural residential legal and policy frameworks on the ground in Burandogo, the conformity of the area to the physical planning requirements and the prevailing environmental conditions and in achieving all this come up with a proposed spatial plan for the area.

4.3 Nature and sources of data

4.3.1 Nature of Data

The nature of data collected and analyzed sought to address the stated objectives of the study as provided in the Table below;

Table 1: Nature of Data collected under each objective

S/No	Objective	Nature of Data (Variables)
1.	To establish the housing tenure of the residential houses in Burandogo Village	<ul style="list-style-type: none">• The house owners that are present• The charges imposed on the residents as they use the houses if any• Affordability of the charges

2.	To assess the conformity of the Burandogo residential neighbourhood to the Physical Planning requirements	<ul style="list-style-type: none"> • The number of residential houses and their ability to accommodate the existing population • The availability and efficiency of facilities like: storm water drainage, water supply, health facilities, schools, sanitation facilities and recreational facilities • The nature of the residential area in relation to the Physical Planning Handbook and other Physical Planning Act
3.	To evaluate the rural residential legal and policy frameworks	<ul style="list-style-type: none"> • The existing legal and policy frameworks in Burandogo residential neighbourhood. See to what extent the Environmental Management and Co-ordination Act (EMCA), The National Housing Policy, the Physical Planning Act and the Physical Planning Handbook apply in the area.
4.	To assess the prevailing environmental conditions of Burandogo residential neighbourhood	<ul style="list-style-type: none"> • The present environmental conditions of the area and the reasons behind it <ul style="list-style-type: none"> ✓ Solid waste management ✓ Sewer system management ✓ Pollution

Source: Field data 2014

4.3.2 Sources of data.

4.3.2.1 Primary data sources

Primary sources of data included households in Burandogo, resource persons from relevant institutions including Government ministries (Lands, Planning, and Environment), and the County Administration.

4.3.2.2 Secondary data:

All the information that was retrieved from already existing literature for the purposes of this study was treated as secondary data. This information was contained in publications, books, annual/quarterly reports, journals, Development plans, periodicals and existing spatial information like topographical and aerial maps of the study area.

4.4 Methods and Instruments for Data Collection

Various methods and instruments for data collection were used and these included the following:

4.4.1 Observation

Physical aspects that were relevant to the study were obtained through observation to verify verbal claims by respondents. An observation guide as the instrument was used to capture such elements. This was also used in verifying information as data collection using the questionnaires preceded observations as a method of data collection also served to increase the range of relevance and reliability of data. Checklists were used to gather data based on the study's premises, assumptions made on various aspects of the research variables were confirmed or disapproved by use of the above method

4.4.2 Interviews

4.4.2.1 Oral Interview guide

This method involved collection of data through face to face interaction with residents of the study area and relevant institutions such as the Ministry of Environment and Water, the Ministry of Land and Planning, County Environmental Officer, among others.

Data collected using this method included: the housing tenure system in the area, the prevailing environmental conditions and the adequacy level of the residential neighbourhood.

4.4.2.2 Questionnaires

This method involved collection of data through pre-determined questions based on the study objectives. It was administered to households. A total of 100 household questionnaires were used during the field work. The household questionnaires were administered randomly. These were done in a bid to collect information as per the objectives of the study. A sample of this questionnaire is presented in the appendix section.

4.4.3 Photography

Photographs were used to capture information such as the nature of the existing residential houses in terms of the fabric; and design, the status of the access roads, the status of the existing storm water drainage system, and waste management methods. Digital cameras were used to record real on-site images during the field study in order to be used during the report writing and data analysis

4.4.4 Literature Review

Some of the data was taken from existing work on the subject. This information was contained in publications, books, annual/quarterly reports, journals, Development plans, periodicals and existing spatial information like topographical and aerial maps of the study area. This allowed for comparison between primary data collected and existing information.

4.5 Target population:

Information was obtained from the resident who resided in the Burandogo neighborhood through households, the National and County government representatives.

4.6 Sample Size

The sample was determined using the formula recommended by Nassiuma (2000) as follows:

$$n = \frac{NCv^2}{(Cv^2 + (N-1)e^2)}$$

Where n= sample size

N = population

Cv = Coefficient of variation (take 0.5)

e = Tolerance of desired level of confidence, take 0.05% at 95% confidence level.

Based on the above formula and our variables, the sample size was 87.65 rounded off to 88. The study therefore gathered field data from 100 households so as to achieve sufficient and reliable data.

4.7 Sampling Techniques and Procedures

4.7.1 Simple Random Sampling

In this method every member of the population has a known and equal chance of being selected (Kothari, 2004). During the administration of household questionnaires, transects were identified along the major access roads and subsequent systematic samples were taken. This technique was adopted because it gave every resident of Burandogo a chance of being interviewed and hence it minimises the chance of the data collection exercise being bias.

4.7.2 Purposive Sampling

Purposive sampling represents a group of different non-probability sampling techniques (Mugenda and Mugenda 2003). Also known as judgmental, selective or subjective sampling, purposive sampling relies on the judgment of the researcher when it comes to selecting the units (e.g., people, cases/organizations, events, pieces of data) that are to be studied. Usually, the sample being investigated is quite small, especially when compared with probability sampling techniques.

The main goal of purposive sampling is to focus on particular characteristics of a population that are of interest, which will best enable you to answer your research questions. This method was employed in the identification of the various interest groups the Ministry of Land and Planning representatives and the representative of the National and County government.

4.7.3 Convenient Sampling

Convenient sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researcher. The subjects are selected just because they are easiest to recruit for the study. This method was used to identify the various transects used during the research undertaking, i.e. the research involved administering questionnaires to the households near the access routes due to their easy accessibility. This put in consideration that all the sections of the Burandogo neighbourhood were represented.

4.8 Method of data analysis and presentation

Analysis was done using the Statistical Package for Social Scientists (SPSS). After the raw data was obtained it was sorted and coded after which the coded data was put into the SPSS program and analyzed appropriately. Data was the presented in the form of bar graphs showing the various outcomes of the study.

4.9 Limitations to the study

The conduction of the questionnaire interviews was challenging because most of the respondents were illiterate, some asked for handouts in order to assist with the interview while in some cases most of the residents were not willing to be interviewed.

CHAPTER 5: Results and Discussions

5.1 Introduction

This chapter highlights the results on the issues that were found out on the ground and brings out a discussion or an elaboration on the issues. Details on the issues were found out by use of questionnaire interviews, scheduled interviews, observation, photography and literature review.

5.2 Legal and Policy Frameworks on Rural Residential Planning

Legal and policy frameworks offer guidelines that are used in the planning of a neighbourhood and ensuring that environmental conditions of a neighbourhood are maintained in a sustainable way.

5.2.1 Environmental Management and Co-ordination Act, EMCA

Water purity: The objective of the regulations is to protect human health and the environment. The effective enforcement of the water quality regulations will lead to a marked reduction of water-borne diseases and hence a reduction in the health budget. This Act was partially enacted in Burandogo neighborhood because the major water source, although few and unreliable, was piped water whose water originated from the Njoro water Association where the water was treated before being releases for use.

Waste management: Waste Management Regulations are meant to streamline the handling, transportation and disposal of various types of waste. The aim of the Waste Management Regulations is to protect human health and the environment. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source. In Burandogo this Act was not effectively enacted for there was poor disposal of solid waste in the area e.g. some resident disposed their waste by the road side.

5.2.2 National Housing Policy

This policy stated that the Government will promote a sustainable process of shelter improvement and maintenance in the rural areas. The Government, together with other partners, will strive to alleviate rural poverty (a major bottleneck being access to credit) and increase rural incomes through the introduction of rural industry and through the establishment of non-agricultural small and medium scale enterprises (e.g. manufacturing of building materials). At

the institutional level, the dependency of the rural poor on informal credit mechanisms will be supported by the introduction of innovative ways of mobilizing savings from the communities. This will be achieved by encouraging rural-based Non-governmental organizations to work closely with community based-organizations. In Burandogo this was partially evident in that there was a jua kali industry that offered employment to some of the youth. The issue of offering decent housing however, was not implemented.

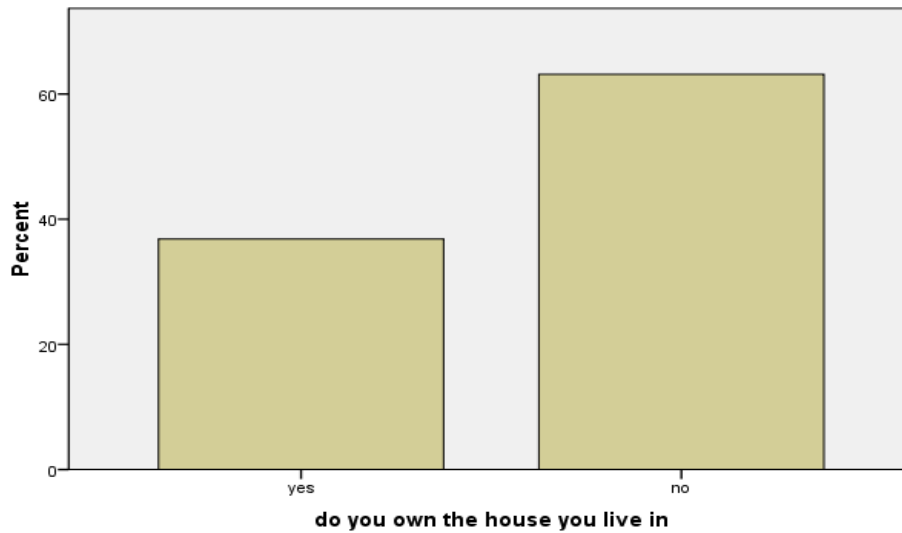
5.3 The housing tenure of the residential houses in Burandogo Village

Housing tenure describes the legal status under which people have the right to occupy their accommodation. In Burandogo village the common tenure systems were Owner occupancy where various individuals occupied the house that they owned and the land it sits on, Tenancy where the landlord owned the houses and rented the right of occupancy to the tenants, and squatting where occupation by non-owner without permission by the owner, if any.

