

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Environmental Sciences

DIPLOMA THESIS ASSIGNMENT

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Landscape Planning

Thesis title

Assessing Informal Settlements Spread in Rwanda – a Case Study of Nzove Cell

Objectives of thesis

The aim is to investigate the causes of informal settlements in Rwanda, the response of authorities towards the problem and to suggest ways of controlling informal settlements.

Methodology

The study area will be described and analyzed by author's field survey (non-participant observation) and analysis of secondary data. Characteristics and opinions of people living in informal settlements in the study area will be then analyzed using a questionnaire survey. The data from the questionnaire will be analyzed using appropriate statistical methods. To understand how local government reflects the problem, local authorities will be interviewed using semi-structured interviews. Based on the findings from all these information sources, the author will identify key problems and challenges of informal settlements in the study area and suggest possible solutions.

The proposed extent of the thesis

30 – 50 pages

Keywords

Informal settlements, Urban sprawl, Rwanda, Local authorities, Spatial planning

Recommended information sources

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STUDENT'S DECLARATION

I, Alice Ncuti, hereby declare that except for references to other people's work which have been cited and acknowledged, this thesis is the result of my own effort and that it has neither in whole nor in part been presented elsewhere.

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SUPERVISOR'S DECLARATION

I hereby certify that preparation and presentation of this thesis were supervised in accordance with the guidelines binding the supervision of diploma thesis laid down by the Czech University of Life Sciences.

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Abstraktní

Městská centra Rwandy jsou pod rostoucím tlakem a hledají řešení pro ty, kteří hledají zaměstnání, zlepšují životní styl a přístup ke službám. Cílem tohoto výzkumu je posoudit šíření neformálního osídlení zejména v oblasti Nzove, sektoru Kanyinya, v okrese Nyarugenge.

Proto byly pro sběr primárních údajů použity dotazníkové šetření, pozorování v terénu a rozhovor; Přehled literatury byl proveden pro sběr sekundárních dat.

Výsledky ukazují, že dochází k výraznému nárůstu neformálního usazení v buňce Nzove. Podle průzkumu provedeného v buňce Nzove, faktory, které přitahují lidi k tomu, aby se usadili v buňce Nzove, zatímco je na vysokém svahu terénu, jsou levné pozemky ve srovnání s ostatními regiony města Kigali. Tam jsou také některé pracovní příležitosti v okolí Nzove buňky, včetně práce v pivovaru Skol, jízda na kole v Nyabugogo, prodej drobných výrobků v autoservisu Nyabugogo, a další příležitostné práce na "Giti cy 'inyoni a Nyabugogo", protože je snadné cestovat z Nzove do těchto oblastí.

Z průzkumu vyplynulo, že místní úřady mají malou senzibilizaci, aby se zabránilo šíření neformálního usazení; proto je doporučeno, aby místní úřady vnímaly a prosazovaly pravidla a zákony upravující stavby v městských oblastech; Místní orgány by měly informovat obyvatele, aby se vyhnuli usazování na velmi strmém terénu, protože hrozí nebezpečí sesuvů půdy; Místní úřady by měly přísně kontrolovat výstavbu nových domů v této oblasti prováděním improvizované návštěvy v této oblasti a likvidací jakékoli nové nepovolené stavby; Místní orgány by měly uvést do činnosti model neformální modernizace poskytovatelů služeb, který navrhuje úřad pro bydlení v Rwandě.

Abstract

Rwanda urban centres are under increasing pressure finding the solution to those seeking employment, improved lifestyles and access to services. The aim of this research is to assess the spread of informal settlement especially in Nzove cell, Kanyinya sector, in Nyarugenge district.

Therefore, the questionnaire survey, field observation and interview were used to collect primary data; literature review was done for secondary data collection.

Results show that there is a significant increase of informal settlement in Nzove cell. According to the survey carried out in Nzove cell, factors that pull people to settle in Nzove cell while it is on a high slope terrain are that there are cheap parcels compared to other regions of Kigali city. There are also some job opportunities in and around Nzove cell including working in the Skol brewery, cycling in Nyabugogo, selling small stuffs in Nyabugogo car station, and other casual works at “Giti cy’ inyoni and Nyabugogo” because it is easy to travel from Nzove to those areas.

The survey has revealed that there is little sensitization from local authorities to avoid the spread of informal settlement. The Local Authorities do not prevent informal settlements but also, they do not follow the provider model of informal settlement upgrading as suggested by the RHA.

Therefore, it is recommended for the local authorities to sensitize and enforce the rules and laws governing constructions in urban areas; Local authorities should put in action the provider model of informal settlements upgrading as proposed by the Rwanda Housing Authority.

Contents

Abstract	v
List of Abbreviations	viii
Acknowledgment	lix
Chapter One: Introduction	1
1.1. Research objectives	2
1.2. Research questions	3
1.3. Research Hypotheses.....	3
Chapter Two: Literature review.....	5
2.1. Meaning of Informal settlement.....	5
2.2. Types of informal settlements.....	5
2.2.1. Upgraded squatter settlement	6
2.2.2. Illegal subdivision	6
2.2.3. Settlement for vulnerable groups of refugees and internally-displaced persons	6
2.2.4. Substandard inner-city housing.....	6
2.2.5. Squatter settlements	7
2.3. Informal settlements in Africa	7
2.4. Informal settlement in developing countries	7
2.5. The characteristics of informal settlements.....	8
2.6. The causes of informal settlements development	9
2.7. Consequences of informal settlement development	10
2.8. Advantages of informal settlements	11
2.9. The government of Rwanda with regard to informal settlements.....	11
2.9.1. Development and Urban Planning Programs	14
2.9.2. Informal settlements upgrading	15
2.10. Infrastructure development in Kanyinya Sector.....	17
2.11. Land tenure security in informal settlements.....	18
Chapter Three: Study area description.....	20
3.1. Map of the Study area	21
3.2. Kanyinya sector Slope map	22
Chapter Four: Research Methodology	24
4.1. Data Collection and analysis methods	24
4.1.1. Library research	24
4.1.2. Primary data sources	24

4.2. Data analysis and interpretation	27
Chapter Five: Results	28
5.1. Socio demographic characteristics of respondents	28
5.1.1. The Gender of respondents.....	28
5.1.2. The age of respondents	28
5.1.3. The level of education	29
5.2. Time of establishment in Nzove cell.....	30
5.3. Why settling informally in Kanyinya Sector.	30
5.4. The quality of houses in Kanyinya sector	31
5.5. Attitude of authorities in face of informal settlements	32
Chapter Six: Discussions	34
This chapter discusses the results towards the main objective which is to assess the spread of informal settlements in Rwanda. This Part answers the research questions and tests the hypotheses.	34
6.1. Characteristics of respondents	34
6.2. Time of establishment in Nzove Cell.....	34
6.3. Why settling informally in Kanyinya Sector	35
6.4. The quality of houses in Kanyinya Sector	35
6.5 Attitude of authorities in face of informal settlements.....	36
6.7. Hypotheses verification	37
Chapter Seven: Conclusion and recommendations	38
7.1. Conclusion.....	38
7.2. Recommendations.....	39
References	40
ANNEXE I. SURVEY QUESTIONNAIRE	43
ANNEXE II. GUIDE FOR THE INTERVIEW	45

List of Abbreviations

CBD: Central Business District

DAC: Development Assistance Committee

EICV: *Enquête Intégrale sur les Conditions de Vie des ménages*

GoR: Government of Rwanda

MININFRA: Ministry of Infrastructure

NGOs: Non-Governmental Organizations

NISR: National Institute of Statistics of Rwanda

OECD: Organization for Economic Cooperation and Development

RPHC: Rwanda Population and Housing Census

SPSS: Statistical Package for Social Sciences

UNECE: United Nations Economic Commission for Europe

UN-Habitat: United Nations Human Settlement Programme

WASAC: Water and Sanitation Corporation

KCMP: Kigali Conceptual Master Plan

RHA: Rwanda Housing Authority

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Chapter One: Introduction

The informal settlements first appeared in 19th century London, when the burgeoning urban working classes moved into overcrowded and poorly serviced tenements, living close to the factories and industrial plants that employed them. The term referred to what was initially designated “a room of low repute”, but over time took on the generic definition, “a squalid and overcrowded urban area inhabited by very poor people” (UN-Habitat,2006).

The informal settlements continued to grow over the course of the last two centuries but their evolution was particularly swift in the latter half of the 20th century as the developing world became more urbanized. Today’s informal settlements are much larger and have many more residents than the informal settlements prevalent in 19th century Europe and North America. The informal settlement population of Rio de Janeiro, for example, is almost the same size as the total population of Helsinki. Mumbai’s more than 5 million informal settlements dwellers exceed the total population of Nairobi. Informal settlements dwellers now live primarily in the cities of Africa, Asia and Latin America, although a smaller number also live in cities of the developed world (UN-Habitat,2006).

Africa being host to the fastest rates of urban growth in the world, is also experiencing the problems of informal settlements. The continent is quickly becoming urban, with massive implications for African economies, societies, and politics. In contrast with much of the rest of the world, urbanization in Africa is driven not by economic growth, but, rather, is taking place amidst widespread economic stagnation and poverty, and, moreover, without conventional urban planning (Rosalind, 2012). The rapid growing urbanization and the inadequate urban planning in Africa are among the main causes of the informal settlement spread in African cities.

By the middle of the 21st century all regions of the world will be predominantly urban, the major contributing regions being Africa and Asia which still have the great proportion of their population living in rural areas. East Africa though presently among the least urbanized (24% in 2012) is experiencing very rapid rate of urbanization (around 4.0% per annum) (University of Nairobi,2012).

The report from the University of Nairobi in 2012 has shown that urbanization has many advantages to a developing country. However, the urban expansion experienced in East Africa is to large extent characterized by the growth of informal settlements accompanied by high levels of poverty and unemployment (University of Nairobi, 2012).

