

# Impact of Urban Growth on Land Management in Rwanda

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**Abstract:** Urban growth can have positive effects if well managed or negative impacts in instances of uncontrolled urban expansion. Often, land management regulations are employed in urban areas to ensure that land is efficiently planned and managed to achieve sustainable land management (SLM). This study examines the changing landscape of Kabuga town in Gasabo district, City of Kigali due to land use conversion. The employed data were obtained from 107 respondents and interviews with the local authorities in charge of urban planning. The results reveal that 6% of the population lived in Kabuga before 1994 and the remaining 94% are migrants; 55% came within the period 1994-2005, 29% came during 2006-2012 and 10% came after 2012 implying that residents are predominantly migrants. The analysis finds evidence of diminishing agricultural and forested land and vacant lands in favour of residential area and commercial activities due to influx of people. Major impacts of this changing environment in Kabuga town are overcrowding, pollution and lose of green spaces. For sustainable urban growth, alternative ways and means of controlling the growth of Kabuga town in order to overcome issues related to land use conversion are proposed.

**Keywords:** Kabuga, land management, Urban, Rwanda

## 1.

### Introduction

Urban growth as a result of rapid urbanisation is one of the realities of our times. As the world's population is getting more urbanized as people migrate from the rural to the cities. Towns are perceived to offer improved living conditions, job opportunities and other opportunities including infrastructure such as good roads, schools, hospitals, markets, better communication network and electricity. Urban growth in Africa both in spatial and economic terms is mainly due to natural population increase and migration (Bankunda 2003). The high rates of population growth that have been experienced in the last three decades are unprecedented in human history (United Nations – UN 2001). With 53% of the world's population living in urban areas as

at 2012 and 2.5 billion people in developing countries lived in urban areas in 2009 studies of urbanization and land change in developing world setting are essential (Thomas 2008, WHO 2013). In developing countries, 90% of population growth are taking place in cities and towns with more than half the African and Asian population living in urban areas by 2020 (International Food Policy Research Institute – IFPRI 2002). Urbanization has undergone remarkable acceleration and the major effect is changes in land use (Drakakis 2000).

Land use is the human use of land which involves the management and modification of natural environments (United Nations Environmental Programme - UNEP 2011). According to Ceccarelli (1997), Land use is subject to competitive pressure as urban

areas are increasing and land speculation abound. Whether, low-income groups such as small and marginal farmers or residents of informal settlements can benefit from these changes in land use, or end-up losing access to land, depends largely on land rights system. As land is a finite resource, land use planning is required for the methodical use of land resources and development of possible alternative systems of land use and management. It is most important to the selection and application of the most appropriate kinds of use. It commences with land evaluation but carries it several steps further, into selection of the best land use option, preparation of the plan and its achievement (Anthony 1997, Devis et al. 2004 cited in Kaiser et al. 2006, Galster et al. 2000, Torrens et al. 2000).

According to Kaiser et al. (2006), land use systems are dynamic and there are three main influencing factors from the planner's perspective: 1) Developer responses to real estate market demand, 2) Policy objectives, Government plans and decision, capital expenditures and regulation aimed at managing community development, as well as the people's values and interest directed at maintaining and improving quality of life, 3) Land use plans and regulations making up a main set of influences on land use. Government policies and master plans for town development influence the local community on how they can use their lands. For example, real estate developers' influence is to change the land use such as actually converting the use of the land from forest to residential built-up. The local government's influence is to manage the land use by giving permission based on the master plan and zoning regulations. But the influence of the different community interest groups is a stabilizing one, such that advocating for and/or against certain land uses in the community. As the world is becoming more urbanized, issues such as

ineffective governance, weak institutions in charge of land use planning and control of housing development ensue in most developing countries UN-HABITAT (2012). To better understand the cultural and economic development aspects of cities, models and methods currently used will need to adapt to include new emerging cities as there is a knowledge gap (Hanson 2003, Greene and Pick 2006, Akinyemi and Rugege 2012). Such knowledge is particularly needed in developing world urban settings where urbanisation is rapid and sometimes uncontrolled.