According to the Ministry of Planning the settlement into Burandogo was as a result of squatting by the workers of a sisal farm that was operating in the adjacent land years ago. It was after they had attained their constitutional right to own the land that the government made arrangements that they be issued with title deeds so that they can become legal occupants of those lands. In 2004 the ministry of planning conducted a study aimed and coming up with a development plan for the area. They established the plots that are present and it was established that most of the occupants in the area were squatters. The government hence made efforts to issue allotment letters which will grant the occupants legal ownership as they wait for their title deeds to be prepared. This exercise stalled because most of the residents registered plots that they were not occupying at the present time hence there was confusion, there was also the issue of lack of funding and lack of political support.

From the field research it was found that most individuals did not own the houses that they occupied. According to the interview conducted about 37% of the residents owned the houses that they occupied and 63 % did not own the hoses that they occupied. This is shown in figure 1.

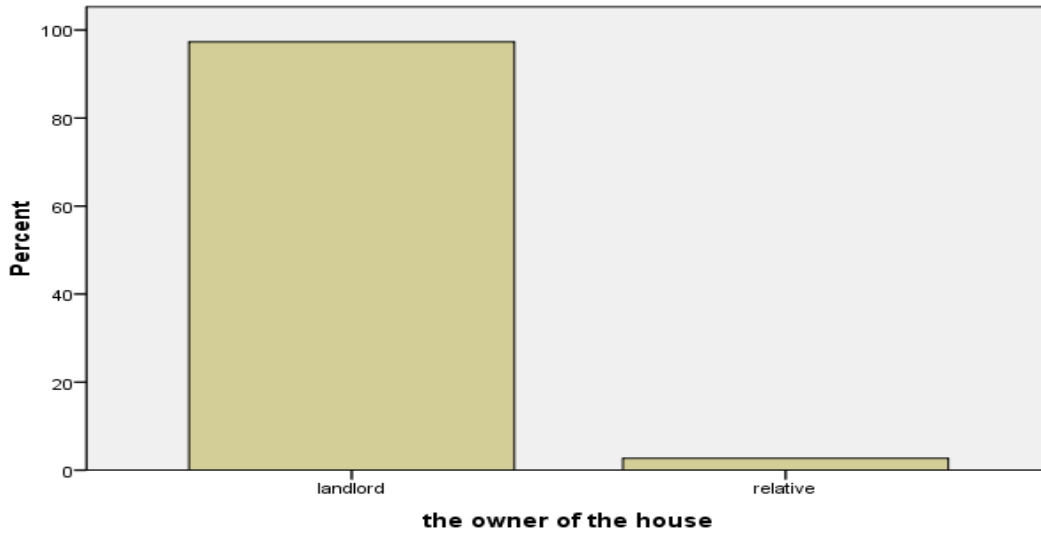
Figure 2: House Ownership



Source: Field Data, 2014

Most of the houses that were not owned by these individuals were owned by a landlord who the rented the occupancy rights to the residents who occupied the houses. Some of them lived in houses owned by their relatives where they did not have to pay rent. This is shown in figure 2 below.

Figure 3: House Owner



Source: Field data, 2014

When asked if they pay rent the tenants all agreed that they pay a particular amount every end month to the landlord. The rent payment per month ranged from 500-1300 Ksh. per month. The rent paid by the tenants per month is shown in figure 3.

Figure 4: Amount of rent paid per month



Source: Field data, 2014

Most of the residents agreed to the rent charges being affordable to them but some said that the charges were high considering their monthly or daily income. They were hoping for rent subsidies by the landlord so that they can be able to afford it. They said that they are most of the

time forced to share houses with mates so that they can split the rent costs so as to be able to afford them. 82% of the residents interviewed agreed that the rents were affordable and 28% of the interviewed residents argued that the rent charges were quite high. This shown in figure 4 below

Figure 5: Rent affordability



Source: Field data, 2014

5.4 The conformity of Burandogo residential neighbourhood to the Physical Planning Requirements

The adequacy of the residential houses looked at various aspects as discussed below.

5.4.1 Residential houses carrying capacity

In every residential neighbourhood it is a right for every resident to have proper housing that can accommodate them in their everyday living, i.e. every citizen has a right to a roof over their heads (Physical Planning Handbook). This requires that residential neighbourhoods should have sufficient housing to cater for the residents that live there.

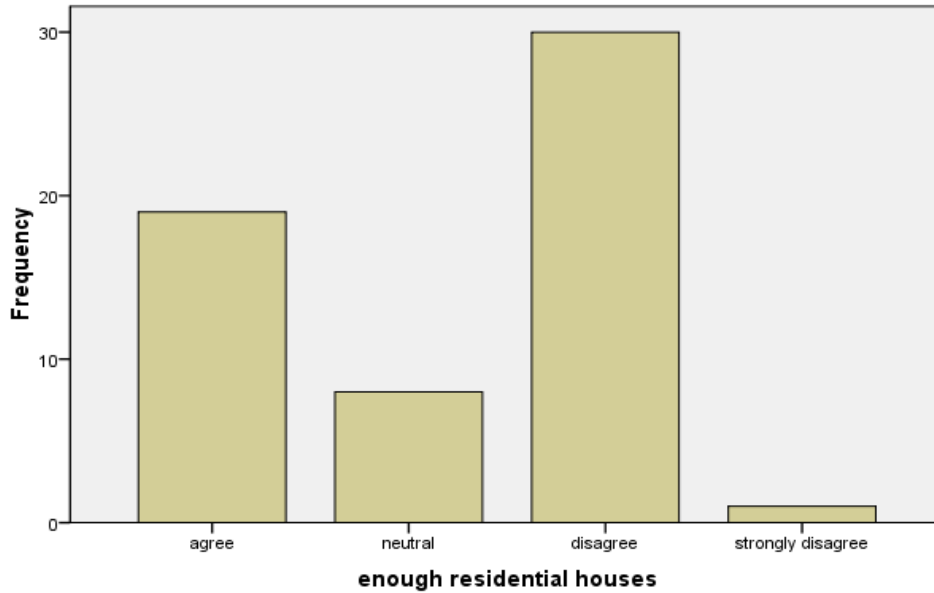
An interview was conducted and when asked if there are enough residential houses to accommodate the present and ever growing population of Burandogo neighbourhood most of the respondents said that that is not the case. They argued that the houses in the area are few that most residents are forced to share houses with each other from time to time. They also argued that sometimes due to lack of houses individuals are forced to move from the Burandogo neighbourhood to other neighbourhoods that are quite expensive for them. In the interview 51% of the respondents disagreed to the idea of the residential houses being enough for the residents

and 33% agreed that the residential houses are enough for the residents of Burandogo village. From observation it was seen that most of the houses were low-rise and had very little carrying capacity that could not accommodate a large population yet occupied a large piece of land on the area. Some of these houses are shown in plate 1 below. Figure 5 shows the respondents view on the carrying capacity of the residential houses in Burandogo village.



Plates 3: Condition of most houses in Burandogo

Figure 6: The carrying capacity of residential houses



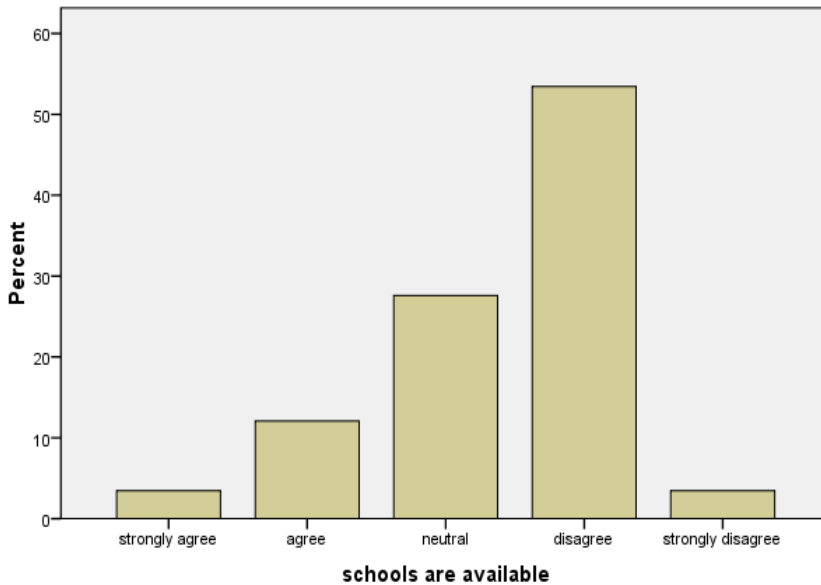
Source: Field data, 2014

5.4.2 Availability of schools

Information is power therefore when you educate the populace; you empower them to exploit the opportunities at their disposal. Provision of educational facilities therefore is a pre-requisite to the development process. It is very vital for all neighbourhoods to have schools that are within a walking distance for the pupils that reside in the neighbourhood. A neighbourhood with a catchment of at least 4000 pupils should be provided with a nursery and primary school and that with a catchment of 8000 pupils should be provided a secondary school (Physical Planning Handbook).