According to the same report, 65% of urban population in east African cities lives in informal settlements.

Rwanda, like other eastern African countries is also experience rapid urbanization and the development of informal settlement. Immigration has been directed to the cities regarded as attraction centers. The basic causes of the immigration are more job opportunities than in rural areas, high wages compared to rural areas, and availability of other facilities such as education, health, etc. in urban areas. Some of the factors that push people to migrate from rural areas in Rwanda are: famine and drought while the majority of rural population is dependent on subsistence agriculture; unemployment and poverty. The primary aim of the in-immigrants is having a guaranteed and permanent job and then having a shelter. However, because of the financial inefficiencies of the local authorities, the level and quality of the services (access to clean water, electricity, transport, education, health care) has been low. Especially the lack of convenient dwelling areas has led to construction of the informal settlements (Uzun and Cete, n.d.).

Kanyinya Sector my case study, has been gradually urbanized from 2005 and onward, to the point that now it is a noticeable informal settlement that is developing over a high risk zone. The area is facing problems that are common to informal settlement in developing world despite the existence of the master plan passed in 2007. The development of this informal settlement on a steep terrain is visible to anybody who crosses the area. It is not a hidden place that authorities can see when it has considerably developed. Moreover there are now technologies that can help to control the urbanization, and the city of Kigali has those technologies.

1.1. Research objectives

The main objective of this research is to assess the process of the development of informal settlement in Kanyinya. This would help to better understand how informal settlements are

being put in place in Kigali while legal tools and administrative measures are in place since 2007, even earlier to prevent such development.

In order to fulfill the main objective, the following will be the research specific objectives:

- Describe the present situation of informal settlement in Kanyinya sector (the extent of informal settlement, quality of houses and infrastructure).
- Investigate the causes of the spread of informal settlement.
- To identify different problems associated to living in informal settlements.
- To identify the benefits associated to living in informal settlements.
- Examine the attitude of the administration in face of such a haphazard development.
- Suggest ways of controlling or preventing the development of informal settlement especially in high risk zones.

1.2. Research questions

The current study will respond to the following questions:

- What is the quality of houses in Kanyinya sector?
- What are the drivers for the development of informal settlement in Nzove cell?
- Why do people settle informally in Kanyinya sector?
- What are the problems encountered by informal settlement dwellers in Kanyinya sector?
- What are the benefits of living in informal settlements?
- Is there the political will to avoid the spread of informal settlements?
- Do the authorities offer alternatives to people living in informal settlements?
- What are the techniques that are used by authorities to prevent/stop development of informal settlements?

1.3. Research Hypotheses

The research will study to verify or falsify the following hypotheses as being or not the reasons behind the informal settlements formation in Kanyinya Sector around the year 2005.

The research will also verify or falsify hypotheses about life in general in informal settlements. Those Hypotheses are as follow :

- Skol Brewery was an important reason that lead to the formation of informal settlement in Kanyinya Sector.
- People live in informal settlements of Kanyinya sector so that they can easily do their small jobs (luggage carrying,etc.) in Skol brewery and in the city center.
- There is no political will to stop people from settling in informal settlements.
- The quality of houses is poor in informal settlements due to the use of cheap non-permanent building materials.
- There are not enough public infrastructures in Kanyinya sector.
- The public infrastructures are not well distributed in informal settlements.
- Informal settlements dwellers of Kanyinya sector face challenges of natural hazards such as landslides and flooding due to high slopes.
- The most pressing problem of informal settlements residents is land security.
- Living in Kanyinya informal settlements facilitates the access to the city center and provides cheap accommodation.
- The authorities use the technique of public meetings and other severe techniques like houses demolition to discourage people from living in informal settlements.
- The authorities in Kanyinya sector do not follow the provider model of RHA's informal settlement upgrading.

Chapter Two: Literature review

This part refers to the related literature of different researchers on the spread of informal settlement. It focuses on the definitions and theories that have been published by different authors, reporters and NGOs that are related to the spread of informal settlement.

2.1. Meaning of Informal settlement

Informal settlements are areas where groups of housing units have been constructed on land that the occupants have no legal claim to, or occupy illegally; they are unplanned settlements and areas where housing is not in compliance with current planning and building regulations (Glossary of Environment Statistics, Studies in Methods, 1997).

Informal settlements are the spatial illustration of poverty in the cities. The dwellers in these kinds of settlements are those who could not find the economic opportunities within the cities. Cities are land of wishes to attract rural residents. But the promise of the land of wishes remains undelivered and the informal settlement appears as a way to alleviate the problems of the homeless, (Zouqui, n.d). This is because many people move from rural areas without having the capacity to live in formal settlement. So, in order to solve their problem of homelessness, they build low standard houses in informal settlements where they lack adequate basic infrastructures like water, sanitation, electricity, etc.

Informal settlements form and grow in many different parts of the world for many different reasons. Some of those reasons are rapid rural-urban migration, economic stagnation and depression, high unemployment rate, poverty, informal economy, poor planning, politics, natural disasters and social conflicts. Strategies or measures to reduce informal settlements in different countries include removal of informal settlements, relocation of informal settlements, slum upgrading, urban planning with city wide infrastructure development, and public housing projects.

2.2. Types of informal settlements

The United Nations Economic Commission for Europe UNECE (2009) has classified informal settlements into five (5) main types. These are: (i) upgraded squatter settlement, (ii)

illegal subdivision, (iii) settlement for vulnerable groups of refugees and internally-displaced persons, (iv) substandard inner-city housing, and (v) squatter settlements.

2.2.1. Upgraded squatter settlement

This type of settlement usually starts as a squatter settlement and evolves into established neighborhood. They often earn *de facto* legality. In some cases, governments provide some facilities and residences could evolve into viable rental and homeownership markets.

2.2.2. Illegal subdivision

This kind of informal settlement is usually built on unauthorized land, without planning and or building permit. Residents sometimes have titles to the land and the quality of settlement is not necessary poor. Such settlements are illegal because they violate land-use planning, may have low-facility standards that do not meet building safety standards. However, they are often tolerated and may become incorporated into master plans in the long run.

2.2.3. Settlement for vulnerable groups of refugees and internally-displaced persons

This is a form of settlement usually established with government's permission as a temporary response to a crisis. Such settlement is usually found in urban peripheries, pockets of marginal land, or close to refugee centers. The living conditions are poor, while displaced groups face significant obstacles which prevent their return home or from achieving local integration.

2.2.4. Substandard inner-city housing

This includes overcrowded, dilapidated housing without adequate facilities in the city centers or densely urbanized areas. The sites were originally developed and planned, but have gradually lost their attractiveness and quality over time because of systematic underinvestment. Security of tenure may not be a problem, but the safety and quality of housing warrant concern.

2.2.5. Squatter settlements

These are settlements in urban areas that are established by people who have illegally occupied an area of land and have built their homes in slums using self-help methods. They often result from rapid influxes of people to cities and urban areas. The quality of housing is the lowest among all the other types; slums often lack running water and good sanitation, in some cases residents face serious risks when the terrain is insecure. In addition, residents often face segregation and social exclusion.

2.3. Informal settlements in Africa

According to UN-Habitat (2015), 61.7% of urban population live in informal settlements; and by 2050, Africa's urban dwellers are projected to have increased from 400 million to 1.2 billion. Since 1990, 213 million informal settlement dwellers have been added to the global population. Over 90% of urban growth is occurring in the developing world and an estimated 70 million new residents are added to urban areas of developing countries each year. Over the next two decades, the urban population of the world's two poorest regions which are South Asia and Sub-Saharan Africa is expected to double, suggesting that the absolute numbers of informal settlement and slum dwellers in these regions will dramatically grow.

One of the most important factors that hinder development in Africa is rapid population growth. This, together with continuing poverty and lack of basic needs of acceptable life like food, clean water, shelter, basic health care, security of tenure imposes a great challenge for sustainable development. What is even more important, however, is the fact that most of the population growth in the world during the next 15 years will be urban growth, and the vast majority of it will take place in developing countries. The population growth rate in years 2000-2020 is estimated to be 1.3 % in developing regions. 2.4 % in Sub-Saharan Africa compared to only 0.1 % in developed regions (UN-Habitat, 2003).

2.4. Informal settlement in developing countries

Developing countries are where most of informal settlements of the world are located. This is caused by many poor people in those countries who cannot afford to build houses formally. Many researchers have tried to explain the causes of informal settlement development in developing countries. According to Zouqui (n.d), in the big cities of the developing countries, due to the shortage or lack of the land, poor and low paid people are forced to build their

humble houses in slanting foothills of the valleys and torrential fields or the lands beside the polluter and dangerous industries.

Informal settlement has been defined in various ways depending on the planning and legal framework of a country where it exists. It is characterized mostly by the low quality houses and the lack of, or inadequate infrastructure and social services. Informal Settlement has been perceived both as a problem and solution to housing needs in speedily growing cities of many developing countries (Srinivas, 2005, Todaro, 1994). It is a problem when looked at in the angle of different consequences faced by the dwellers but it is also a solution when looked at in the angle of providing shelter to the homeless population of developing countries.

In developing countries, the informal settlement appeared by economic policies of the developed countries under the title of the third world growth and development programs. Active industrial areas attracted the labor force from different regions of the country and the excess labor force settled in suburbs and inappropriate and deteriorated buildings. In many of Africa's cities and towns, less than 10% of the population lives in formal settlements. A few examples are illustrative. In Zambia, 74% of urban dwellers live in slums; in Nigeria, 80%; in Sudan, 85.7%; in Tanzania, 92.1%; in Madagascar 92.9%; and in Ethiopia, a staggering 99.4%. In Nairobi, Kenya, Kibera slum has more than half a million people living on 225 hectares (Stephen, 2002).

2.5. The characteristics of informal settlements

The most common characteristic of informal settlements is the houses built from non-permanent materials in an unstable and non-technical way. For example, the walls are built with normal building materials but the roofs are made of mat, tins and tree leaves.