This study seeks to contribute to the knowledge gap on emerging small towns in Africa. According to the UNFPA (United Nations Population Fund) report of 2007, much of urban growth is taking place in small towns. It states that: Although megacities have received most of the attention, conditions in smaller urban areas call for even greater consideration. Contrary to general belief, the bulk of urban population growth is likely to be in smaller cities and towns, whose capabilities for planning and implementation can be exceedingly weak. Yet the worldwide process of decentralizing governmental powers is heaping greater responsibility on them. As the population of smaller cities increases, their thin managerial and planning capacities come under mounting stress. New ways will have to be found to equip them to plan ahead for expansion, to use their resources sustainably and to deliver essential services." Based on the foregoing, this study examines the changing landscape of Kabuga town due to land use conversion and it seeks to decipher the drivers of this change.

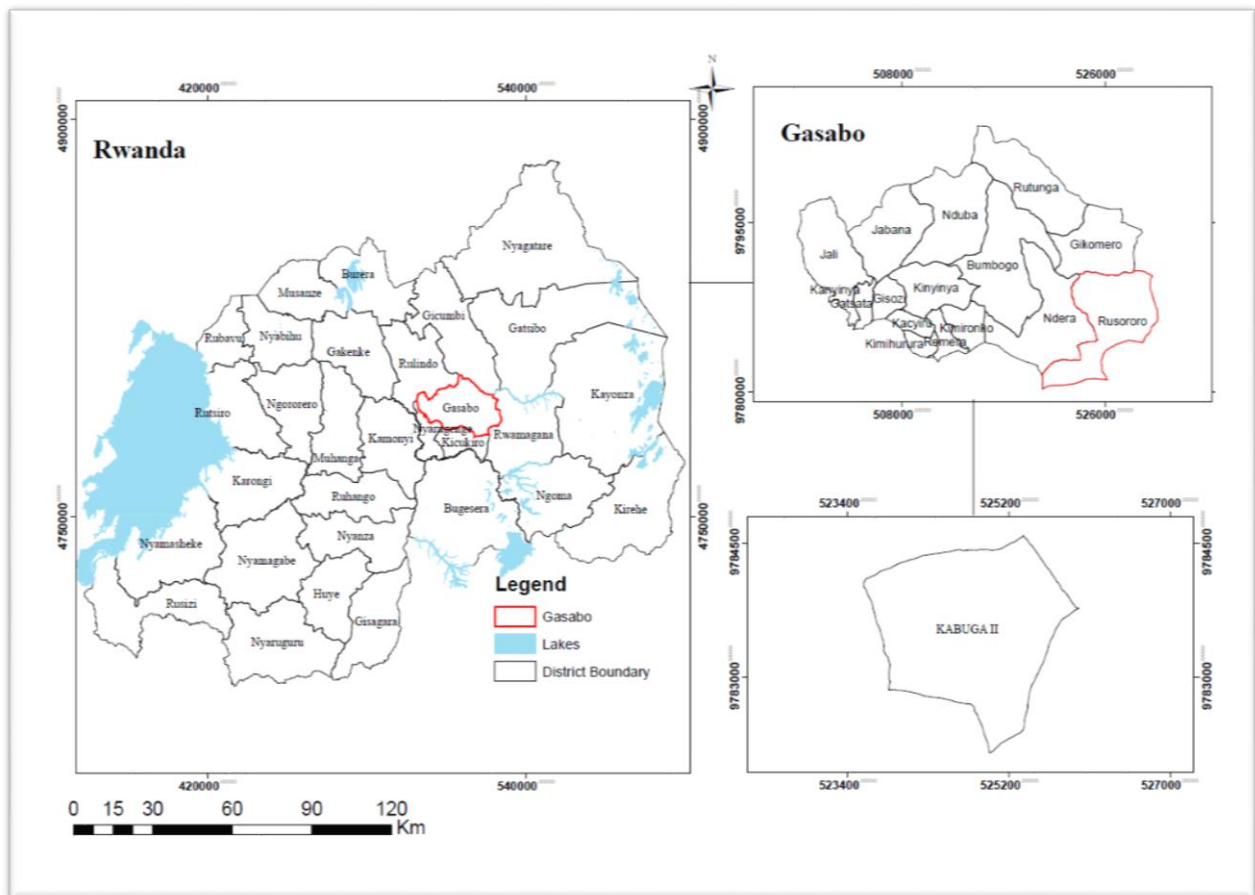
## 2. Methods and Materials

### 2.1 Description of study area

This study focuses on Kabuga town, which is one of the emerging Rwandan towns

located on the outskirts of Kigali (the capital city). Kabuga town has part of it located in Rusororo sector in Gasabo district and Masaka sector in Kicukiro district. Rusororo and Masaka sectors comprise of 8 and 6 cells respectively. However, the town is composed of only 4 cells, namely: Kabuga I, Kabuga II and Nyagahinga (Gasabo district) whereas Gako cell is located in Kicukiro district (see Figure 2). Gasabo and Kicukiro are two of the 30 districts in Rwanda and they are