Interviews were conducted and when asked about the availability of schools in Burandogo some of the residents disagreed to there being a school within the neighbourhood. Some of the residents agreed to there being no schools but were okay with the idea of their children going for more than 2km of the recommended maximum distance to a school (Physical Planning Handbook). 53% of the respondents disagreed to there being schools in the neighbourhood while 12% agreed to there being schools. Those who agreed were referring to schools in the neighbouring neighbourhoods Figure 6 shows the respondents view on the issue on availability of schools.

Figure 7: Availability of schools in Burandogo



Source: Field data, 2014

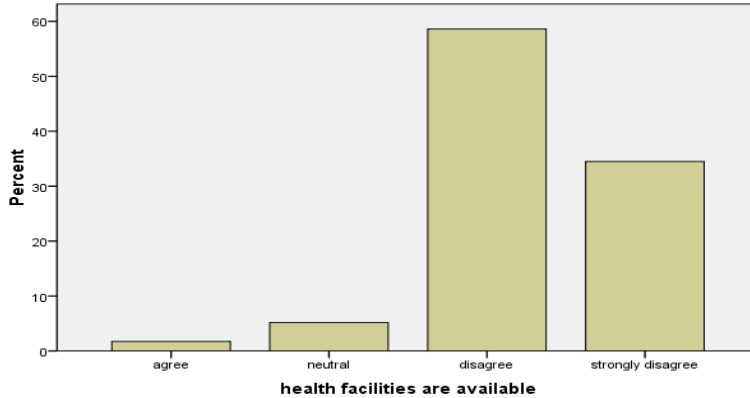
5.4.3 Health facilities

According to the physical planning requirements, every neighborhood should have a health facility that is well equipped to cater for the needs of the residents at all times in any given condition. It is important for a neighbourhood to have a healthy population for there to be a healthy nation (Physical Planning Handbook).

According to the study Burandogo village lacks this requirement in that it does not have a health facility within the neighbourhood and residents have to walk or ride long distances to access health services e.g. from the Taveta District Hospital or other clinics and dispensaries within Taveta Constituency. Respondents complained that in cases where they are faced with an emergency they usually face a lot of difficulties in making efforts to access health services. This has sometimes led to some of the residents losing their loved ones. For instance during disease outbreaks like cholera, that is quite common in the area, most residents lose their lives because they are not able to access proper health services. From time to time the government gives the residents some health services within the neighbourhood e.g. supplying them with water guard and conducting free treatment clinics but these are not usually regular enough to meet the needs of the residents. When asked about their take on the availability of health facilities within Burandogo village neighborhood 58% of the respondents disagreed while 38% strongly disagreed

to there being a health facility within the neighborhood. The respondents' reactions are shown in figure 7 below.

Figure 8: Availability of health facilities



Source: Field data, 2014

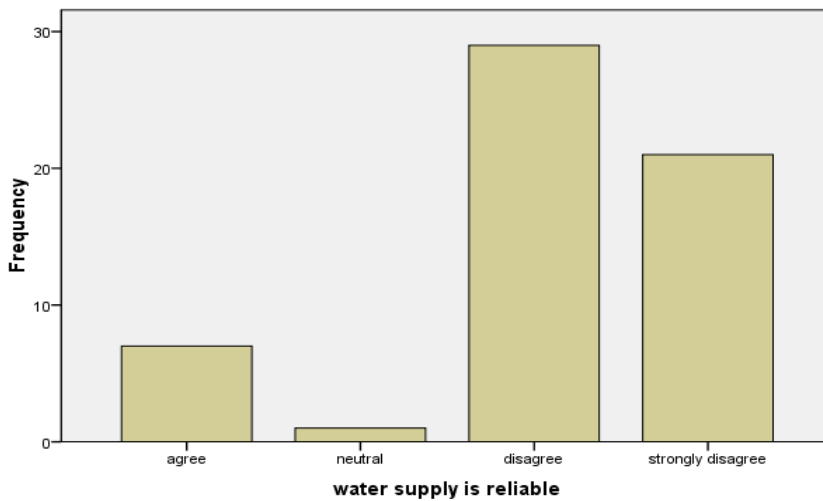
5.4.4 Water supply

All residents in a neighbourhood are entitled to the regular and frequent supply of water in their everyday life (Physical Planning Act). They should be able to access clean and safe water for their commercial and domestic use. From the study it was realized that the residents of Burandogo neighborhood did not have regular water supply in that running water was only accessible a few days a week and most of the time it was only available at night in those few days. Most of the residents had to rely on water vendors to supply them with water most part of the week. The problem with accessing water from the vendors was that it was very expensive and it consumed a lot of their time because they had to stand in long queues to access the services. The lack of running water in the village has led to many individuals contracting some diseases like diarrhea because it becomes hard for the individuals to maintain proper hygiene. When asked whether water supply is reliable 50% of the respondents disagreed, 36% strongly disagreed while 12% agreed that water supply is reliable. Figure 8 below shows the respondents' view on water supply reliability and availability.



Plates 4: A girl uses water from jericans to wash utensils because of lack of running tap water

Figure 9: Response on water supply reliability



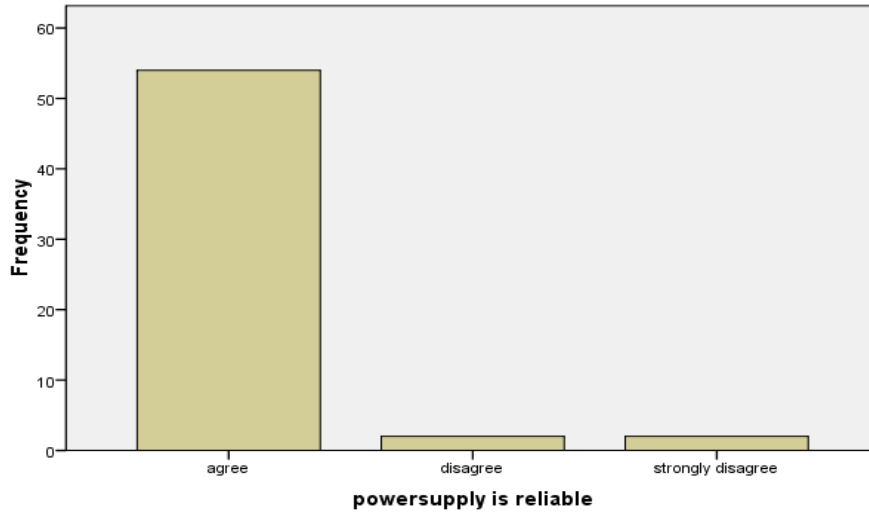
Source: Field data, 2014

5.4.5 Power supply

Electricity is essential in a neighbourhood for the resident to be productive and be able to operate machinery and work efficiently in their everyday activities. According to the study, Burandogo village has regular and reliable power supply. This has enabled resident to be productive e.g. there is a Jua Kali industry within the neighbourhood that has offered employment to residents and also provides product that are affordable to most member of the village. From the study,

when asked if the power supply in the neighbourhood was reliable 93% of the respondents agreed, this is shown in figure 9 below.

Figure 10: Response on power supply reliability



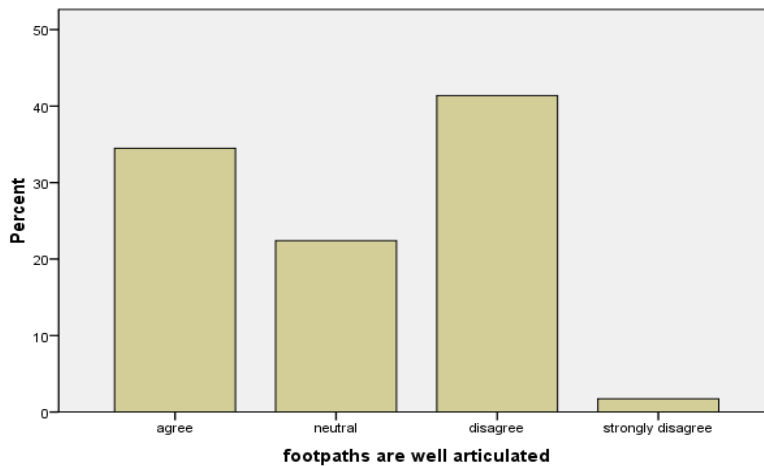
Source: Field data, 2014

5.4.6 Foot paths

Foot paths are necessary so as to enable residents to access different points of the neighborhood with ease and save on time. They are mostly used where the main road does not serve the area and can also be used as through ways during traffic. Within a neighbourhood, foot paths should be provided and should be covered in concrete or tar. The foot paths should be at least 6-12 meters wide so that they can serve the users efficiently (Physical Planning Handbook).

When asked if foot paths are well articulated in Burandogo, i.e. if they are well paved, are adequate and available, 34% of the respondents agreed that they are while 41% of the respondents thought otherwise. Plate 3 below shows the status of some of the foot paths while figure 10 shows the response of the respondents.

