

Article

Access to Affordable Houses for the Low-Income Urban Dwellers in Kigali: Analysis Based on Sale Prices

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Abstract: The government of Rwanda recently passed housing development regulations and funding schemes which aim at promoting access to affordable houses for the low- and middle-income Kigali city inhabitants. The existing studies on housing affordability in this city did not yet discuss whether this government-supported programme is likely to promote access to housing for these target beneficiaries. This study applies the price-to-income ratio (PIR) approach and the 30-percent of household income standard through the bank loan to assess whether housing units developed in the framework of affordable housing schemes are, for the target recipients, affordable at all. It relies mainly on housing prices schemes held by real estate developers, data on households' incomes collected through the household survey and a review of the existing studies and socio-economic censuses reports. Findings reveal that the developed housing units are seriously and severely unaffordable for most of the target beneficiaries, especially the lowest-income urban dwellers, due to the high costs of housing development, combined with the high profits expected by real estate developers. The study suggests policy and practical options for promoting inclusive urban (re)development and housing affordability for various categories of Kigali city inhabitants. These options include upgrading the existing informal settlements, combined with their conversion into shared apartments through the collaboration between property owners and real estate developers, the development of affordable rental housing for the low-income tenants, tax exemption on construction materials, progressive housing ownership through a rent-to-own approach, and incremental self-help housing development using the low-cost local materials.

Keywords: housing development schemes; affordable housing; Kigali city; low- and middle-income groups; price-to-income ratio

1. Introduction

Access to housing has been on the sustainable development agenda at the global level. It has also been envisioned among the key factors for promoting inclusive urban development, which embrace the right to inhabit well for all urban dwellers [1–3]. To promote this right, proponents of the rights to the city have largely reiterated the urgent need for the real estate agencies, government and municipal leaders to advance the habitability of the urban space through the inclusive approach of housing development schemes providing affordable houses for the low-income urban dwellers [2,4]. Following this claim, the provision of affordable housing has been the crux of many contemporary urban (re)development schemes in various world cities [5]. The housing literature defines an 'affordable house' as a house at or below a specified price threshold, whose price is relatively aligned with the

household's income and permits the beneficiaries of the affordable housing programmes to meet other basic needs required for sustaining their livelihoods [6]. Balancing housing prices with income is an important approach to promote the living conditions of all urban dwellers. It allows for the preservation of affordability proportional to household income and advances the integration of various categories of urban dwellers into urban development processes [7]. Apart from being a basic human right, access to affordable housing has been introduced in the contemporary urban development programmes as a strategy for redressing the exclusion of the poor and low-income groups from the cities due to high cost of housing [8]. This is operationalised when the developed housing units, which are the products of any spatial re-organisation processes, and primary spatial goods are equally distributed among all urban dwellers, especially the low-income group [9]. Thus, the development of affordable housing for this category of people can counteract the competitive housing market from which they are excluded [10,11]. This problem is more crucial in African cities, where most dwellers are very poor and low-income people.