among the 3 districts comprising the Kigali city council. With a combined surface area of 595.8529 km<sup>2</sup> and a total population of 850,568 inhabitants, the average density is 1578 persons per km<sup>2</sup>. At the national level, population density has increased from 321 persons per km<sup>2</sup> in 2002 to 416 persons per km<sup>2</sup> in 2012. These districts have the highest number of inhabitants than most districts in Rwanda and have both urban and rural areas.



**Figure 1:** Location of study areas in Kabuga town within the context of Rwanda

## 2.2

### Data collection and analysis

To capture different aspects of land use conversion, 3 indicators and 5 variables were used (Table 1). Primary data was obtained from the local community

(households), government officials and land agents within Kabuga town using a combination of questionnaire survey, interview and field observation. Moreover, the authors' familiarity with the town is not in question. A total of 107 respondents were

surveyed. Maps, satellite and aerial images were also employed to analyse the extent of land use conversion over time.

Table 1: Key indicators and corresponding variables

Indicators	Variables
Migration	- migrants' time of arrival - pull factors of migration
Land use	- initial use of land, and - current use of land
Means of land acquisition	- Ways of acquiring land

### 3. Results and Discussion

#### 3.1 Means of Land acquisition

In Kabuga town, it was found that people acquired land in different ways. These are

through inheritance, squatting, purchase and rent (see Figure 2).