Figure 11: Response on footpath articulation



Source: Field Data, 2014



Plates 5: An existing footpath in the neighbourhood

5.4.7 Existing Markets and their Conditions

A market is one of the many varieties of systems, institutions, procedures, social relations and infrastructures whereby parties engage in exchange. While parties may exchange goods and services by barter, most markets rely on sellers offering their goods or services (including labor) in exchange for money from buyers. This therefore means that it is vital for a neighbourhood to have a market so that there can be good circulation of goods and services. A market centre

should be planned to serve a catchment population of 15,000 to support a primary, a secondary school and a health centre (Physical planning handbook).

It was observed that in the Burandogo neighbourhood there was no designated and well constructed market area for the residents. There was a central place where most residents met to exchange goods and services but the area was not well constructed and articulated to qualify to be a market. When asked if there was a market available for the residents 57% of the residents disagreed while 17% agreed. The respondents that agreed to there being a market referred to a central area where most residents meet to buy goods and services from time to time. Those who disagreed argued that they had to walk long distances to the main Taveta market to carry out their weekly shopping because it was there that they'll get all that they required for their day to day supplies. Plate 4 below shows the area which the Burandogo residents, at least, refer to as a market.



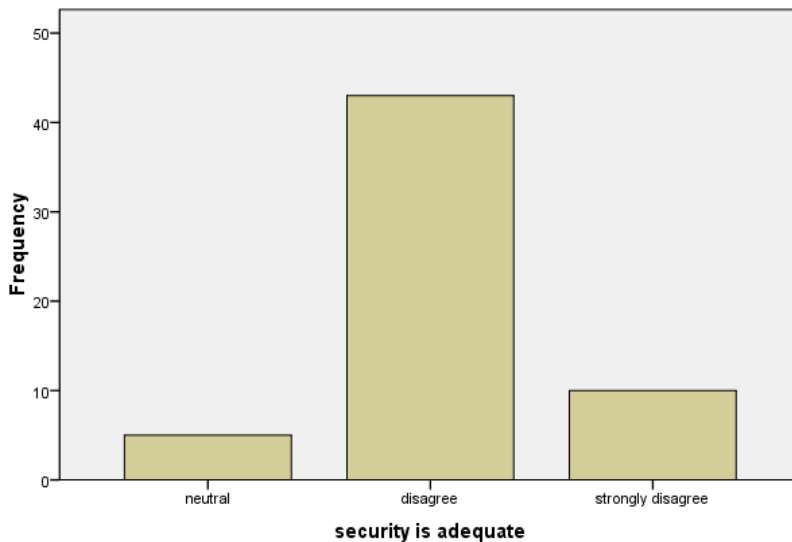
Plates 6: The Burandogo "market" area

5.4.8 Security status in Burandogo

Every citizen in Kenya is entitled to adequate security at all times and places (Kenya Constitution). In any neighborhood it is necessary for there to be sufficient security so that the residents can have peace and also be able to go ahead with their day to day investments comfortably without the fear of any type of danger. When an area lacks security many a time

people tend to avoid it and that means there will be less development taking place in that place. According to the respondents the insecurity issues that are most prevalent in Burandogo neighborhood are robbery and rape cases. Most of the respondents complained that they lose a lot of their property to armed robbers who attack them on the road and in their homes. They also complained that most ladies and sometimes men are attacked and raped by unknown individuals leading to trauma, stigmatization and sometimes contraction of HIV by the victims. They blamed most of these act to the lack of employment of the youth within and outside the neighborhood. They argued that, due to the lack of employment most of the youth engaged into robbery activities so that they can get money or commodities for sale. Most of the youth use the money they get on illicit brew and then engage into immoral acts like rape. They argued that this has led to the area being avoided by investors and other settlers. When asked if there was sufficient security in the neighborhood 74% of the respondents disagreed to there being sufficient security. Figure 11 show the respondents' take on the issue of security.

Figure 12: Response on the security status of the area



Source: Field data, 2014

5.4.9 Storm water drainage system

Whenever it rains it is necessary for an area to have an efficient drainage system to avoid the occurrence of floods or water stagnating on uneven grounds. According to the respondent, Burandogo neighbourhood is not served by efficient drainage system. The respondents argued that due to the lack of efficient storm water drainage systems the roads become impassable

during the rainy season, some of the shanty houses get carried away by the floods, waterborne diseases become a common occurrence in the area; people lose property to the floods and most of the pit latrines overflow. Due to the lack of proper drainage system, some of the residents have opted to use gunny bags to prevent flooding water from flowing into their property and spoiling it. Plate 5a below shows the existing drainage system while plate 5b shows what some of the measures some residents have taken to counter flooding in the neighbourhood.



Plates 7a and 7b: A drainage system and gunny bags used to mitigate flooding

5.4.10 Sanitation facilities

Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and feces (World Health Organisation). Sanitation is the hygienic means of promoting health through prevention of human contact with the hazards of wastes as well as the treatment and proper disposal of sewage wastewater. In every residential neighbourhood, it should be ensured that a pit latrine or toilet is provided after every 100m on the streets (Physical Planning Handbook).

In the Burandogo sanitation is a major challenge (Taveta Public Health Officer). This is because most households lack toilets or pit latrines to dump human waste in. this has led to some of the residents dumping human waste in the sisal fields, in bushes or on the road side leading to the

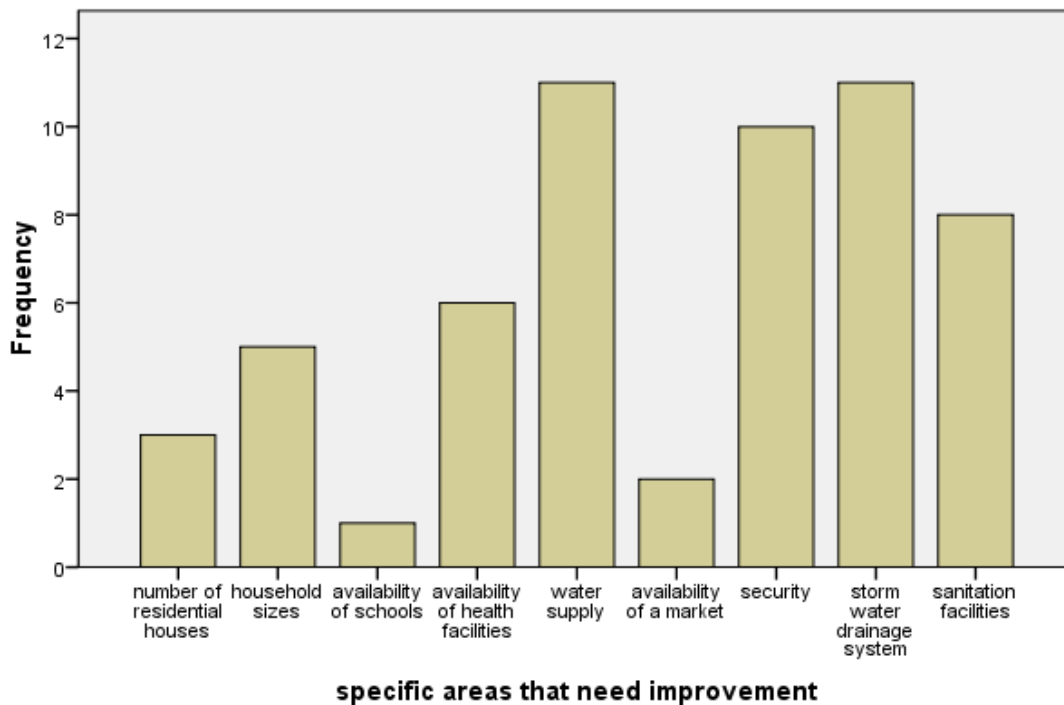
contraction of some diseases like diarrhoea. The other issue is that some of the existing pit latrines are in poor conditions e.g. some become filled up and overflow while some are made using poor fabric and hence sometimes collapse.



Plates 8a and 8b: The inside and the outside of a pit latrine in Burandogo

According to the residents, all issues were relevant and of importance for them in their existence in Burandogo but there were some issues that carried much weight. When asked which issue raised much concern 19.3% of the respondents said water supply was of much concern while another 19.3% of the respondents said that the storm water drainage system was of much concern. 14% of the respondent said that they much concerned about the security of the area, 14% had a problem with the area's sanitation while 11% were concerned about the lack of health facilities in the area. According to the respondent, if there is adequate and reliable water supply it would be possible to maintain and ensure that there is sufficient sanitation in the area because domestic and commercial activities that need water will be catered to efficiently and effectively. The presence of an efficient storm water drainage system will also help in ensuring proper sanitation in the area since the storm water will be channelled to the right destination effectively and this will restrict flooding hence reduce the risk of water borne diseases. They argued that the lack of efficient sanitation facilities like good condition pit latrines contributed mostly to the contraction of diseases in the area. Figure 12 below shows the respondents' response on the areas of most concern.