In Kigali, the capital city of Rwanda (located in Eastern Africa), around 54% of inhabitants are poor and low-income people who earn between 38.0 and 225.0 US dollars per month. Around 13% of them are very poor and earn less than 38 US dollars per month. The middle-income group represents 21% of inhabitants whose monthly incomes range between 225.0 and 678.0 US dollars [12,13]. Generally, the housing market has largely targeted high-income households, which represent less than 12% of all urban dwellers. They earn more than 678.0 US dollars and can afford housing prices which are greater than the purchasing capacities of other categories of urban dwellers [13,14]. Access to decent houses has therefore been a pressing issue for the poor, low- and middle-income people in this city. As a consequence, most of the Kigali city inhabitants who cannot afford formal housing prices have informally self-developed their dwellings in unplanned areas, which occupy the majority (60%) of residential neighbourhoods in this city [15]. However, this trend of informal settlements' development is highly discouraged by the current urban development regulations. Recent studies mention that there is a dire need to produce 20,000 housing units every year to subvert to the current needs for decent housing in Kigali city [16]. To promote access to decent housing in this city, the government of Rwanda encourages real estate agencies to invest in low-cost housing units which are affordable for low- and middle-income urban dwellers, through different incentives [17]. In this perspective, the law n° 06/2015 related to the investment promotion and facilitation in Rwanda entitles a preferential corporate income tax rate of zero per cent (0%) to real estate agencies whose investment capital is equal to or greater than 10,000,000 US dollars [18]. In addition, the government of Rwanda established an affordable housing fund within the commercial banks which entitle both affordable housing developers and buyers to apply for the low interest rates and bank loans [19]. Real estate developers can also be assisted by government agencies in the acquisition of land through the expropriation process [20]. This process consist of the compulsory acquisition of private real properties, including the land and various assets thereon attached, subject to payment of a fair compensation [21]. In Rwanda, the state has supreme powers to manage all the national land and it is its sole authority to allocate rights of occupation and use of land to Rwandan people [22]. Actually, land is held by individuals through a renewable emphyteutic lease contract, issued to every landowner, following the process of systematic land registration completed over the whole country in 2015 [23]. Prior to this process, in 2004, the Government of Rwanda undertook a land reform process which resulted in the institutionalisation of a unique statutory land tenure system [24]. This system distinguishes two main categories of land: the state and individual private land. The state land includes vacant lands, forest, wetland, parks, water reserves, land occupied by infrastructure and land used by public institutions, while individual private land is owned by ordinary citizens through the long lease contracts. On this note, expropriation is carried out when the development of affordable housing is planned on private land whose main use is residential housing development [25,26]. Apart from the facilitation of the expropriation process, government agencies are also responsible for the provision of basic infrastructure such as roads, electricity and water networks, waste water drainage and treatment systems in affordable housing sites [26]. The key aim is to set

housing prices within the reach of the overwhelming number of Kigali city inhabitants and curb the problem of unplanned settlements. As stated in the current Rwandan affordable housing scheme, the beneficiaries of these affordable houses should not spend more than 30% of their monthly income to purchase them [27]. The beneficiaries include low- and middle-income households whose monthly income range is between 220.63 US dollars¹ (equivalent to 200,000 Rwandan Francs) and 1,323.78 US dollars (equivalent to 1,200,000 Rwandan Francs), and who do not own any dwelling² place [27]. They are also eligible to apply for low and long-term loans at 11 percent interest rates (compared to 18 percent for normal bank loans, for 20 years) through the affordable housing fund, established by the Government of Rwanda in collaboration with the World Bank [28].

In the existing studies, the Centre for Affordable Housing Finance in Africa [29], Gardner, Lockwood [14], Manirakiza and Ansoms [30] discuss the issues of access to housing, based on housing demand, delivery and affordability at the general housing market. Some of these studies allude to the prohibitive prices of most affordable housing units developed by the real estate developers in Kigali city and suggest detailed studies ascertaining whether Kigali city inhabitants can really afford these houses [14,29]. Therefore, this study builds upon this call for evaluating whether the various housing packages under development in Kigali city, within the framework of developing affordable houses, are affordable for the prospective beneficiaries. More specifically, this study was motivated by the knowledge gap about the contribution of the affordable housing developments schemes in curbing the problem of access to housing in Kigali city, regarding the affordability of the developed housing units and monthly incomes of various categories of the target beneficiaries. In this fashion, this study is guided by the following research questions: To what extent can low- and middle-income Kigali city inhabitants afford the housing units developed under the affordable housing schemes? Which strategies can be adopted for promoting housing affordability for all categories of Kigali city inhabitants?

The findings to these questions will shed light on the current trends in housing affordability, following the adoption of the above-mentioned housing schemes, which are expected to make housing affordable for a large number of Kigali city inhabitants. This paper draws also from its findings to suggest practical and policy strategies that may be applied towards improving the implementation of these affordable housing schemes and enhancing access to housing for various categories of urban dwellers in Kigali city. Before the presentation of the analytical approach applied in this assessment of housing affordability and data sources, we discuss the relevance of affordable housing schemes, within the broad contours of the current Kigali city (re)development processes with respect to socio-economic situations of its inhabitants.