The informal settlements always have high population and have higher population density compared to the other parts of the city. Informal settlements generally accommodate big families i.e. father, mother, children and their relatives who live under the same small roof.

Also, the informal settlements accommodate the low-income population that are unable to afford housing in the formal settlements in the city.

The poor housing structure and lack of improved sanitation and infrastructure facilities such as water pipes, electricity, cause the highest level of environment pollution in informal settlements (Taleshi M, 2009).

2.6. The causes of informal settlements development

Urbanisation and population growth, lack of resources, poverty, as well as the rural-urban migration due to insufficient infrastructures in rural areas are the main causes of informal settlements.

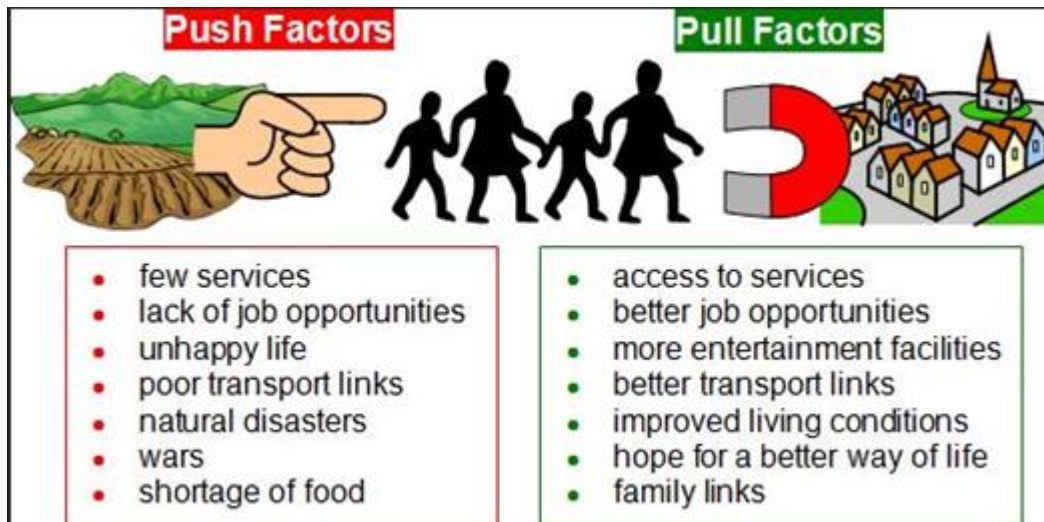
A rapid increase in the urban population and the limited capacity of the government to meet the high demand for building plots has led to mushrooming of the informal settlements (Scholz 2005). As the population continues to increase, the financial means of each family are insufficient for their daily needs. Somehow each member of the family needs to study or find a job to overcome the poverty. This might lead to rural urban migration when the country does not provide sufficient infrastructures for education, health, jobs etc. in rural areas as they are in the city center.

At the center of the informal settlements phenomenon lies the question of poverty. With an average annual per capita income of less than US\$200, the majority of the population in informal settlements can be categorized as extremely poor. To construct a house in a planned area one needs to have enough money to buy a plot and build a decent house.

On average a plot of 400 square metres is sold between US\$ 4,000 and 5,000 which is beyond reach for many residents. Therefore, to build a house is a life time project. People start constructing houses by using mud and thatch and these are gradually replaced over time by cement bricks and corrugated iron sheets. This process can take years; there are houses that were built in the 1960s and 1970s which can still be regarded as unfinished, even though families have been living in them for all these years.

The only place that allows this common practice to take place is in an unplanned area where neither drawing nor building permits are required. Thus, a vicious circle is created whereby poverty leads to informal settlements and informal settlements breed poverty.

The table below summarizes the push and pull factors of informal settlements:



(Chi Wang, 2014)

2.7. Consequences of informal settlement development

Informal settlements can affect landscapes through three main processes: transformation, degradation and fragmentation. The transformation of formerly pristine or agricultural lands into built-up areas is visually the most obvious consequence. Valuable habitats and agricultural soils are lost (Scalenghe & Marsan, 2009).

With the spread of built-up areas in the landscape, natural and semi natural areas are being partitioned into smaller patches and reduced in size. This fragmentation affects the resilience of ecosystems, because smaller habitats are more prone to isolation, lack of sufficient food resources and reduced variability in habitat structure (Fischer, Lindenmayer, & Manning, 2006). In addition, disturbances as a result of human activities (e.g. because of proximity to residential and commercial areas), the invasion of non-native species, traffic noise, and air and water pollution also negatively affect ecosystems. As a consequence, wildlife populations decline and are reduced in their genetic diversity (Trombulak & Frissell, 2000) , and are more easily driven to extinction (Burkey, 1989).

Problems associated with living conditions in urban informal areas include lack of reliable sanitation services, supply of clean water, reliable electricity, timely law enforcement and, vulnerability to natural and unnatural hazards like landslides and floods, unemployment and informal economy, violence, diseases and epidemics; and child malnutrition (Fernandez, 2011).

In summary, the challenges of living in informal settlements according to the UN Habitat report of 2016, include:

- The tenure security is low
- Dwellers in informal settlements are always threatened for eviction
- Insufficient access to basic services such as safe water and sanitation
- Informal settlements always face the challenge of overcrowding
- Low quality of house structure
- Insecurity and high crime rate
- Informal settlements are always prone to disasters
- No governance structures

2.8. Advantages of informal settlements

In most cases, informal settlements are looked at as having only bad impacts in the community and to the environment. However, there is a positive side of living in informal settlements.

The benefits of informal settlements include the fact that, they are close to the city centers which increases the job opportunities to the informal settlements dwellers and other opportunities not found in rural environments like easy access to education, health, etc... Also, the sense of community is stronger among informal settlements dwellers.

Another advantage is the ability to accommodate the poorer population which creates openings to new community to evolve.

Informal settlement is a building type that is popular because it suits the needs of the poor people in urban areas. It offers choice, it gives people what they can afford, it enables individual creativity and it is affordable. It is also simple to build and easy to use (Mills,2012).

2.9. The government of Rwanda with regard to informal settlements

Located in the Central Africa region, Rwanda is bordered by the Democratic Republic of the Congo, Burundi, Tanzania, and Uganda. It is one of the smallest countries on the continent at 10,169 square miles (26,338 sq km). Topographically, the country is mountainous and hilly, and is aptly nicknamed “the land of a thousand hills”. In the center of the country lies its

capital, Kigali. At 732.24 square kilometers and a population of approximately 1,135,430, the population is incredibly dense (Rwanda Housing Authority,2014). The topography coupled with this population density means that many urban areas are packed into very steep slopes. For governance purposes, the city is divided into three Districts: Kicukiro, Gasabo, and Nyarugenge. The Districts are further divided into 35 administrative sectors, which are then split into 161 cells (Rwanda Housing Authority,2014). For urban planning purposes, development plans are designed for each cell, which generally projects such as the construction of roads, installation of streetlights, or other infrastructure.

In 2013, the population density of Nyarugenge was recorded as 2,127 residents/km², whereas Gasabo was 1,237/km² and Kicukiro 1,918/km².

Topographically, Kigali poses many issues to urban housing. The landscape varies greatly, drastically changing from wetlands and marshes to steep, mountainous areas. All three districts also have high altitudes relative to the country's rural districts. According to multiple government documents, the high altitude and steep grades make much of the land in Kigali uninhabitable as it stands. Certain grades can allegedly lead to soil erosion, mudslides, and heavy runoff. According the Rwanda Housing Authority, 6.8 percent of Kicukiro District, 37.5 percent of Gasabo District, and 37 percent of Nyarugenge District is uninhabitable. The implication is the justification of eradicating any houses on land designated "uninhabitable." These same areas, however, are allocated to development projects that involve housing, making the designations seem malleable to the needs of government projects (RHA,2014).

Like many developing countries, Rwanda has been experiencing and still experiences rapid urbanization that is one of the driving forces for the increase of informal settlements on the fringe of urban centers, especially on the fringe of Kigali city. Estimates from satellite imagery suggest that the city's built-up area expanded from about 4 sq. km in 1979 to about 93 sq. km in 2012. Development expanded in all directions, but mainly eastward towards the airport and south towards the Nyabarongo River (OZ Architecture, 2007).

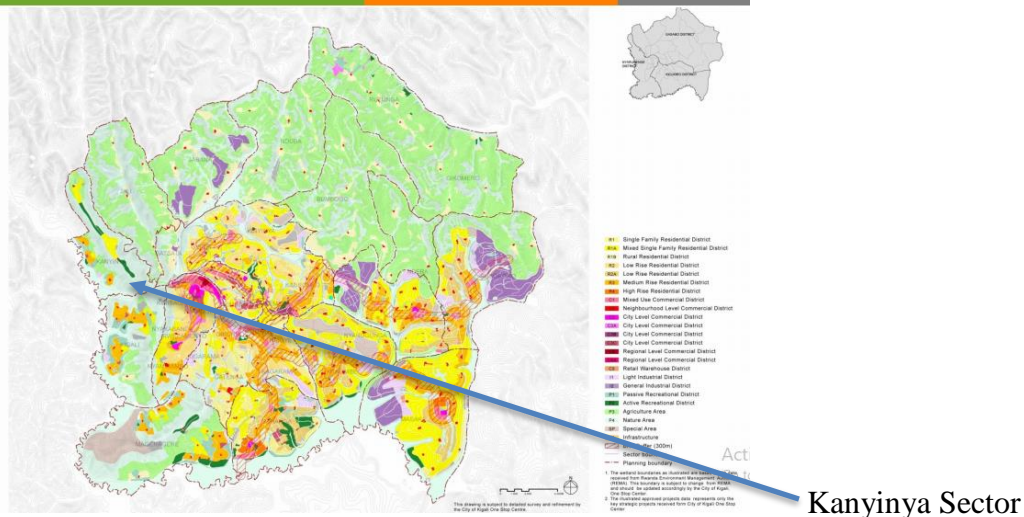
Most of the new urban dwellers in the city of Kigali come from rural areas. They are attracted by basic infrastructures found in the city, living conditions in the city and the security in the city. There are also various rural push factors like rural poverty due to land pressure and natural disasters which causes rural migrants to migrate to the city. According to the results of the EICV3 survey, between 2006 and 2011, 58 percent of migration has been towards

Kigali, a trend virtually unchanged since the EICV2, which records that 57.6 percent of internal migration was to Kigali.