Figure 13: Areas of major concern



Source: Field data, 2014

5.5 The prevailing conditions of Burandogo residential neighbourhood

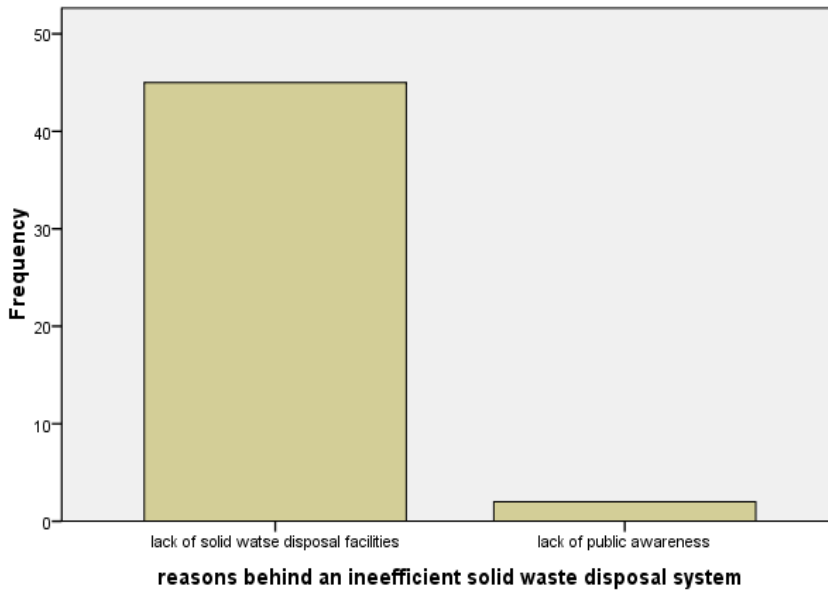
The aim of this objective is to assess the present environmental conditions of Burandogo. The environmental issues in question were pollution, solid waste management, sewer system efficiency, and the conditions of the roads and presence of open spaces.

5.5.1 Solid waste management

Every residential area has a degree of solid waste generation from time to time. The solid waste is generated from the food people prepare and consume, industrial goods that they buy like detergents, and dead leaf matter. If the solid waste is left to accumulate in an area of residence it becomes risky to peoples' health and therefore the solid waste needs to be gotten rid of as often as possible to keep the environment clean and for the sake of the health of the people. Garbage collection sites must be environmentally friendly. They should be located on the leeward side and have a 100m-protection belt (Physical Planning Handbook). When asked if there was

sufficient solid waste management 81% of the respondent said that there is none while 19% of the respondent said that there was sufficient solid waste management. The 81% of respondents argued that the area lack solid waste management in that most of the residents just dumped their solid waste in the sisal farm or on the road side. They argued that the lack of efficient solid waste management was as a reason to lack of solid waste management facilities and lack of public awareness. This is shown in figure 13 below.

Figure 14: Reasons behind insufficient solid waste management



Source: Field Data, 2014



Plates 9: Waste disposal on the road side

Those who supported to there being a sufficient solid waste management system argued that each household should dig a solid waste dumping pit that they would burn the waste in from time to time keeping it from accumulating. They said that that way they have been able to maintain proper solid waste management in their homesteads. They were against the idea of dumping waste in the sisal farm and on the road side.

5.5.2 Sewer system

It is recommended that sewage collection and sewage treatment plants be considered for all settlements with a population of 3,000 or more. In settlements where an integrated sewage scheme is not provided provision should be made for septic tanks. Care must be taken to ensure that sewage effluent does not infiltrate ground water aquifers in a manner causing pollution of water sources. According to the environmental Planner and the resident of Burandogo, the area lacks an efficient sewer system. The area is not served by the Taveta sewer system. This has led to toilets' overflows, poor disposal of waste water e.g. some individuals dig small drainages to carry away waste water from their homesteads into the road and pollution of the environment all together.

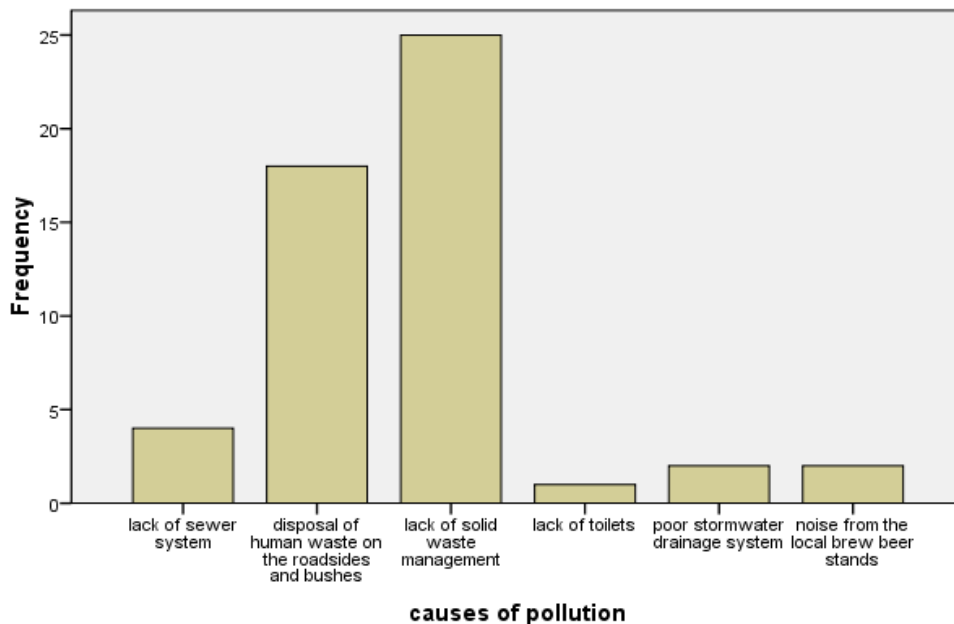
5.5.3 Pollution

Pollution involves the contamination of an environment with foreign wastes. Once an environment is contaminated it becomes unfit for the existence of human and other living organisms and things. According to the respondents, Burandigo experiences some degree of pollution. The respondents complained that due to poor solid waste disposal most parts of Burandogo were covered with polythene papers and other solid wastes. They also argued that the disposal of human waste on the road side and in the bushes resulted to some parts of the area smelling bad and making it uncomfortable for them to use these areas. They also said that due to these pollution activities their health conditions are sometime compromised especially during the rainy seasons when the entire waste is carried to their homesteads by running water.

When asked what was the cause of the pollution 48% of the respondents said it was due to lack of proper solid waste management, 35% said it was due to the habit of disposal of human waste on the road side and the bushes, 8% said it was because of the lack of a sewer system, 4% said it was because of noise from the local brew bars, 4% said it was because of lack of an efficient

storm water drainage system and 2% said it was because of lack of toilets in several homesteads. This is shown in figure 14 below and plates 9 and 10.

Figure 15: Causes of pollution in Burandogo



Source: Field data, 2014

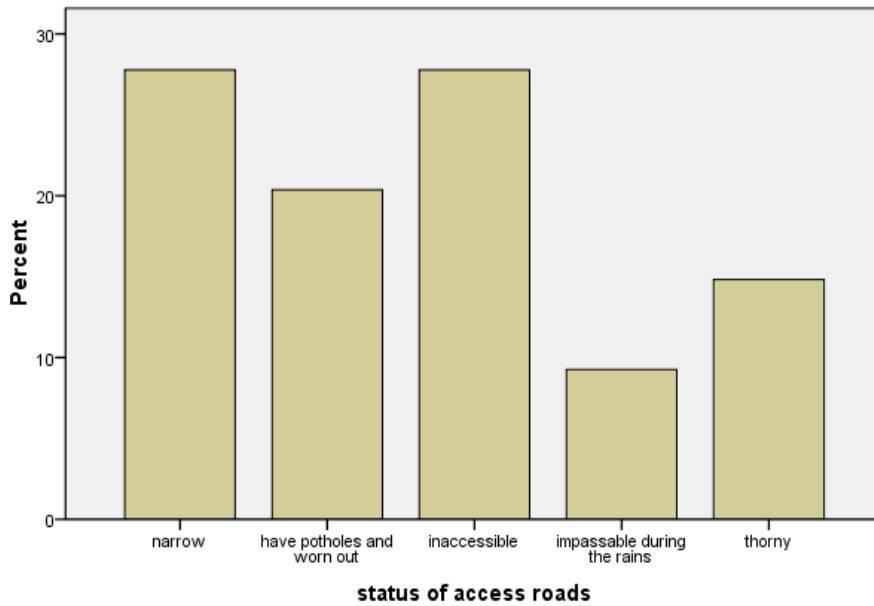
5.5.4 Access roads

The access roads are relevant in a neighbourhood to ensure that residents can be able to reach different points of a neighbourhood with ease. It is therefore necessary that they are in good condition, are wide enough to accommodate motorist and are well drained during the rainy seasons so that no inconveniences are experienced. Burandogo has various access roads but unfortunately they are not sufficient to serve the large population in the area and to cover the large area altogether. When asked to comment on the status of the roads 29% said that the roads are narrow, other 29% said that they are inaccessible, 20% said that the roads are worn out and full of potholes, 15% said that they are thorny hence causing punctures on their motor vehicles while 9% said that they are impassable during the rainy season. Most motorists complained that due to the roads being narrow it becomes hard for them to use it two-way at the same time. They hence have to wait and take turns to use it if they are heading towards the opposite direction. The

narrow condition of the roads is caused by the congestion of the houses that are built so close to the roads and most of them consuming the space meant for the construction of the roads. Those who said that the roads are inaccessible argued that most of the roads are as good as not being there because one cannot use them with their motor vehicles because if they do they risk getting stuck because some parts of it are totally worn out.