2. The Income-housing Affordability Nexus in Kigali City Zoning Regulations

From the perspective of inclusive urban re-development, affordable housing schemes have been conceived from the perspective of government obligation to promote access to decent houses for the poor and low-income urban dwellers who cannot afford a decent house in the general housing market. Generally, the economic situation of the country is among the determinants of household income, which can also be a catalyst to afford such a house [31]. To grasp the relevance of these housing schemes in the Rwandan context, this section briefly presents the main sources of income in Rwanda, housing development options, and related regulations which are among the factors influencing access to housing for Kigali city inhabitants [29].

¹ 1 US dollar was equivalent to 906.6 Rwandan Francs on 04 September 2019. See <https://www.bnr.rw/index.php?id=23>.

² Access to housing for people whose monthly income is less than 220.63 US dollars will be promoted through the social housing schemes that the government has recently started to implement across Kigali city.

2.1. Households Income Sources in Rwanda

Kigali city has experienced a rapid population growth in the last 20 years. In the 1960s, the city was a small center which acted as the political administration point for the country [25]. The built-up area increased from 3 km² in 1962 to 15 km² in 1984, and reached 93 km² in 2012 [15]. Its population also increased from 6000 inhabitants in 1962 to 235,664 inhabitants in 1991 and reached 1,135,428 inhabitants in 2012. This population growth results from an increasing annual growth rate of 9%, combining the mean birth rate of 2.6% and rural–urban migration rate of 10% [32]. This high rural–urban migration rate results in a high urban growth rate in Kigali city, whose inhabitants represent 48% of the total Rwanda urban population. At the national level, the average urban growth rate was 4.5% in 2012 [33]. The main factor for rural–urban migration is the lack of job opportunities in Rwandan rural areas, where subsistence agriculture is the main source of income for about 70% of the population [34]. At the national level, the percentage of active population employed in the agriculture sector is 67.3%. Among them, self-employed farmers represent 43.6%, compared to 23.7% in the farm wage employment. The non-farm sector employs 32.7% of the active population. They include 20.0% who are formally and informally employed in industry and services, 0.7% who are formally employed in the public sector and 1.82% in the private. In the non-farming sector, 12.7% of the active population is self-employed, with 10.9% and 1.8% in the informal and formal sectors, respectively [35].

In Kigali city, the main sources of income for its active population are threefold: 17.4% of this population rely on wage and non-wage farming, 79.9 % of the population are employed in industry and services, while 2.7% are self-employed in the non-farming sector [36]. Just like other low-income countries, the Rwandan Gross Domestic Product (GDP) per capita is low, estimated at 774.00 US dollars in 2017 [37]. Generally, the farming sector contributes 31.5% to the national, GDP, against 17.6% from the industry and 50.8% from services [38]. Generally, the incomes of most of Rwandans, as well as Kigali city inhabitants, are very low. Studies on housing demand have shown that the monthly salary of about 61% of people who have wage-employment is less than 110.00 US dollars, and ranges between 110.00 and 220.00 US dollars per month for 13.5% of people. These figures show that it is a challenge for most Kigali city inhabitants to have access to decent housing through the formal real estate market [39]. The next section describes the current trends of this market and modes of access to housing in Kigali city.

2.2. Housing Development and Market Trends in Kigali City

Two main modes of access to housing exist in Kigali City: formal and informal development.