The results of these increases in population are the formation of informal settlements and the spread of the already existing ones. Since its independence in 1962, Rwanda has been using the master plan approach as a tool for urban planning without providing the necessary land for housing (OZ Architecture, 2007). This approach has resulted in development of informal settlements due to multiple reasons, including lack of adequate implementation of urban planning standards, rapid urban growth, frequent reform of urban boundaries, lack of proper urban land policies (Nsamba-Gayiyi, 2006).

Statistics show that in Rwanda, 340, 877 households live in informal settlements and 57.9% of those informal settlements are located in urban areas including Kigali city. Kigali city is made up of 286, 664 households of which 188, 246 (65.7%) live in informal settlements (NISR, 2012).

ZONING PLAN



However, the zoning plan above provides enough space for different types of residential areas in which the public infrastructures are well and evenly distributed.

These residential areas are accessible to everyone including the migrants from rural areas but some of migrants from rural areas install themselves in informal settlements because they cannot afford the areas planned for residential in the city.

2.9.1. Development and Urban Planning Programs

To understand the context of the development plans underway, it is helpful to consider the individual development plans and governmental and privately funded institutions at play. As outlined above, the division of Rwanda into cells is specifically useful for generating development plans. Along with larger goals for districts (District Development Plans), individual cell development plans are used often.

Individual cell development plans must adhere to the larger District Development Plans, which in turn must adhere to the zoning plans of the district. All development plans are technically supposed to follow the KCMP, but as the plan is conceptual, there are no specific laws or regulations ensuring this. Zoning plans are used to regulate land usage, including the intensity of development and the desired setting and height of buildings in a given area. The purpose, then, of a zoning plan is to clearly explain what can and cannot be developed on a given plot. The District Zoning plan for Nyarugenge includes a Zoning map and set of zoning regulations. Whereas the map identifies zoning districts within the planning area and the desired intensity and building height for the area, the regulations tabulate land use into categories of permitted, conditional, and prohibited uses. Certain developments are designated as compatible with the zoning plans (permitted use), semi-compatible with the zoning plans, which may require certain conditions to be fulfilled (conditional use), or non-compatible with the zoning plans as a result of safety or other concerns (prohibited use).

Approximately 66 percent of Kigali's population resides in informal housing (Ansoms and Rostagno,2012). In comparison to informal settlements throughout East Africa, living conditions on average in Kigali's informal settlements are considered to be much better (Huggins 2010). For example, many informal neighborhoods in Nairobi are characterized by open sewers, an average density of over 1,000 persons per hectare, and high crime rates. Informal settlements in Kigali have virtually no open sewers, an average density of 190 persons per hectare, and reported low crime rates. In an intensive study of informal settlements in Kigali, Huggins reports that a major opinion-survey demonstrated that between 83% and 90% of residents in informal settlements were satisfied with their living conditions and would not want to move. In contrast to the relatively positive living conditions, one major concern regarding informal settlements is a lack of land security. Land security is the personal belief that there is little to no chance of being randomly, forcibly removed from your home (Bizimana,2012). The lack of land security, then, is the constant fear of forced removal.

In Kigali, the lack of land security is multiplied for tenants in informal settlements, who are allotted no protection in the legal framework. A study conducted by the Rwanda Housing Authority found that approximately 85 percent of the residents in informal settlements do not have land security (Rwanda Housing Authority,2014). Aside from a general feeling of discomfort, a lack of tenure security severely hinders residents' attempts to improve shelter conditions or plan for long-term housing (Bizimana,2012). Additionally, it often allows for the manipulation of land and services (Bizimana,2012). This issue is very rarely discussed in government documents or development plans. When land security is addressed, it is not projected as a risk of life in informal settlements. While the main risks addressed in such documents are mostly related to water access, electricity, drainage, and transportation, the most pressing concern of residents as demonstrated in recent qualitative research (Huggins 2010; Bizimana 2012) is land security. This shows a major discrepancy in the perception of risk in informal settlements between policy-makers and residents; the risk factors addressed in “improving the livelihood” of residents in development projects do not aim to increase land security, but aim to improve physical conditions. Addressing these risks is a short-term solution to the housing crisis. A long-term solution would be taking measures to increase access to land security.

2.9.2. Informal settlements upgrading

According to the Rwanda Housing Authority, informal settlement upgrading includes improving access to basic physical and social infrastructure, economic opportunities, tenure rights, and information and institutions while actively involving “slum communities” during the planning, implementation, monitoring, and management process. Specific upgrading mechanisms are dependent upon the categorization of each informal settlement. Categories are based upon the “level of missing components” in a given area, including: road accessibility, improved sanitation, sufficient living conditions, surface/storm water drainage, and durability of housing (Rwanda Housing Authority 2014). Depending on these components, settlements are categorized by the rubric below:

- Category 1A: very critical, high slope areas. Structures in this area are built on slopes higher than 40 degrees are prone to soil erosion, have no storm water drainage, and limited road accessibility. Immediate relocation is suggested.

- Category 1B: very critical, wetlands. These areas are prone to shift during heavy rains, have poor sanitation, and lack of sufficient living conditions. Immediate relocation is suggested.
- Category 2: missing most components. Residents are in immediate or at high risk of danger as a result of the lack of most components and little access to emergency relief. RHA states that most informal settlements in Kigali are category 2. Immediate relocation is suggested.
- Category 3: mainly missing access roads and durable housing. This category requires certain upgrades, but does not require immediate relocation.
- Category 4: mainly missing access roads. This category requires certain upgrades, but does not require immediate relocation.
- Category 5: mainly missing durable housing. This category requires certain upgrades, but does not require immediate relocation.
- Category 6: average condition in all attributes. This category requires certain upgrades, but does not require immediate relocation.

Additional sub-categories include “high risk slope informal settlements (IS),” “flood risk IS,” “worst IS,” “poor IS,” and, “moderate IS.”

Specific approaches to informal settlement upgrading fall into the broader categories of provider or support model (RHA,2014). The provider model dictates the provision of infrastructure and new housing for informal settlement residents, whereas the support model dictates the provision of basic infrastructure and the assumption that residents are able to build new housing for themselves (RHA,2014). The following are upgrading strategies within each model:

Provider Model strategies:

- Green field: an undeveloped area is provided with basic plots and housing where informal settlement residents are relocated to.
- Roll-over approach: current housing in an area is demolished; new housing and infrastructure is developed in its place.
- Infill development: Redeveloping an “underutilized” space to create new housing.
- Public social housing: government-funded housing is provided.

Support Model strategies

- In situ upgrading: upgrading infrastructure and service availabilities, rather than housing, with the least amount of expropriation possible.
- Core housing: provision of the minimum structure of a house that still needs some construction by residents in a new location.
- Site and services: residents are given a plot and basic infrastructure in a new location.
- Incremental housing: incremental loans are distributed to residents for the gradual construction of a house in a new location. Though the RHA report extensively discusses the support model, there are no current development plans in place that implement any of the strategies. The strategy used most frequently in upgrading projects is roll-over.

2.10. Infrastructure development in Kanyinya Sector

In 1996, the government of Rwanda passed the national human settlement policy. It came to be known as the Imidugudu concept. The rationale was to focus on group settlement and in so doing, solve the problem of land scarcity and environment management at the same time. In urban areas there was no master plans or land use plans to guide development. Although the government of Rwanda has nowadays been trying to address these issues, infrastructure and service provision is still wanting. Some of the issues include: lack of adequate water, electricity supply and sanitation systems, inadequate garbage collection methods, poor drainage, poor roads, inadequate public transport network and insufficient housing supply (REMA,2009).

The level of public infrastructure in Kanyinya sector is low as there are only 2 primary schools in a whole 24.2Km² sector. There is no hospital or any medical facility at all (Rwanda Population Census,2012). The only paved road in the sector is the one that connects Kigali City to the Northern Province. Otherwise, across the sector only small and not paved roads can be seen.

Looking at the sanitation and source of water, Kanyinya sector has the lowest percentage of households that use improved source of water compared to other sectors of Nyarugenge district as only 58.1% of private households use improved source of water according to the report of the 2012 population and housing census by NISR (NISR, 2012). The same source

reports that 41.1% of private households in Kanyinya sector use improved source of water and 0.8% of private households in Kanyinya sector use unstated sources of water.

2.11. Land tenure security in informal settlements

The land tenure security refers to the degree of confidence held by people that they will not be arbitrarily deprived of the land rights enjoyed and/or of the economic benefits deriving from the land. Security of land tenure exist when individuals perceive that they have the right to a piece of land on a continuous basis, free from imposition or interference by outside sources, as well as the ability to reap the benefits of labour and capital invested in such land, either in use or upon transfer to another holder. However, in Kigali City, the land remains the exclusive property of the State. The right to use, develop and occupy the land is granted by the government under the permit to occupy regime. The state retains the eminent ownership of the land and is entitled to take it back if leaseholders of plots of land for housing in urban or suburban areas cannot develop the land within 5 years, according to construction standards set out by public authorities (Durand- Lasserre, 2007).