Motorists complained that during the rainy season the roads become muddy and cars and motorcycles get stuck in the mud freezing the whole transportation activities. Figure 15 below shows the response on the status of the access roads in Burandogo. Plates 11 and 12 below show the status of some of the access roads in Burandogo

Figure 16: Status of access roads



Source: Field Data, 2014



Plates 10: Access roads in Burandogo

Source: Field Data 2014

6.0 Chapter 6: Recommendations

6.1 Summary of the findings

Every citizen of Kenya is entitled to a well-planned housing and infrastructure of acceptable standards and affordable cost combined with essential services so as to afford dignity, security and privacy to the individual, the family and the community as a whole. To an extent, this was not the case in Burandogo Neighbourhood. As people were settling in Burandogo there was no planning that was done to ascertain that the neighbourhood has all the social amenities required, this could be due to the fact that some of the residents settled there as squatters a form of informal settlement that does not consider planning aspects. The housing tenure of the area is mostly tenancy and ownership with tenancy being the most common housing tenure system in the area. With tenancy most tenants pay rent which most of them considered the rent charges as being affordable to them.

Some of the physical planning requirements were not adhered to in the neighbourhood for instance the area was not served with an efficient storm water drainage system. The area lacks all weather and well articulated access roads, no properly constructed market place, and poor solid waste management, lacks a sewerage system, lack sufficient and efficient sanitation facilities, security enforcement personnel and schools. The areas that the residents mostly advocated for their improvement include water supply, security, sanitation, storm water drainage and the introduction of a health facility.

The demand of housing still far outstrips supply due to the high rate of urbanization, increased poverty, escalation of housing costs and the lack of a clear government initiative towards the same.

6.2 Conclusion

The investments in the housing sector in Kenya since the 1966/67 Policy have been minimal and sporadic. The demand for housing still far outstrips supply. High rate of urbanization, increasing poverty and escalation of housing costs and prices have made the provision of housing, infrastructure and community facilities one of the daunting challenges in the socio-economic development of the country. More research on low cost building materials and construction techniques should be done to provide viable guidance to the development of the housing sector.

In the development of every residential neighbourhood, planning should be a consideration and it should be ensured that all the social amenities like schools, health facilities, and good condition access roads and foot paths are provided.

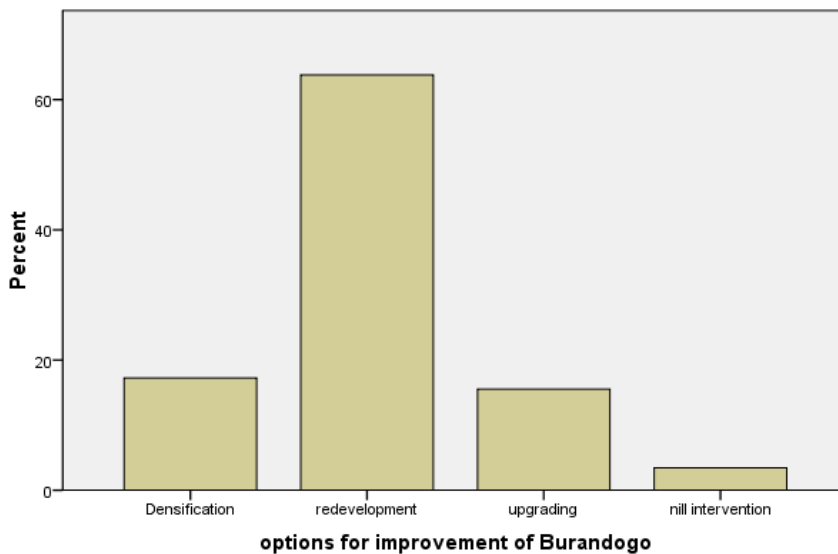
6.3 Recommendations

In this study recommendations that are going to be presented will include those of the respondents and those of the researcher of the subject.

6.3.1 Recommendations from the respondents.

The respondents were provided for options that they would recommend for the improvement of Burandogo neighbourhood. The options included densification, redevelopment, upgrading and nil intervention. In their response 17% opted for densification, 64% opted for redevelopment, 16% opted for upgrading while 3% opted for nil intervention. This is shown in figure 16 below.

Figure 17: Options on environmental improvement

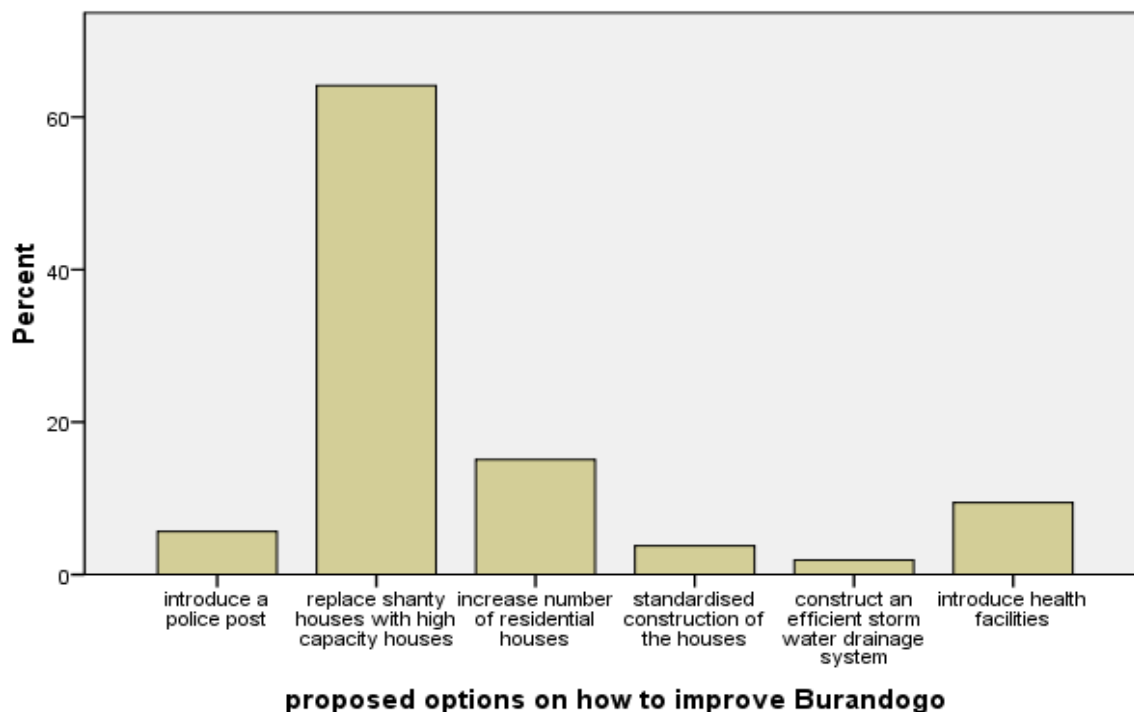


Source: Field Data, 2014

The respondents had some particular actions that they wanted to be taken in relation to the improvement of the neighbourhood. Some proposed the replacement of the shanty houses with high rise houses, increase number of residential houses, introduce standardized construction of the houses, construct an efficient storm water drainage system and introduce a health facility. The respondent argued that the grass thatched mud houses that were dominant in the area

occupied a lot of space but did not accommodate a large number of the population at a time. They said that with the introduction of high rise building, the population of the area will be well accommodated and residents will get to live in houses with good conditions e.g. in terms of fabric used for construction. With the introduction of a standardized construction of buildings they argued that it will help in that all the houses will be constructed with enough equal space to accommodate their families. The specific improvement options proposed by the residents are shown in figure 17 below.

Figure 18: Specific improvement options



Source: Field Data, 2014

6.3.2 Recommendations from the researcher

There will be a provision of a preferred spatial plan that will cater for various issues that were of concern in the Burandogo neighbourhood during the research. This plan aims at offering solutions to address these issues.

6.3.2.1 Housing tenure in the area

Through planning it should be made possible that each family be able to own their own apartment in the area. This can be made possible by the construction of multifamily, high-rise

houses using cheaply available and affordable materials. These houses can then be given to the residents who will pay mortgages at affordable rates until they can finally own the houses fully. This kind of system has worked in many countries in the world like the United States of America and Libya and has helped ensure that all citizens in those countries can afford decent housing. When and if they attain ownership tenure, the residents will then be able to focus in other development projects like education and business because they will be sure that they have a roof over their heads on a daily basis.

6.3.2.2 Conformity to the physical planning requirements

Here are some of the recommendations on various facilities

- Residential houses carrying capacity

To increase the residential houses carrying capacity there should be an introduction of multifamily and high-rise residential houses that will accommodate a high carrying capacity. Areas designated as multi-family are flexible, in that, there are a number of residential typologies (townhome, duplex, triplex, etc.). This will make it possible to use solar as a source of energy for lighting and for cooking since the area is served by sufficient solar energy. The high-rise buildings, in the multifamily planning design, will provide for more space to accommodate large population sizes at the same time. The construction of the multifamily houses will ensure that individual units, their entries, and private outdoor spaces are designed to maximize privacy and clearly delineate private and common spaces.



Plates 11: Multi-family housing design

Source: Field Data, 20

- Availability of schools

Educational facilities should be introduced in to the area so as to give the pupils in the area the chance and platform to learn and better their lives. It is a planning requirement for every neighbourhood to have a school for education is power. The education facilities are required to be within a walking and safe distance for the pupils. In the area a nursery, primary and secondary school should be introduced to serve the population.

- Availability Health facilities

A healthy nation means a productive nation. It is therefore very important the Burandogo neighbourhood be served by a health facility that will have all the health service all year round so as to ensure that the residents are healthy and hence productive. The health facility will help the residents when they are face health emergency issues and will save them the trouble of going for long distances looking for health services. Since the area is not very vast a dispensary or health clinic can serve the purpose.