Formal housing development: the formal sector housing in Kigali is typically made of real estate agencies or individuals who buy land plots from the private landowners in different planned residential neighbourhoods and develop various housing units (villa, single family houses or residential apartments), which are then sold to the public. Main developers include public agencies such as the Rwanda Social Security Board (RSSB) and *la Banque Rwandaise de Développement (BRD)* or the Development Bank of Rwanda (DBR), and various local and foreign private registered real estate agencies. These include *Urukumbuzi*, *Abadahigwa ku Ntego*, the Ultimate Developers Ltd (UDL), the Millennial Development Ltd, and the Remote Estates, among others. However, they supply a small number of houses: from 800.00 to 1,000.00 dwelling units per year [12], which can be affordable for the high-income groups only [29]. This formal market can barely meet 3% of the annual housing demand in Kigali city. Due to this limited supply, a large number of households from the middle- and high-income groups (representing 21% of Kigali city inhabitants) use the formal process to develop their houses (single-family houses) through self-help, using their incomes or loans provided by financial institutions. Since some of them do not own land or do not have land plots in the planned residential neighbourhoods, they acquire them from other property owners through the formal land transaction process [39,40]. Thereafter, they request construction permits from Kigali city and develop their houses according to zoning regulations [40]. However, this formal process has not been used by the overwhelming number of Kigali city inhabitants, mainly poor and low-income groups due to the high

cost of formal housing development. Therefore, these urban dwellers have been accessing housing through informal housing development.

Informal housing development: this housing development option, through self-help construction, is applied by around 40.00% of the poor and low-income Kigali city inhabitants whose monthly income is less than 380.00 US dollars [40,41]. Therefore, they do not have the capacity to buy or build a house in Kigali city through the formal process. Most of them are the original inhabitants who own land through the traditional processes of inheritance. Others include rural–urban migrants who, until 2008 when land rights were not yet registered in Rwanda, had been acquiring land from the original landowners through the informal land market, whose records were maintained through the process of private conveyancing. From 1980, when the first masterplans in Kigali city (covering a small part of the administrative boundary of the city) were crafted, these poor and low-income groups have been informally developing their houses in unplanned areas [42]. Under this informal housing development arrangement, the mean cost for the development of a housing unit is 2757.50 US dollars for low-income groups and less than 552.00 US dollars for poor urban dwellers. The cost of land is not counted, since most of them are the original landowners. The middle-income groups have also been applying the informal housing development option to build-up their houses, which they use for their own residences or rent to tenants. Tenants represent around 53.00% of Kigali city inhabitants [43]. This percentage can increase up to 80.00% in the old informal settlements which are close to the Central Business District (CBD) and service centers where most of the poor and low-income groups can find wage employment [40].

This practice of informal housing development resulted in the escalation of informal settlements until 2013, when the new masterplan that covers the whole administrative boundaries of Kigali city, which was adopted in 2008, was not yet enforced [25,39]. Since these houses were developed using low-cost local materials, they exhibit appalling housing conditions, so that the current Kigali city masterplan recommends that they should be demolished, especially those located in high-slope or flood-prone areas [44,45]. Their demolition can result in very high demand for low-cost housing, which has never been met by the real estate developers and government agencies. Nevertheless, some of these informal settlements can be upgraded or converted into modern residential apartments and green spaces with respect to the land slope and current zoning regulations [45]. Table 1 shows the demand in various housing categories for Kigali city urban dwellers, until 2020.

Table 1. Housing demand in Kigali city from 2012 to 2020. Data source: adapted from City of Kigali and Nkubito [25,41].

Housing Category	Number of Unit	Percentage
Social housing	43,436.00	12.62
Affordable housing	186,163.00	54.11
Mid-range housing	112,867.00	32.80
Premium housing	1601.00	0.47
Total	344,068.00	100.00

- **Social housing:** A housing typology that is affordable by households below the poverty line, earning less than 120.00 US dollars per month. This is under-development by the government through a subsidy system;
- **Affordable housing:** This is demand for households earning between 120.00 and 772.00 US dollars per month. This is the largest segment of the housing market. These households have some payment capacity and could access a special rental market which may include the rent-to-own leasing mechanisms, etc.;
- **Mid-range housing:** Targets households whose incomes vary from 772.00 to 4110.00 US dollars per month. Households whose income is less than 1320. 00 US dollars can also buy these dwellings

under the affordable housing scheme and apply for the related bank loan, as stated in the current affordable housing schemes. Others can use their income or apply for mortgage financing to fund their houses;

- **Premium housing:** This addresses housing demand from the high-income group whose monthly income is greater than 4110.00 US dollars per month.