Due to rapid urbanization in Kigali City, the official land delivery channels have been unable to avail developable land at a rate matching the population growth. As a result, most people occupy public land without land ownership. As Kigali City urbanized, informal settlements which used to be tolerated was no longer acceptable (Ilberg, 2008). The government tried to stop the informal settlements and slum areas development and get rid of existing ones by relocation and expropriation, linked to enforcement of building regulations in line with the implementation Kigali Conceptual Master Plan. The new urban planning policies are no longer accepting the use of low-cost construction materials such as mud bricks and wood (Kalimba and de Langen, 2007). Therefore, relocating informal settlement dwellers is being experienced for availing space for urban redevelopment. Based on 2005 Organic Land Law, prompt, adequate, and effective compensation must be provided in case of expropriation for public interest. Government can only expropriate for a public purpose, on a non-discrimination basis, and in accordance with due process of law (MINTERE, 2007). However, informal settlements dwellers claim that they are not given fair-compensation and most of the times they do not agree with the authorities about the eviction or relocation process. This mostly results in forced expropriation. For example, the expropriation of

Ubumwe cell dwellers (one of the Nyarugege district's cells where Kanyinya sector is also located), which happened in the year 2007.

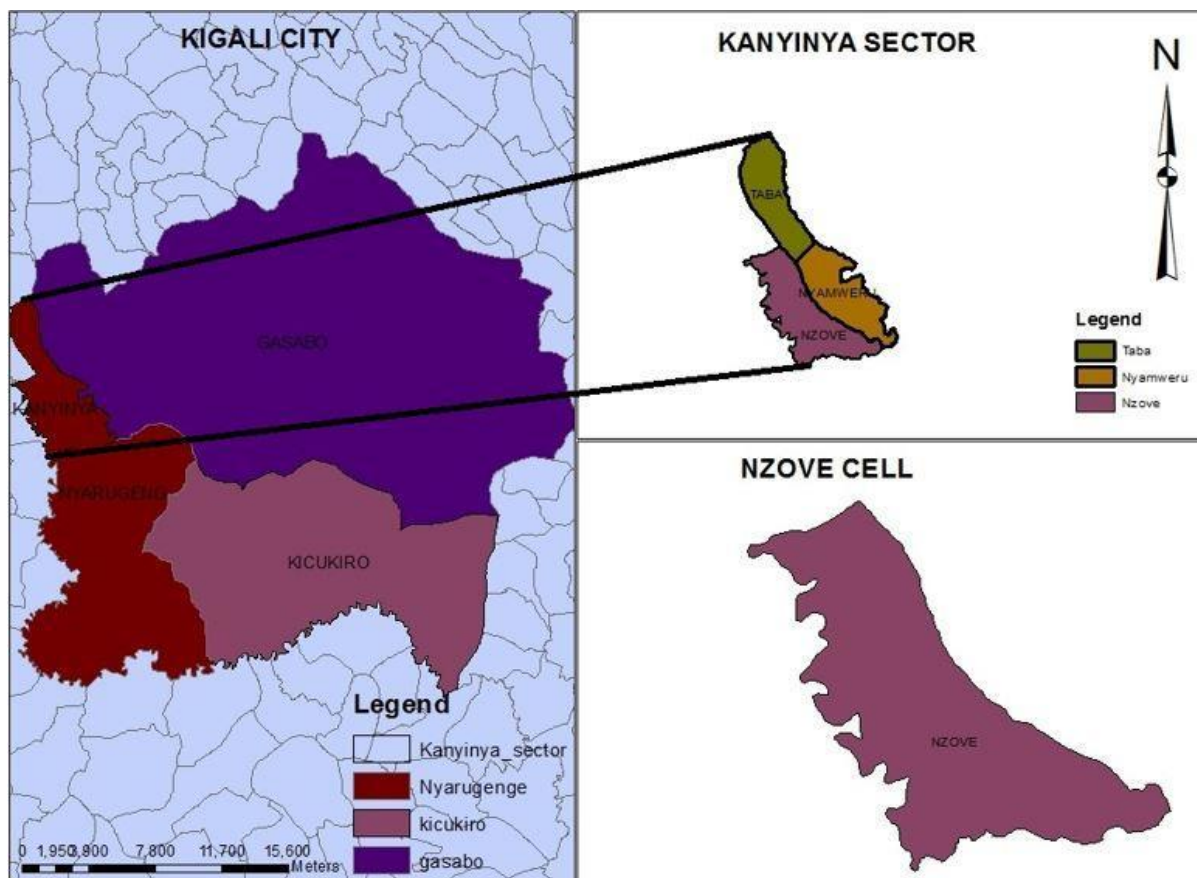
Occupants in informal settlements do not usually have any real rights such as a property title or a lease. In many cases, other documents such as administrative permits, deeds of sale, receipts, invoices, ration cards, may be accepted as evidence of quasi-ownership, but with a lower value than real rights or leaseholds. This tenure status is worse for residents in informal settlements especially during compensation while expropriation is taking place.

Chapter Three: Study area description

Kanyinya sector is located in Nyarugenge district which is the most densely populated district of the city of Kigali as revealed by the 2012 population census (NISR, 2012). Kanyinya sector is made of three cells and those are Taba, Nyamweru and Nzove cells. It is surrounded by three districts and those are Gasabo, Rulindo and Kamonyi districts.

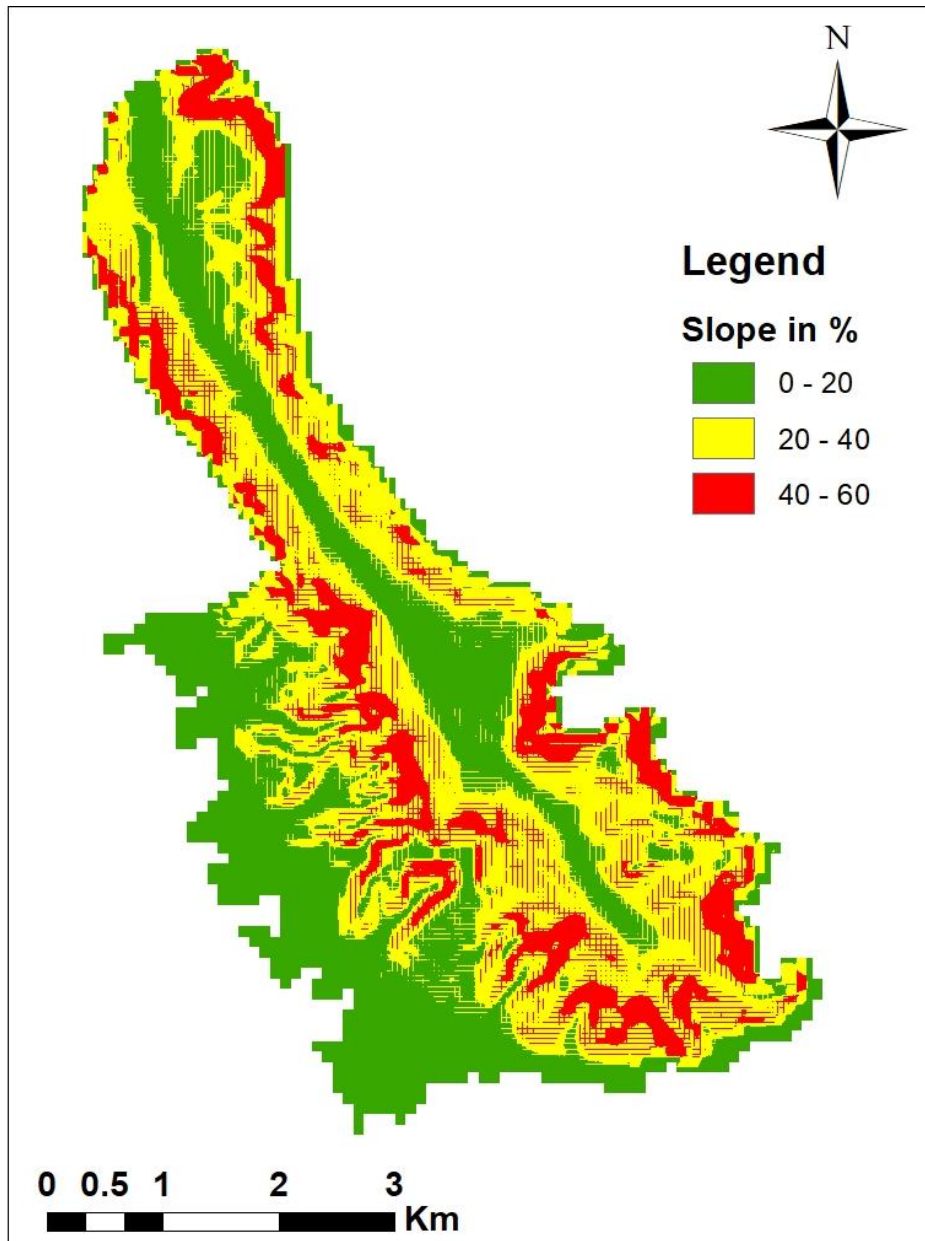
Kanyinya Sector is the northernmost sector of the district. It is very well connected with the Kigali CBD areas with a paved road. The national highway which connects Kigali to the Northern Province passes through this district and runs north-south and crosses through Kanyinya sector. The national road which connects Kigali to the southern province runs along the south of the district. It is surrounded by Kigali Sector to the south. Kanyinya is largely unoccupied, except for the housing settlements and small public facilities along the national highway on the ridge and the industrial developments and water treatment facilities in the south along Avenue de Nyabugogo. Farming and fishing occurs on a small scale along the wetlands in the west. The Sector has a highly undulating topography, with only 15% of the total land area being developable and most of the land being in areas of steep unbuildable slopes or covered by forest, vegetation or wetlands. A long ridge runs north-south through the centre of the Sector. The areas of the sector to the west, along wetlands as well as along the ridge are relatively gentler. The rest of the sector occurs mainly in the form of steep slopes in the east and west (Kigali city sub-areas planning, 2010).