- Water supply

Adequate water supply should be provided in the area to ensure that the residents can access water at any time of the day and meet their commercial and domestic need of water. To ensure this there can be an introduction of a borehole big enough to supply water to the residents. Resident can also be encouraged to dig wells and also have big water tanks for the purposes of water storage.

- Foot path provision and articulation

To ensure that the foot paths are sufficient and efficient they can be laid in between all the high rise buildings and serve as the buffer to buildings and also create a common space for the residents.

- The market area

There should be an introduction of a commercial zone where a well designed market space will be provided catering for all kinds of trader e.g. the vegetable vendors, livestock traders and

second-hand clothes vendors. The market space should be big, well organised and safe for all its users.

- Security in the area

From the study, one of the major causes of insecurity is that the youth lack employments hence rely on stealing as a means to get money or commodities for sale and uses so as to meet their daily needs. Therefore, to curb insecurity the government should provide jobs for the youth to give them a source of income and to also keep them busy so that they don't engage in drug abuse or rape. There should also be an introduction of a police post in the area and an introduction of regular police patrols on the area. Residents can also be introduced to the Nyumba Kumi system. There should be street lighting in every path and road that will provide lighting during the night for the users.

- Storm water drainage system

There should be a construction of efficient concrete storm water drainage channels that will lead to a storm water harvesting point where the water can later on be used for activities like small scale fishing. The channels must then be given regular maintenance services.

- Sanitation facilities

It should be ensured that each household is served with a well constructed and functional toilet and bathroom. On the streets, it should be ensured that after every 100m a toilet is introduced in the area, this is as per the physical planning handbook. Residents should be given education and extension programs to enlighten them on the importance of toilets and bathrooms in their living spaces.

- Open spaces

There should be a provision of open spaces that are multi-functional in that they can cater for the young, the youth and the elderly and provide for both active and passive recreational activities. In the open spaces there can be the provision of community parks, amusement parks, restaurants and sports facilities. With the provision of recreational facilities it will help the residents relieve stress, have a good time, bond with each other and have good health all together.

6.3.2.3 The prevailing environmental conditions

The residents of a neighbourhood are entitled to a clean environment all year round, this is relevant for their physical and mental health.

- Solid waste management

There should be an introduction of regular solid waste collection by an identified solid waste management agency or group. Space for waste stream separation and storage, including recycling, composting and residual garbage, should be provided in all housing units or buildings. The waste will then be collected by the agency on assigned day and taken either to an incineration point, recycled or used to make compost manure for farmer near Burandogo.

- Sewer system

A sewer system should be provided to serve every housing unit and commercial area. The sewage will be directed to a collection point where it will be treated and reused for activities like fish farming.

- Access roads

Access roads should be provided and be constructed in a way that they are wide enough to serve the residents without causing traffic. The roads should be tarmac so as to avoid vehicles getting stuck when it rains. The roads should be given regular maintenance services to ensure that they are in good condition.

6.3.2.4 Policy and Legal Frameworks

Policies on housing should be reviewed and formulated in a manner that they cater for the ever growing population and the everyday need of the people of Kenya. Promises and proposal made in the policies should be given a follow up to ensure that they are implemented to the later and that the Kenyan citizens live in serene environments all year round.

6.4 The recommended spatial plan

To cater for the issues in the study area there is a spatial plan that addresses all the issues. In the spatial plan, an area is reserved for schools, a police station, a hospital, commercial zones, industrial zones, residential housing, administration offices, access roads, borehole, a church and mosque, storm water and solid waste collection points, a sewer treatment plant and a reserved land for future development. The industrial area will provide for industrial activities which will provide employment and help curb insecurity in the area.

Below is a plate 12a and 12b showing how Burandogo is at the moment and plate 13 showing the recommended spatial plan for the area.



Plates 12: How burandogo is at the moment

Source:

Field

Data,

2014

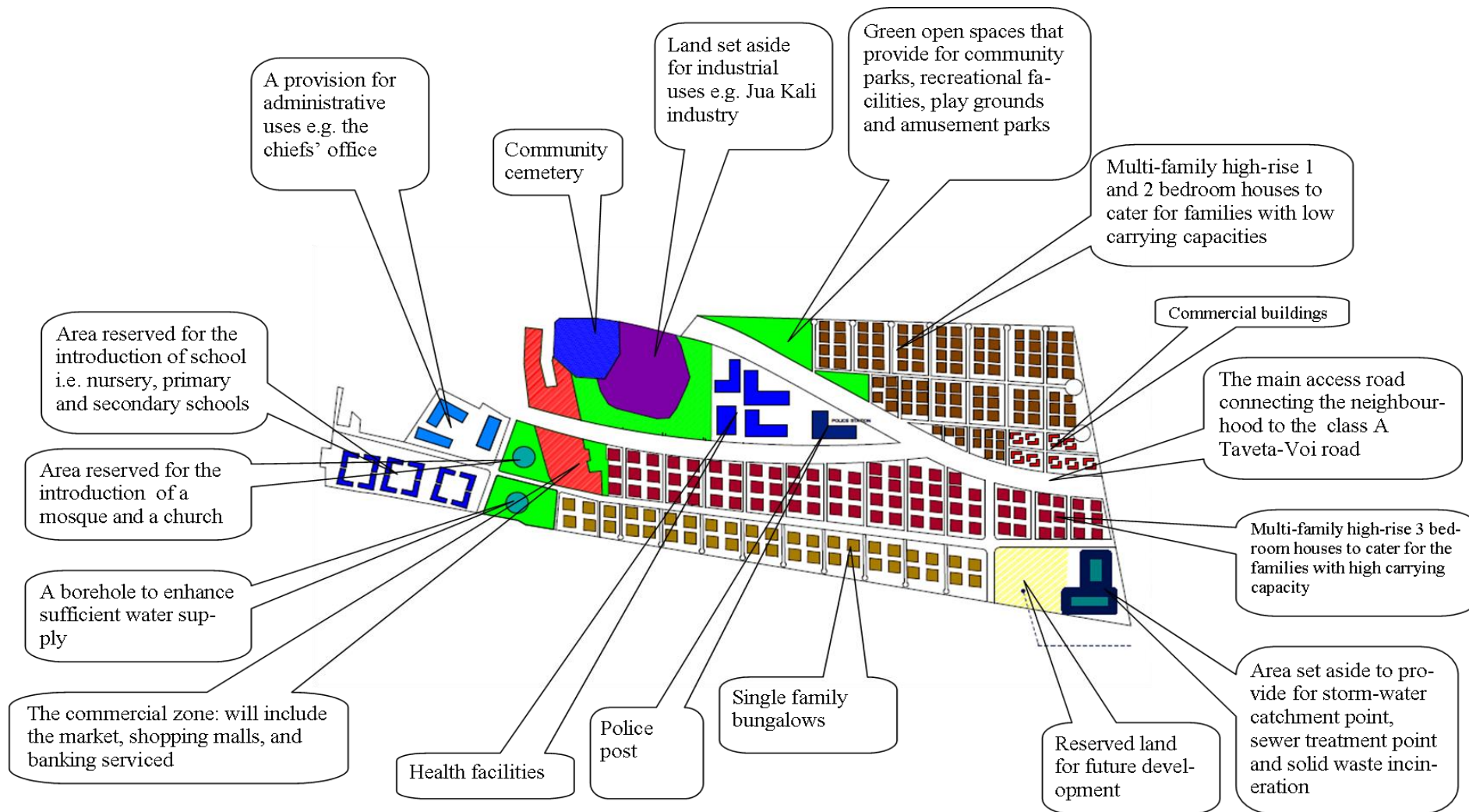


Plate 1: Proposed spatial data for Burandogo Residential Neighbourhood

The spatial plan will be executed in phases so as to ensure that not a large portion of the population is displaced at once and create problems with relocation and to ensure that development proceeds in a manner that most efficiently and effectively utilizes existing infrastructure, and is most economically viable as new infrastructure is developed in the neighborhood. The high rise 1 and 2 bedroom flats will be constructed in phase one together with the sewer treatment plant, the storm water collection point, the borehole and the solid waste incineration point. This is to provide for the sewerage, water supply, solid waste management and storm water management service to the constructed apartment as the other phases are yet to be implemented. Phase 2 will involve the construction of 3 bedroom high rise flat, phase 3 will involve the construction of the bungalows while phase 4 will involve the construction of the industrial area, health facilities, police station, commercial zone, schools and the administration offices.