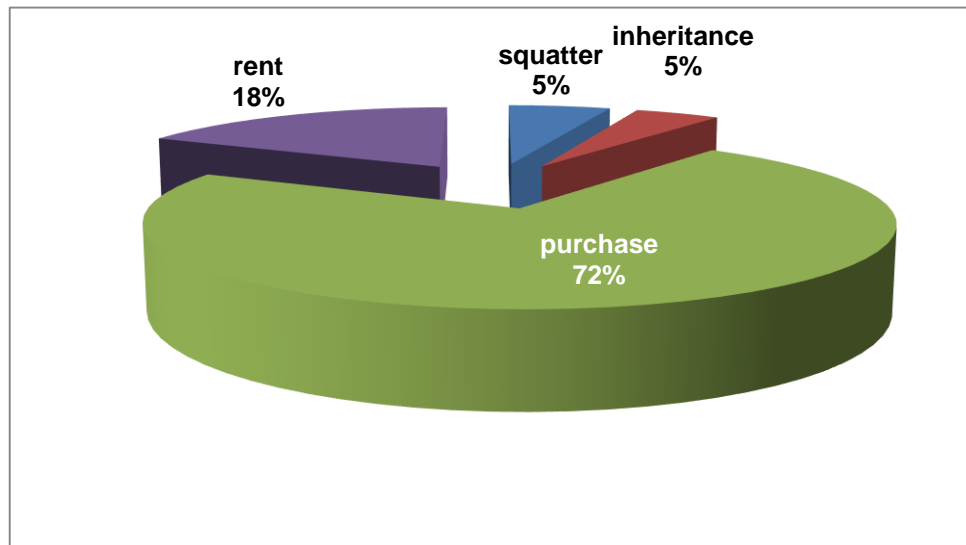


Figure 2: Means of acquiring land

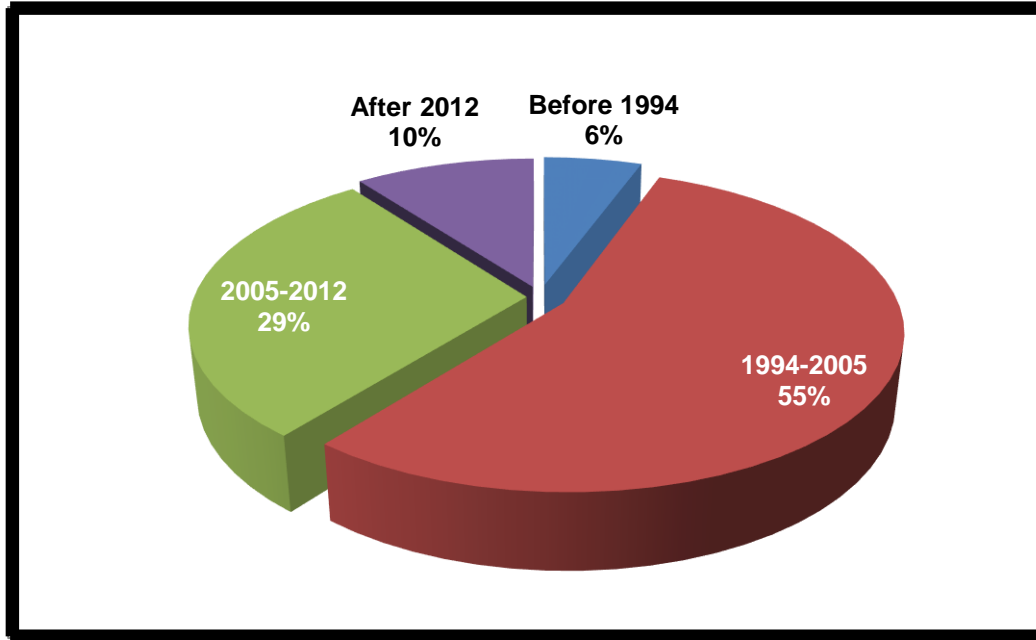
#### 3.2 Migration

The time of people's arrival in Kabuga town was sought as Kabuga town is a newly developed town (see Figure 3). Most people migrated to Kabuga town between 1994

and 2005. The Figure shows that 94% of respondents settled in this town after 1994, 55% settled between 1994 and 2005, 29% have been settled there between 2005 and 2012 and 10% after 2012, before 1994 inhabitants were few (6%). This means that

Kabuga town has been receiving many people from different areas within and outside Rwanda such as Changuu, Rwamagana and Gitarama after 1994. This goes to explain why majority of respondents acquired their land by rent or

by purchase as most are migrants. Majority of people that settled before 1994 have acquired their lands by inheritance of were squatters that returned earlier. The different reasons given for migrating to the town are shown in Table 3.



**Figure 3: Time of migrant arrival**

**Table 2: The pull factors attracting migrants to Kabuga town**

Reason	Surveyed household	Percentage (%)
Residential area	30	28
Job opportunity	38	36
Nearness to work place	26	26
Affordable cost of land	11	10
Total	107	100

Results reveal majority of the respondents (36%) were attracted to Kabuga town because of the existence of job opportunities. Other factors were residential (28%), nearness to work place (26%) and affordable cost of land (10%).

By using the orthophoto (scale is 1:25cm), Digital Globe image of Kabuga town in 2008 from Google Earth and the Master plan for Kabuga Town, different land uses were digitized such as built-up, agriculture, forest, vacant land and wetland (see Figure 4 and Table 4).