3.1. Map of the Study area



According to the fourth population and housing census (referred 2012 national census), Kanyinya sector is inhabited by 21,859 inhabitants that are 7.7% of Nyarugenge district inhabitants. Among them 10,777 are males and 11,082 are females. Youth (between 14 and 35 years old) represent the largest portion of the population with 43.5% and only 3.2% are people aged 60 years and above. The population density of Kanyinya is 904 inhabitants/km². The same source indicates that in 2012 Kanyinya sector was settled at 99.7% by Rwandans and the rest are foreigners. It also revealed that Kanyinya sector has the highest percentage of people with disabilities compared to other sectors of Nyarugenge district as 1 057 persons living in Kanyinya sector that means 5.8% of Kanyinya sector dwellers who are 5 years old and above have disabilities. The fourth population and housing census showed that in Kanyinya sector, there are 5,760 private households with 3.8 as mean size of private households (NISR, 2012).

3.2. Kanyinya sector Slope map



(Source: Author, 2019)

The KCMP stipulates a slope gradient cut-off value of 20%, beyond which no buildings are allowed to be constructed (Kigali City sub-areas planning, 2010). According to the map above, Kanyinya sector is mostly composed of high slope value terrains and human settlements are not appropriate to those kinds of slopes. That is why informal settlement in Kanyinya sector should be avoided to prevent the risks of natural hazards such as landslides and floods.

As of characteristics of housing in Kanyinya sector, the NISR in its fourth population and housing census of 2012 has shown that 3.1% of private households in Kanyinya sector are in clustered rural settlements, 51.2% are in dispersed settlements, 0.2% are in planned urban settlements, 45.2% are in spontaneous housing or informal settlements, 0.2% are in other types of housing and 0.2% are not stated. So as we can see there is a big number of households in Kanyinya sector that are in informal settlements as almost a half of all private households are in informal settlements.

Looking at the sanitation and source of water, Kanyinya sector has a the lowest percentage of households that use improved source of water compared to other sectors of Nyarugenge district as only 58.1% of private households use improved source of water according to the report of the 2012 population and housing census by NISR (NISR, 2012). The same source reports that 41.1% of private households in Kanyinya sector use improved source of water and 0.8% of private households in Kanyinya sector use unstated sources of water.

Chapter Four: Research Methodology

4.1. Data Collection and analysis methods

In conducting this research, the data were gathered from both primary and secondary data sources.

4.1.1. Library research

The secondary data sources were found from different published materials such as textbooks from libraries, document from internet like those ones are peering reviewed. This research was mainly based on data from journals, thesis, published report of central governments and statistical abstract, census report and other reports published by different ministries of government.

4.1.2. Primary data sources

Primary data were obtained through a field observation and a survey with heads of households living in Nzove cell.

4.1.2.1. Field observation

The observation carried out in the study area in September 2018, has helped to understand the situation of the informal settlement in the study area as it was one of the specific objectives of the study. Pictures were taken to visualize the position and structure of informal settlements in Kanyinya Sector.

Pictures of settlements in Kanyinya Sector (Pictures by Author)



4.1.2.2. Field survey

The goal of the survey questionnaire was to find out answers to the research questions.

A sample of people to be interviewed was determined out of the total population in the study area.

A. Survey questionnaire

This is a very commonly used method of collecting primary data. Here information was collected through a set of questions that were useful for getting precise information from the respondents. The survey questionnaire (Annex I) was made of different sections that helped to understand the socio-demographic characteristics of respondents, time of establishment in

Kanyinya, reason for settling in Kanyinya as well as housing development and quality in Kanyinya Sector. So, the questions related to these sections helped to understand the concept of informal settlement in Kanyinya sector. Face to face completion method was applied to administer the questionnaire to the 99 households of Kanyinya Sector. The completion of each questionnaire took roughly between 15minutes and 20minutes.

B. Sample size determination

To determine the sample size, I took into consideration the level of precision, the level of confidence or risk, and the degree of variability in the attributes being measured; which are the criteria for sample size calculation as according to Miaoulis and Michener, 1976.

The following formula was used to calculate the sample size:

$$n = \frac{no}{1 + \frac{no}{N}}$$

$$\text{Where } no = \frac{t^2 \times p(1-p)}{d^2}$$

n = the sample size

N = the universe, that means total number of households in the study area

t = the value of standard normal distribution for a confidence level of 95% which is equal to 1.96 \approx 2

p = probability of complementary event (p=0.5)

d = margin of error which is equal to 10% or 0.10, for a confidence level of 95%.

no = is calculated from the probability of two complementary events p and q,

$$\text{So, } no = \frac{2^2 \times 0.5(1-0.5)}{0.10^2} = 100$$

So, knowing the total total number of households in the study area, it is then possible to calculate the sample size as follow as;

n=sample size

N=12556

$$no=100 \quad n = \frac{100}{1 + \frac{100}{12556}}$$

Therefore n= 99.20 So, 99 Households were involved in field survey in the Study area.

C. Sampling technique applied

Cluster sampling was used. The reason of choosing this sampling method is to divide the small area in small zones basing on where informal settlements are concentrated in the study area. In that framework, the study area was divided into two clusters where informal settlement is concentrated. Those clusters include the area on the steep slope just over the Skol brewery and WASAC and the area just near the bridge connecting Kigali to Musanze district where Nzove cell starts.

4.2. Data analysis and interpretation

The data collected from the field were first cross-checked and edited to ensure that there would be no mistakes in the responses and the information given would be relevant. The data were then coded and fed into the computer. The Statistical Product for Service Solutions (SPSS 16) was used to process and analyze the data from questionnaires. From this, percentages and graphs showing the occurrence of events were drawn which helped in the visualization of the results.

Data from questionnaire was put in SPSS 16 and diagrams were drawn to visualise the results.

	ID	age	Gender	Education	Settlingtime	Reason	constructiontime	constructionperiod	constructmaterial	preventiontoconstruct
1	Tuginama Noel	5	1	4		2	1	3	1	1
2	Dusabimana Esperance	2	2	5		3	1	2	1	1
3	Uwiringiyimana Pierre	3	1	2		3	4	3	1	2
4	Nziragira Samuel	5	1	2		4	2	2	1	3
5	Nsabimana Basil	5	1	1		5	5	3	1	2
6	Niragire Samuel	3	1	3		3	2	3	1	2
7	Habinshuti Vincent	4	1	1		4	1	2	1	3
8	Urayenzeza Jean Bosco	5	1	2		3	4	2	1	2
9	Maniraguha Dieudonne	2	1	2		2	4	2	1	2
10	Mbarushimana Emmanuel	4	1	2		3	2	2	1	3
11	Ndikubwimana Laurent	3	1	2		3	4	1	1	3
12	Uwitonze d'amour	4	1	2		3	4	2	1	3
13	Mukamazimpaka Annonciata	5	2	1		5	5	2	1	2
14	Dukuzimana Bonaventure	3	1	2		5	3	1	1	2
15	Mugabarigira Jean Bosco	5	1	1		5	4	2	1	2
16	Mujawamariya Anne Marie	2	2	1		3	3	1	1	2
17	Nzabamwita Sylvestre	3	1	1		5	5	2	1	2
18	Nyirabageni Renia	3	2	2		3	4	1	1	3
19	Siwemfite Felicien	3	1	2		2	4	3	1	3
20	Munganyinka Beatha	5	2	1		5	5	3	1	3
21	Rubayiza Vedaste	3	1	3		2	2	2	1	2
22	Byiringiro Dieudonne	3	1	2		2	3	2	1	2
23	Mbonimpa Emmanuel	4	1	3		3	2	2	1	2
24	Nsanzimana Jean de Dieu	3	1	3		3	3	2	1	2

Chapter Five: Results

5.1. Socio demographic characteristics of respondents

Although the study was not geared towards the description of the personal characteristics of respondents, it is important to highlight some of the variables that have been found to be commonly associated with dwellers of informal settlements and which have been found to influence the spread of informal settlement. The socio demographic variables covered in this study are gender, age, and the level of education.

5.1.1. The Gender of respondents

Out of 99 respondents, males constituted 64.6 percent while 35.4 percent were females as shown in the table below. This distribution is not because the study area is settled by a big number of males, but because many of the females were not willing to respond to the survey questions.

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	64	64.6	64.6	64.6
Female	35	35.4	35.4	100.0
Total	99	100.0	100.0	

5.1.2. The age of respondents

Age is an important variable that must be taken into consideration when dealing with dwellers of informal settlement. The age of respondents ranges from people under 25years old to people over 55years old. The age of respondents was categorized into ten years intervals in order to know the particular age group that contains the majority of respondents. This is especially important because a study by the UN-Habitat (1987) found out that the majority of people living in informal settlements are young adults (45.4%) who are in their active working age.