Table 1 shows that there is need to produce about 39,000.00 housing units every year. However, production has remained a crucial concern, as revealed by the increasing deficit in housing supply by the general formal market since 2012. They can supply less than 1000.00 housing units every year, as previously mentioned [25,41]. In addition, the development of social housing is also very low, since, each year, Kigali city, in collaboration with other government agencies, can develop around 200 housing units for the poor urban dwellers [25,46].

2.3. Regulatory Framework for Housing Development in Kigali City

Different legal instruments and tools, including policies, laws, and strategic development plans related to land management and socio-economic development in Rwanda, significantly support the current programme of promoting access to decent housing for Kigali city inhabitants. Table 2 summarises their provisions or principles in relation to the promotion of access to housing in different ways. They also reiterate different aspects pertaining to affordable housing development. In Table 2, the first column indicates the related document and the year of publication in brackets. The second column summarises these ideas relating to housing development.

Table 2. Overview of regulations related to housing development in Rwanda. Data source: [17,22,24,28,47–49].

Instruments and Tools	Indicative Provisions Related to Housing Development
Land policy (2004)	Section 5.5 promotes the good management of urban land through: <ul style="list-style-type: none"> - Densification in the planned residential areas through the development of high-rise buildings and horizontal semi-detached houses; - Restructuration of informal settlements, including the expropriation of land rights, clearance of houses located in public areas, provision of basic infrastructure and services and resettlement of displaced communities; - Real estate development through the sale of state land to individuals or real estate agencies in order to replace existing buildings with new ones that are bigger, taller, and more luxurious; - Production of a high number of buildable plots and their diversification, so that they can accommodate the highest number of settlement units; - Promotion of access to housing funding schemes.
National human settlement policy (2009)	Principle 3.1: The Government of Rwanda recognizes the fundamental right to housing for every citizen. It is determined to provide the population with easy access to decent housing and improve their housing conditions. Strategy 2.2: Rehabilitation of residential areas should give priority to home security for their residents, by means of various solutions including rehousing.
Organic law repealing organic law n° 08/2005 of 14/07/2005 determining the use and management of land in Rwanda (2015)	Article 2 allows for the expropriation of the private land for public interest, including the development of social and affordable housing.
Law N° 32/2015 of 11/06/2015 relating to expropriation in the public interest (2015)	Article 7 grants the public agencies or private investors the rights to carry out the expropriation for the implementation of various urban development projects, including the construction of affordable houses.
National Urbanisation Policy (2015)	The densification pillar promotes urban compactness, including the development of high building densities for different categories of income group.
National housing policy (2015)	Section 3.2 promotes access to housing for all people; Housing development options include: private urban rental housing; shared condominium ownership; rent-to-own; owner mortgage; self-construction with local materials mainly sourced on site; and incremental housing development and improvement; Section 3.3 supports affordable housing development: a housing unit whose cost is around a third of the household's income.
Law n° 15/2010 of 07/05/2010 creating and organizing condominiums and setting up procedures for their registration	Article 3 and 4 allow different property owners to own and develop a land plot, like the construction of shared apartments in a condominium tenure.
7 Year Government Programme: National Strategy for Transformation 2017–2024 (2017).	The priority area 5 of the social transformation pillar promotes the improvement of household living conditions through: <ul style="list-style-type: none"> - The relocation of households living in high-risk zones through the development of affordable and sustainable housing models for urban and rural areas; - Operationalization of the affordable housing fund to facilitate citizens to acquire affordable and decent housing. The fund will offer affordable interest rates to both private sector and beneficiaries.