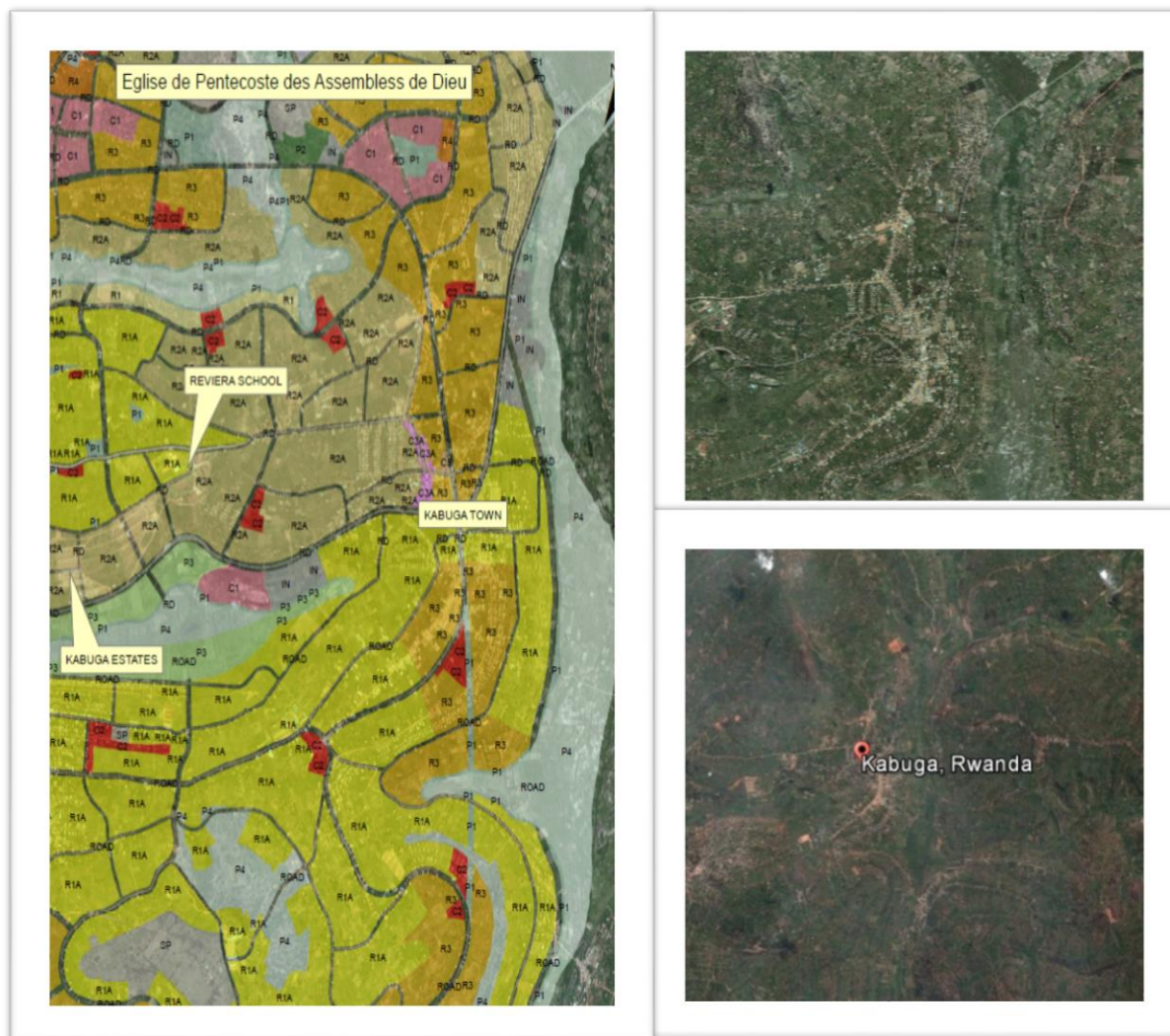
### 3.3 Evolution of urban growth

**Table 3: Metadata of images used**

Image format	Date/scene	Product, quality
JPG/Google Earth	17 July 2006	Digital Globe



ECW	2008	Orthophoto
Pdf	2009	Master plan



**Figure 4: Plan and images of Kabuga Town used for the study a)- The Master plan of Kabuga Town b)- Orthophoto of Kabuga Town (2008) c)- Image of Ka2006 from Google Earth**

The major uses of land in most parts of Kabuga town are residential and agriculture. Our results reveal that conversion of forest and agricultural land to either residential or commercial built-up is

the major trend in the study area. We further sought to understand this observed trend in land use conversion by asking respondents the land use type before they settled in the area and the current use of land (Table 5).