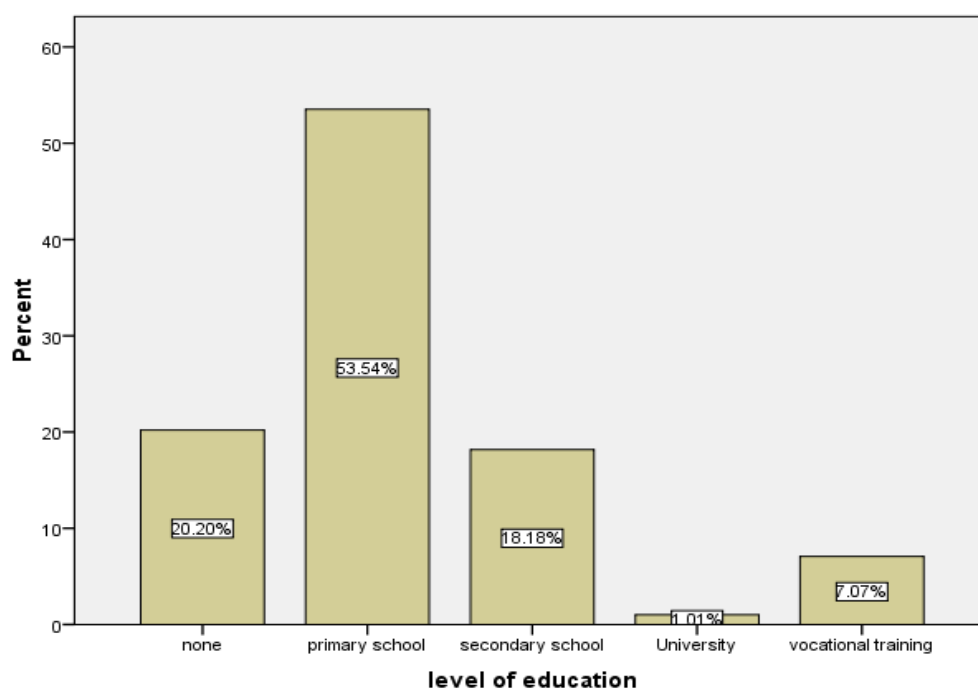
Age group	Frequency	Percent	Valid Percent	Cumulative Percent
<25years	4	4.0	4.0	4.0

25-34years	37	37.4	37.4	41.4
35-44years	37	37.4	37.4	78.8
45-54years	12	12.1	12.1	90.9
>54years	9	9.1	9.1	100.0
Total	99	100.0	100.0	

The distribution of respondents according to age shows that the respondents within 25-34 and 35-44 years brackets constituted 37.4%, followed by those within 45-54 years (12.1%). In general, the age distribution of respondents showed that most of the respondents were between 25 and 44 years old.

5.1.3. The level of education

Out of 99 respondents, 20.2% are illiterate, 53.5% have attained primary school, 18.2% have attained secondary school, and only 1% has attained university while 7.1% have done vocational trainings.



5.2. Time of establishment in Nzove cell.

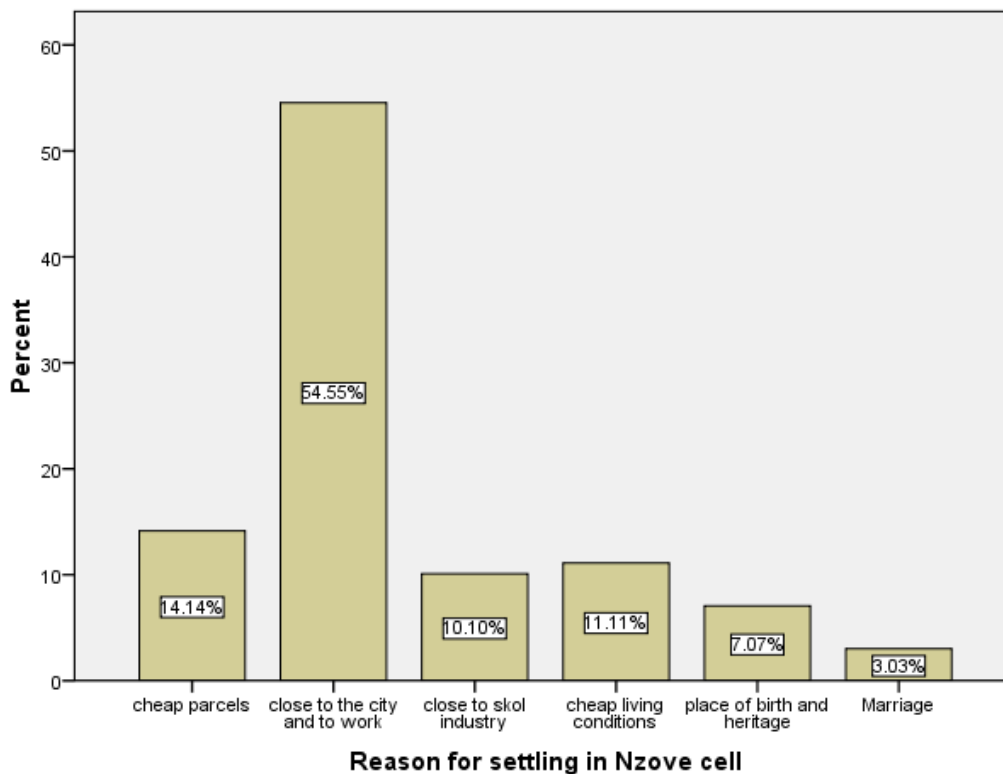
The time when respondents have been living in the study area is important in order to know the time when the majority of respondents came to settle in Nzove cell. The survey shows that 38.4% of respondents lived in Nzove cell for between 2 and 5 years. This was confirmed by the Executive secretary of Nzove cell who said during the interview that informal settlement in Nzove cell arose from 2013 when Kanyinya sector was put to Kigali city administratively. 32.3% of respondents have lived in Nzove cell for between 5 and 10 years, 17.2% of the respondents have lived in Nzove cell for below 2 years, only 4% of the respondents have lived in Nzove cell for between 10 and 15 years while 8.1% of the respondents have lived in Nzove cell for more than 15 years. The high proportion of households who settled in the area between 2 and 5 years means that most of the households are not well established. They are still people who are starting their life in urban areas. This can have impact on living conditions in general (housing, employment, access to services, etc.).

Time of settlement in the area	Frequency	Percent	Valid Percent	Cumulative Percent
<2years	17	17.2	17.2	17.2
2-5years	38	38.4	38.4	55.6
5-10years	32	32.3	32.3	87.9
10-15years	4	4.0	4.0	91.9
>15years	8	8.1	8.1	100.0
Total	99	100.0	100.0	

5.3. Why settling informally in Kanyinya Sector.

According to the survey, 54.5% of 99 respondents have chosen to settle in Nzove cell because the area is close to the city and to their working places(to mention some jobs: SKOL

industries and luggage carrying in the Nyabugogo main bus station); 14.1% have chosen to settle in Nzove cell because parcels were very cheap there; 11% have chosen to settle in Nzove cell because living conditions were cheap compared to other places in Kigali city; and 10.1% of the respondents have chosen to settle in Nzove cell because of employment opportunities they found in the SKOL industry. It also shows that 7.1% of respondents live in Nzove cell because it is their place of birth and it is their heritage; while only 3% of respondents live in Nzove cell because they got married to people living there. The Executive Secretary during the interview, stated that the most pulling factor to Kanyinya sector settlements is the position of the area near the main bus station (Nyabugogo) and the employment opportunities in the station and the Skol industries.



5.4. The quality of houses in Kanyinya sector

Construction materials are important components in the determination of housing quality in informal settlements. The questionnaire survey carried out in Nzove cell revealed that the majority of houses in this cell (57.6%) are constructed with sundried bricks; 37.4% of houses

are constructed with trees and mud; while only 5.1% of houses are constructed with burnt bricks.



According to the survey, 39.4% of the houses in Nzove cell were constructed between 1 and 12 months. 26.3% are completed in less than 1 month, 14.1% are completed in more than 1 year.

5.5. Attitude of authorities in face of informal settlements

It is also one of the objectives of this study to examine the attitude of the authorities in face of the spread of informal settlement. During the survey, 38.4% of respondents said that they have not been forbidden by authorities to construct informally in Nzove cell, 38.4% said that they were forbidden and houses were demolished by authorities; 20.2% of respondents said that they were obliged to pay fines because they had constructed without permission from authorities, and only 3% of respondents said that authorities forbid them to construct informally through public meetings, yet they still built without permission.

Basing on results from the survey, we can say that there is the sensitization from authorities to avoid the development of informal settlements in Nzove cell because only 3% of respondents said that their authorities talked about it in meetings; and the survey did not count those who actually moved from Nzove cell as a result of public meetings carried out in the area. 38.4% of respondents said that when they build informally, their houses are destroyed by authorities but houses are still being built there on steep slopes of Nzove cell because some people pay fines in order to finish their unauthorized houses. So rules, regulations and laws governing constructions in urban areas are not enforced in Nzove cell because when there is informal construction, they just pay 50000rwf (roughly 62.00 euros) of fines to the executive secretary of Kanyinya sector or to the sector's engineer and finish their construction on unsuitable terrain in Nzove cell.

Chapter Six: Discussions

This chapter discusses the results towards the main objective which is to assess the spread of informal settlements in Rwanda. This Part answers the research questions and tests the hypotheses.

6.1. Characteristics of respondents

Out of all the respondents, males constituted 64.6 percent while 35.4 percent were females. This is mainly because many of the females were not willing to respond to the questions during the survey. The study found out that most people living in Kanyinya sector are between 25 and 44 years old; which is exactly in line with the report of UN-Habitat (1987) stating that the majority of people living in informal settlements are young adults (45.4%) who are in their active working age.

According to Nawagamuwa and Viking (2003), the low level of education and high illiteracy rate are some of the basic characteristics of informal settlements dwellers. The fourth Population and Housing Census in Rwanda conducted in August 2012 shows that 68% of Rwandan population aged 15 years and above were literate while 18.7% were illiterate (RPHC,2012). The survey carried out in Kanyinya sector shows that 20.2% of the respondents are illiterate which is higher than the national illiteracy rate. 53,5% have attained the primary school.

6.2. Time of establishment in Nzove Cell

It is important to know for how long the respondents have been living in Kanyinya sector in order to know when exactly most people came to settle in this area. The survey shows that 38.4 percent of the respondents lived in Nzove for between 2 and five years. This was confirmed by the Executive Secretary of Nzove cell who said during the interview that informal settlement in Nzove cell arose from 2013 when Kanyinya sector was put to Kigali City administratively.

6.3. Why settling informally in Kanyinya Sector

Observation shows that a big part of Kanyinya sector is on very steep slope and other parts of the sector are in wetlands of Nyabarongo and Nyabugogo rivers. Despite the steep slopes there is a significant development of informal settlement. There are small houses and constructed with non-permanent building materials. Along Nyabarongo river, is constructed WASAC water treatment plant, Skol brewery; and in front of Skol brewery there is Nzove sector health center. The level of infrastructure development is not high as there is no paved road in the area, no schools, etc.