Table 2: A PLANNING MATRIX ON THE SUSTAINABLE NEIGHBOURHOOD PLANNING OF BURANDOGO NEIGHBOURHOOD

Objectives	Planning Issues	Strategies	Activities	Timeframe			Actors
				Short	Medium	Long	
To assess the rural residential legal and policy frameworks	<ul style="list-style-type: none"> The existing policies are not effectively enacted. This includes the EMCA requirements on water purity and proper solid waste management. 	<ul style="list-style-type: none"> To effect the stated highlights in EMCA, both on water purity and on solid waste management. To create awareness on the importance of maintaining water purity and proper solid waste 	<ul style="list-style-type: none"> Ensure that all the practitioners deliver and follow the law effectively and to the latter. For instance the sewage service providers should regulate discharges into the sewer line as per the specifications. Proper handling, transportation and disposal of waste. Issuing of penalties to offenders of the 		✓	✓	National government, Taita Taveta County government, NGOs, CBOs and FBOs
						✓	

		management.	law. <ul style="list-style-type: none"> • Engaging technocrats and stakeholders • Give education and extension programs on the importance of water purity and proper solid waste management. 	✓	✓	✓	
	<ul style="list-style-type: none"> • The housing issue raised in the National Housing policy was not implemented. 	<ul style="list-style-type: none"> • To provide decent housing to rural areas residents. • To provide industrial facilities in the rural areas so as to offer employment. 	<ul style="list-style-type: none"> • Conducting regular follow-up activities on the housing projects to ensure that they are effected • Government and stakeholder involvement • Establishing single line funding at both national and county levels 	✓	✓	✓	National government, Taita Taveta County government, NGOs and CBOs

			<ul style="list-style-type: none"> • Lobbying and advocating for Parliament to enact a bill on rural neighborhood planning. • The County government of Taita Taveta should implement the policy and conduct follow up activities 			✓	
	<ul style="list-style-type: none"> • Lack of awareness on legal and policy frameworks on rural neighborhood planning 	<ul style="list-style-type: none"> • To create awareness on the legal and policy frameworks that guide rural neighborhood planning • To ensure that 	<ul style="list-style-type: none"> • Organizing seminars and workshops to enlighten people on the legal and policy frameworks available • Ensure that all developer have fulfilled the policy requirements before being issued with a 	✓	✓	✓	National government, Taita Taveta County government, Educational Institutions, NGOs and CBOs

		every developer enact the policy requirements	permit to develop. <ul style="list-style-type: none"> • Capacity building 	✓	✓		
To establish the housing tenure of the residential houses in Burandogo residential neighbourhood	<ul style="list-style-type: none"> • The housing tenure types that are in the area • Housing affordability 	<ul style="list-style-type: none"> • To provide ownership type of housing tenure to the residents • To provide affordable house payment rates to the residents 	<ul style="list-style-type: none"> • Construction of high-rise buildings then leasing them to the residents • Giving low cost mortgage rates to the residents so that they can be able to afford the houses and own them eventually. 			✓ ✓	National government, Taita Taveta County government, NGOs, CBOs, Donors and Investors

<p>To assess the conformity of the Burandogo residential neighbourhood to the Physical Planning requirements</p>	<ul style="list-style-type: none"> • Availability of enough residential houses and adequate carrying capacity • Availability of schools • Availability of a health facility • Unreliable water supply • Lack of a market and commercial area • Insecurity issues like robbery • Inefficient storm water drainage systems that lead to flooding in 	<ul style="list-style-type: none"> • To ensure that the residential houses can accommodate the ever growing population. • To ensure that the neighborhood is served with learning institutions • To provide a health facility to serve the area • To provide solutions to the water supply issues • To provide a 	<ul style="list-style-type: none"> • Introduce high-rise buildings in the area with standardized construction. • Construct nursery, primary and secondary schools in the area • Construct a health facility in the area and equip it with all the necessary requirements • Drill a borehole in the area and also provide a few wells so as to boost water production and availability. • Set aside an area and construct suitable structures and 	<p>✓</p>	<p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>National government, NGOs, CBOs, Taita Taveta county government, Donors, and Investors</p>
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	<p>the area</p> <ul style="list-style-type: none"> • Lack of efficient sanitation facilities • Lack of open spaces 	<p>commercial zone for the residents</p> <ul style="list-style-type: none"> • To create a safe environment for the residents • To provide efficient and effective storm water drainage facilities • To create awareness on the importance of having and using sanitation facilities like toilets • To create open 	<p>provide facilities for commercial purposes.</p> <ul style="list-style-type: none"> • Introduce a police post, provide regular security patrol checks, encourage the Nyumba Kumi system, and provide security street lighting in all streets. • Construct storm water drainage channels and a storm water collection point • Give education and extension programs on construction and maintain efficient sanitation facilities • Funding residents to construct efficient sanitation facilities 		<p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p>	
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		spaces and provide recreational facilities	<ul style="list-style-type: none"> • Set aside land that will be designated as area for recreation • Funding recreational projects to make it possible and easy to purchase recreational facilities 	✓			
To assess the prevailing environmental conditions in Burandogo residential neighbourhood	<ul style="list-style-type: none"> • Poor solid waste management • Lack of a sewer system • Inefficient access roads 	<ul style="list-style-type: none"> • To ensure proper handling, transportation and disposal of waste • To serve the neighborhood with a sewer system • To provide efficient and reliable access 	<ul style="list-style-type: none"> • Conduct public awareness campaigns on proper solid waste management and its importance • Provide solid waste management facilities • Government intervention in ensuring that the area is served with an efficient sewer system • Give education and 	✓	✓	✓	<p>National government, County government of Taita Taveta, NGOs and CBOs</p>

		roads	extension programs on the importance of a sewer system <ul style="list-style-type: none"> • Regular maintenance of the roads • Road expansion • Providing more road network 			✓ ✓ ✓	
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APENDIXES

QUESTIONNAIRE

SUSTAINABLE RESIDENTIAL NEIGHBOURHOOD PLANNING, A CASE STUDY OF BURANDOGO TAVETA CONSTITUENCY

**MASTER OF ENVIRONMENTAL PLANNING AND MANAGEMENT
DEPT OF ENVIRONMENTAL PLANNING & MANAGEMENT
KENYATTA UNIVERSITY**

HOUSEHOLD QUESTIONNAIRES

The information and data provided will be confidential and is intended for academic purposes only.

Name of the Interviewer _____

Date of interview _____

SECTION A – BIO DATA

A1 –Please indicate your age bracket.

- 1) 20-30 []
- 2) 30-40 []
- 3) 40 and above []

A2 –Please indicate your gender.

- 1) Male [] 2) Female []

A3 – Please indicate the number of years you have lived at Burandogo.

- 1) 1 – 5 []
- 2) 6 – 10 []
- 3) All your life []

A4- how many family members do you have in your house?

Father [] Mother [] Children []

Others []

SECTION B – ADEQUACY

B1 –Please indicate by ticking to what extent you agree with the following statements. Selected from Strongly Agree (1), Agree (2), Neutral (3), Disagree (4) and Strongly Disagree (5).

	QUESTION	1	2	3	4	5
B1(a)	There are enough residential houses for the Burandogo residents.					
B1(b)	The household sizes of Burandogo village are sufficient.					
B1(c)	Schools are available within the Burandogo neighborhood.					
B1(d)	Health facilities are available within the Burandogo neighborhood.					
B1(e)	The number of rooms per household are sufficient for the residents.					
B1(f)	Water supply is reliable.					
B1(g)	Power supply is reliable.					
B1(h)	Footpaths for circulation are well articulated.					
B1(i)	A market is available within the Burandogo neighborhood.					
B1(j)	Security at the neighborhood is adequate.					
B1(k)	Views from Burandogo are appealing.					
B1(l)	Views into Burandogo are appealing					
B1(m)	Storm water drainage system works efficiently					
B1(n)	There is sufficient recreation space.					

B2 (a)–List any specific areas from those mentioned above in B1 that need improvement.

B2 (b) – Elaborate on the nature of the problem stated in B2(a) above.

B2(c) –What recommendations do you think would assist in the improvement of the areas mentioned in B2(a) above?

B3 – Which of the following options for improvement of the Burandogo neighborhood would you support? (Tick to indicate your response)

- i. **Densification** – increase residential facilities.
- ii. **Redevelopment**–demolish all buildings and based on new designs and plans redevelop the Burandogo neighborhood.
- iii. **Rehabilitation** –retain current developments, but maintain them in their best possible condition.
- iv. **Upgrading**–retain the current developments, but include new projects and planning.
- v. **Nil intervention**–make no changes of any kind to Burandogo neighborhood.

B4 – What would you propose to be incorporated with regard to your preferred option in B3 above?

SECTION C – PREVAILING CONDITIONS

C1(a) – The disposal of solid waste at Burandogo is efficient.

1) Yes []

2) No []

C1 (b) – If ‘No’, why?

C2 (a) The sewer system is efficient.

1) Yes [] 2) No []

C2 (b) If ‘No’, what problem have you noted?

C3 – What recommendations would you make to solve the problem(s) stated in C2 (b) above?

C4 – In your opinion, is there adequate provision for storm water drainage at Burandogo?

1) Yes []

2) No []

C5 (a) – Do you think there is any form of pollution at Burandogo?

1) Yes []

2) No []

C5 (b) – If ‘Yes’, what is the cause of the pollution?

C6 – What is your opinion of the status of the access roads at Burandogo?

C7- What recommendations would you give with regard to the improvement of the access roads condition?

C8 – (a) Are there any communal and recreational grounds allocated for use by the people of Burandogo?

Yes []

No []

C8 – (b) If yes what is the distance to it and what is its status?

C9 (a) – Do you think there is need for an increase of recreational activities in Burandogo?

1) Yes []

2) No []

Interview schedule

SUSTAINABLE RESIDENTIAL NEIGHBOURHOOD PLANNING, A CASE STUDY OF BURANDOGO TAVETA CONSTITUENCY

Master of Environmental Planning and Management

Dept of Environmental Planning & Management

Kenyatta University

Interview Schedule – Ministry of planning

1. What are your duties and responsibilities
2. Kindly give a brief history of Burandogo village.
3. What are the current land uses in Burandogo village?
4. What maintenance and management activities do you carry out in Burandogo village?
5. What challenges do you encounter in management of Burandogo village?
6. What measures have been put in place in relation to the above challenges
7. What recommendations would give in relation to the above challenges?