**Table 4: Initial land uses before conversion**

Land use	Number of respondents	Percentage (%)
Agriculture	56	52
Residential	30	28
Forest	13	12

Vacant	8	8
Total	107	100

This reveals that the major land use before people settled in this area is agricultural with 52%. Residential built-up accounted for 28%, forest was 12% and vacant land was 8%. This finding confirms the rural nature of Kabuga town at its inception. Compared to what exist today, the town is fast becoming a large commercial centre with vast residential areas. Currently Kabuga town is estimated to have around

10,000 inhabitants living in that area. Further asking the sampled households the uses of their land before and after 1994, results reveal that the farmlands have decreased at the highest rate and residential land use increased (see Table 6). The implication is that a large number of people now live on a residential plot without other spaces for example, for agriculture and other related uses.

**Table 5: What was the use of the plot of land before 1994 and after 1994?**

Use of land before 1994	Percentage (%)	Use of land After 1994 until now	Percentage (%)
Agriculture	52	Agriculture	13
Residential	28	Residential	80
Forest	12	Forest	5
Vacant	8	Vacant	2

Based on visual image analysis and digitization carried out, the surface area covered by the different land uses such as

built-up, agricultural, forest, vacant land and wetland/protected areas between 2006, 2008, 2040 are presented in Table 7.

**Table 6: Change in surface area covered by different land use types**

Land use types	Surface area					
	2006		2008		2040 (Projected)	
	km <sup>2</sup>	%	km <sup>2</sup>	%	km <sup>2</sup>	%
Built-up (Residential and commercial)	1.9	15.95	2.7	22.40	8.1	74.63
Agriculture	6.9	57.28	6.7	55.86	0	0
Forest	1.0	8.47	0.5	3.84	0	0
Vacant land	0.2	1.74	0.2	1.32	0	0
Wetland/protected area	1.99	16.56	1.99	16.58	2.7	25.36
Total	12.1	100	12	100	10.8	100

The amount of surface area covered by each land use type varies between 2006 until 2040 which is the projected year of the master plan for Kabuga town. In 2006, the

total area in Kabuga town under built-up is 15.95%, whereas 57.28% was used for agriculture, 1.74% of the land was vacant, 16.56% were wetlands or protected areas

and forest area was 8.47%. In 2008, the built-up area increased to 22.4% whereas 55.86% was used for agriculture, 3.84% was used as forest, vacant lands reduced to

1.32% and the proportion of wetlands or protected areas remained almost constant at 16.58% (see Figure 5).



**Figure 5: Land use conversion a) - Some left over forest trees as land use is converted from forest to residential b and c) - Agricultural land converted to residential**

Comparing the proportion of land under different land uses to the master plan of Kabuga town which has its focus until 2040, about 75% is apportioned for built-up area whereas 15.5% will be used as wetland/protected areas. There is no plan in the Master plan for agriculture, forest and vacant lands because Kabuga town in its conceptualization is envisioned to become a compact, high density residential/commercial area (Kigali city construction one stop centre). The vacant and forested areas are decreasing considerably in favour of residential and commercial built-up uses as well other socio-economic functions such as road infrastructural development.

### 3.4 Drivers of land use change

Several factors are driving land use conversion in Kabuga town. These are human population increase which is experienced through natural growth and through migration as more people come in to the town. In the 1980s-1990s, a large part of Kabuga town was agricultural lands and

forested areas. Currently agricultural land and forested areas are mostly prone to being converted into residential, commercial and infrastructure such as road, school, hospital and markets. This is in line with other research findings that show that in the tropical areas of the world, forests are the primary sources of new agricultural land in the 1980s-1990s (Gibbs et al. 2010, Akinyemi 2013).