One of the objectives of this study is to investigate the reason why people choose to live in informal settlements of Kanyinya sector. So respondents were asked why they chose to settle informally in Nzove cell in order to know the most pulling factor in the area.

The fact that most respondents said that they chose to live in Kanyinya Sector because the area is close to the City center and to their working places, proves the hypothesis that Skol brewery was an important reason that lead to the formation of informal settlements in Kanyinya Sector. The second biggest percentage of the respondents have decided to live in Kanyinya Sector because the land was cheap compared to other parts of Nyarugenge District. The development of informal settlements in urban areas is mostly seen on cheap land because it is the poor people who migrate from rural areas with high thirst of living in urban areas but with no capacity to build or afford formal housing in the city. The people who relocate from rural to urban areas in search for better economic opportunities such as employment often choose to settle in informal areas because of the high cost of living in formal and serviced parts of the Cities (Tsenkova,2010). The survey suggests that people were attracted in Nzove cell mostly because they expected to get job there, cheap living conditions and cheap land. These pull factors are also observed in other urban informal settlements of developing countries. The low price paid for land is quite understandable since the area was not yet targeted by many land seekers due likely to the fact that the area is too steep.

6.4. The quality of houses in Kanyinya Sector

Most houses in the study area are made of these sun-dried mud bricks considered to be non-permanent due to the way they are made are the fact that they are not given enough time to dry. This is coherent with the time spent to complete these houses. The fact that more houses in Nzove cell are constructed in less than 1 month reveals the precariousness of houses in that

sector and their small size (smaller than $300m^2$ which is the standard size of residential plot in Kigali city according to The Ministry of Infrastructure). This means that houses in Nzove cell do not respect the standards of houses that should be built in Kigali city. According to MININFRA in its Rwanda Building Code of 2005, the sun-dried mud bricks are not allowed in Kigali. Only cement blocks, burnt bricks, burnt clay bricks and precast concrete blocks are allowed. All the floors must be built with impervious units consisting of slabs, bricks, natural stones or cement and the thickness must not be lesser than 40mm. The characteristics of houses in Kanyinya sector are in harmony to Van Gelder's characteristics of housing in informal settlements. According to Van Gelder, one of the characteristics of housing in urban informal settlements in developing countries is their precariousness. Such houses are substandard and not always well finished. Some of them are not plastered (Van Gelder,2013).

6.5 Attitude of authorities in face of informal settlements

The development of informal settlement in Kanyinya sector is somehow strange since it is near the center of Kigali City. Such development should not have happened because since 2008, the GoR has passed the National Urban Housing Policy for Rwanda which aimed at improving the conditions of living of the urban population through controlled and harmonized development of urban areas. This policy stipulated several strategies including the Sensitization, training, and strengthening of institutional capacities of the various players concerned and involved in urban planning and management, particularly local communities (MININFRA,2008) to control unauthorized constructions in urban areas.

The RHA also has specific approaches to informal settlement upgrading which fall into the broader categories of provider or support model. The provider model dictates the provision of infrastructure and new housing for informal settlement residents, whereas the support model dictates the provision of basic infrastructure and the assumption that residents are able to build new housing for themselves (RHA,2014). However, none of these models has been used yet in Nzove cell as the Executive secretary said in the interview that they only try to sensitize through public meetings and anyone who builds informally is fined. He also says that they practice harsh approach of houses demolition without providing new housing for the dwellers.

6.7. Hypotheses verification

Objectives	Hypotheses	Results	True / False
Describe the present situation of informal settlements in Kanyinya Sector	The quality of houses is poor in informal settlements due to the use of cheap non-permanent building materials.	Based on the building materials used, the quality of houses in Kanyinya sector is poor as according to the survey, (57.6%) are constructed with sun dried bricks; 37.4% of houses are constructed with trees and mud; while only 5.1% of houses are constructed with burnt bricks.	TRUE
	There are not enough public infrastructures in Kanyinya sector	The level of public infrastructure in Kanyinya sector is low as there are only 2 primary schools in a whole 24.2 sq Km sector and there is no Hospital at all in that sector.	TRUE
		No paved roads across the sector.	
		Kanyinya sector has the lowest percentage of households that use improved sources of water compared to other sectors in Nyarugenge District.	
Investigate the causes of the spread of informal settlements in Kanyinya sector	Skol Brewery was an important reason that lead to the formation of informal settlement in Kanyinya sector	54.5% of respondents have chosen to settle in Nzove cell because the area is close to the city and to their working places. (Skol industries and luggage carrying in Nyabugogo main bus station)	TRUE
To identify the different problems associated to living in informal settlements	Informal settlements dwellers of Kanyinya Sector face challenges of Natural hazards such as landslides and flooding due to high slopes.	Even though Kanyinya is at Risk because a big part of the sector is on very steep slope and other parts are in wetlands of Nyabarongo and Nyabugogo rivers, there is no recorded landslide or flooding so far in the area.	FALSE
To identify the benefits associated to living in informal settlements	Living in Kanyinya informal settlements facilitates the access to the city center and provides cheap accommodation	14 percent of the respondents mentioned cheap parcels compared to other part of the district as their main interest to living in Kanyinya sector	TRUE
	People live in informal settlements of Kanyinya sector so that they can easily do their small jobs (luggage carrying,etc.) in skol brewery and in the city center.	54.5% of respondents have chosen to settle in Nzove cell because the area is close to the city and to their working places. (Skol industries and luggage carrying in Nyabugogo main bus station)	TRUE
Examine the attitude of administration in face of such haphazard development	There is no political will to stop people from settling in informal settlements.	The political will is there. Authorities try to tell people about the consequences that might rise from living in informal settlements through meetings.	FALSE
	The authorities use the technique of public meetings and other severe techniques like houses demolition to discourage people from living in informal settlements		
Suggest ways of controlling or preventing the development of informal settlements	The authorities in Kanyinya Sector do not follow the provider model of RHA's informal settlement upgrading	Kanyinya sector dwellers have not yet been provided a better place with needed infrastructures where they can move to and leave informal settlements	TRUE

Chapter Seven: Conclusion and recommendations

7.1. Conclusion

Nzove is one of Kigali city cells which are included in urban areas. Like other urban areas, Nzove cell experienced a rapid growth of population which caused the proliferation of informal settlements. This chapter draws general conclusion from the critical literature review and findings from the questionnaire survey carried in Nzove cell; it draws also the suggested recommendations.

The survey carried out in Nzove cell in September 2018 helped to understand the factors that have influenced the residents to live in informal settlements of Nzove cell. The survey revealed that the majority of Nzove cell dwellers moved to this place from rural areas because it is close to the city center and to their working places. This is an important information that can help in avoiding the new formation of informal settlement in the city by providing employment opportunities even in the rural areas to reduce rural urban migration.

Based on the literature, living in urban informal settlements results in problems including the vulnerability to natural hazards like landslides, floods. So far, no hazard of such kind has been recorded yet in Nzove cell, but the area is at risk and classified as a high-risk area by the KCMP because it is mostly steeper than 20% which is the maximum slope gradient allowed to be built on.

Field observation helped to truly understand how Nzove informal settlements are. It gave a clear image of all those small houses built on steep slopes with non-permanent building materials.

An interview was carried with the Executive secretary of Nzove cell to know what the authorities think of the informal settlements rising in Nzove cell. This revealed the technics that the authorities are using to stop the informal settlement. Those technics include the houses demolition and fining those who build without permission. However, more research needs to be done on whether these technics are really helping to reduce informal settlements

and how to make them more effective because despite those measures, informal settlements still grow in Nzove cell.

More sensitization needs to be done in Nzove cell to make the dwellers aware of informal settlements consequences because based on the survey carried out the study area, 39% of respondents have never heard of informal settlements prevention in Nzove cell.

7.2. Recommendations

Based on findings and conclusion of the study the following recommendations are made:

1. To avoid the development of informal settlement in Nzove cell, local authorities should extensively sensitize the residents about rules, regulations and laws governing constructions, and then enforce them otherwise the area will become like other informal settlement in Kigali
2. Local authorities should inform the residents to avoid settling on very steep terrain since there is risk of landslides
3. Local authorities should strictly control the construction of new houses in the area by making improvised visit in the area and demolish any new unauthorized construction.
4. Local authorities should sensitize the poor people who go in urban areas without the capacity to afford formal housing in the city to remain in rural areas where they can afford to construct.
5. Local authorities should put in action the “provider model” proposed by the Rwanda Housing Authority by providing alternative place where the dwellers of Kanyinya sector can relocate.
6. The Government of Rwanda should work on improving infrastructure development and employment opportunities in rural areas in order to reduce rural-urban migration which leads to informal settlement formation in Kigali.

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ANNEXE I. SURVEY QUESTIONNAIRE

I. IDENTIFICATION OF RESPONDENTS

1. Living area

Name

District

Sector

Cell

2. Age of the respondent.....

3. Sex

a) Male

b) female

4. Level of education

None

Primary

Secondary

University

Others.....

.....

.....

II. TIME OF ESTABLISHMENT IN KANYINYA

5. How long have you been in Kanyinya sector?

Less than 2years

2-5 years

5-10 years

10-15 years

More than 15 years

III. HOUSING DEVELOPMENT AND QUALITY

6. How long did it take you to build your house?

One day

One week

Two weeks

Others

7. Were all houses in this sector erected at the same time?

.....
.....
.....

8. With what is your house built?

.....
.....
.....
.....

9. a. Were you prevented by the authorities to build houses? Yes

No

b. if yes, how did they prevent you to build houses?

ANNEXE II. GUIDE FOR THE INTERVIEW

QUESTIONS RESERVED FOR THE LOCAL AUTHORITIES

1. When did the informal settlement start to emerge?

.....
.....
.....

2. What are factors that attract people here?

.....
.....
.....

3. Did you prevent them to build? (in meeting, destroying houses, etc)

.....
.....
.....

4. Who is in charge of monitoring construction at local level?

.....
.....
.....

THANK YOU