#### 3.4.1 Price of land

Based on interview of land agents, it was found that a major factor driving land use change in Kabuga town is the low price of land. The respondents further noted that the price of land in this area was generally not high in the 1990s. When compared to other regions or nearby areas, the price of land in Kabuga town was lower (see Table 8). The table summarizes the different prices of land in Kigali city and nearby areas in 2011. Currently it is still not expensive when compared to others areas such as Masaka, Kachyru, Kinyinya, Kagugu and Muhima.

#### Table 7: The price of land

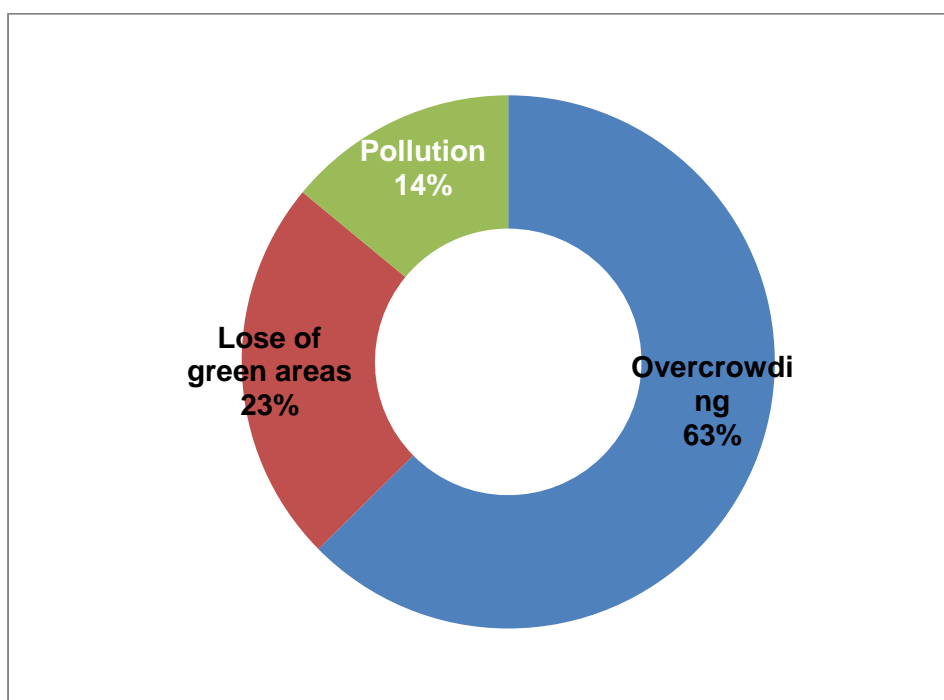


Location	year	Price Rwf/sq.m
City of Kigali(muhima CBD)	2013	80,000
Kabuga town	2011	2000
Kacyiru	2011	45,000
Kicyinya	2011	30,000
Kagugu	2011	30,000
Masaka	2011	3,000

### 3.5 Consequences of land use conversion

Land use conversion has negative impacts on the population. According to the

perspective of the respondents, 63% see the greatest challenge of urban growth in this town as overcrowding. Other challenges are the loss of green spaces (23%), problems of pollution (14%).



**Figure 6: Challenge of growth in Kabuga town**

### 5. Conclusion

The town was conceptualised as a compact, high density residential area due to the need to open up land to accommodate people, especially those from outside the country and other different places. Due to the growth of Kabuga town, the land use in the study area has been changed over time. This research was focused on identifying how urban growth is impacting on the land, resulting in land use conversion. This was achieved through examining the trend in the

changing landscape and the evolution of the study area over time. Most of the changes to the landscape of Kabuga town are due to land use conversion and the major trends are from agriculture, vacant and forest to residential and/or commercial purposes. The results show that the residential parts or areas are ever-increasing whereas, at the same time the agricultural areas, forest areas and vacant lands are diminishing in favour of residential areas. Major drivers of these land use changes are the increase in the number of people migrating into the

town and the low price of land in Kabuga in comparison to other nearby towns and cities. Thus, Kabuga is fast becoming a commercial centre with vast areas of residential properties. This study provides some baseline figures of the surface area of some specific land uses which the authorities of Kigali city and Gasabo as well as Kicukiro districts will find useful as currently, there is a dearth of records. Further research is required to build on this preliminary study.

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