As Table 2 shows, these regulations and strategic development plans stipulate the government's commitment to promote a rational use of land resource, increase production of housing units through densification and improve housing conditions in the existing informal settlements. They also spur the development of mixed-income housing typologies, comprising social, affordable housing units for poor and low-income groups and other housing units which can be sold at the general market rates [17,49]. Regarding the promotion of housing development, the implementation of these regulations and strategic development plans in Kigali city abides by zoning regulations. These regulations are stipulated in the Kigali Conceptual Master Plan (KCMP) adopted in 2008 [50] and the related detailed masterplans regulating land use and the development of land in three districts, namely Gasabo, Kicukiro and Nyarugenge, constituents of Kigali city. By 2013, these detailed masterplans were approved and their implementation became effective [25]. Their objectives include the control and regulation of land use through spatial planning, and the provision of modern and comprehensive housing solutions for all urban dwellers [50]. Therefore, these zoning regulations indicate different residential land use typologies that landowners and real estate developers should comply to if they intend to use the land for residential purposes.

Table 3 shows various types of residential houses which can be developed in Kigali city. It also shows the zoning categories, like R3 and R4, where affordable housing can be developed. As stated in the land law and Kigali zoning regulations, each landowner has the right to develop his/her land plot according to the related zoning category [22,45]. However, existing studies have demonstrated that most landowners in Kigali city do not have sufficient financial capacity to comply by these regulations. The most coping strategy that they adopt consists of selling their land plots and leave the city, which unfortunately becomes the driver for land tenure insecurity [30,39]. Another possible option for the landowners to comply by these regulations would consist of collaborating with other people or real estate agencies who have the financial means to develop these plots and share the developed houses in the form of condominium tenure. However, this option might not have been attempted. As for the development of affordable housing, the most applied approach to acquire land is the expropriation, carried out by government agencies or private real estate developers [26,51]. As stated in the introduction, the key question is whether the developed affordable housing units are affordable for Kigali city inhabitants. The next section discusses the approaches applied in assessing their affordability, in relation to the incomes of Kigali city households.

Table 3. Zoning regulations in Kigali city according to the masterplan for the period 2019–2040. Data source: [45].

Zoning Category	Types of Residential Housing Unit	Maximum Number of Floors	Total Areas in Km ² by 2040
R1: Single-family residential	All types of single-family houses in form of a detached villa	G ³ + 1	17.23
R1A: Mixed single-family residential	All types of single-family houses and low-rise apartments: detached and semi-detached Villas	G + 1	57.73
R1B: Rural residential ⁴	All types of single-family houses: detached and semi-detached villas	G + 1	18.66
R2: Low-rise residential	All types of single-family houses and low-rise apartments: detached and semi-detached villas	G + 3 (apartments)	35.48
R3: Medium-rise residential	Low- and medium-rise apartments, detached and semi-detached villas.	G + 7 (apartments)	38.45
R4: High-rise residential	Low- and medium-rise multifamily and high-rise apartments	G+15 (apartments)	1.53

3. Analytical Approach to the Housing Affordability

This study uses income and housing price, which is largely termed housing price-to-income ratio [52], suggested in most of the literature for the analysis of housing affordability [53,54]. The PIR is applied when analysing trends in housing affordability and housing cost burdens for households based on the share of income spent on housing [55]. The affordability is referred to as “purchase affordability” when the assessment consists of measuring if the households can bear the cost for their houses using their incomes [56]. The evaluation approach is tailored to the housing cost index developed by the United Nations Human Settlements Programme (UN-Habitat) in its urban indicators tool kit guide [57]. This index is also applied by the Organization for Economic Cooperation and Development (OECD), the International Monetary Fund (IMF) and different international financial agencies when they carry out studies on housing affordability for low- and middle-income urban dwellers in various countries, in order to reflect on changes in households’ living conditions over time and in a comparative way [58]. The affordability is calculated using the following formula

$$\text{ousing Price to income Ratio (PIR)} = \frac{HP}{HI} \quad (1)$$

In this Equation (1), the HP refers to the total sale price of each housing unit, while HI refers to the annual household income. This equation is commonly used in assessing the household’s ability to afford the available housing units within an area, based on the purchase affordability [59]. In this analytical approach, the low PIR index reflects good housing affordability, while the high index portrays a high degree of unaffordability [57,60]. Generally, the affordability rates have been identified as follows:

1. The PIR below 3 reveals the general situation of “affordability” in which the household is sufficiently able to purchase the house, without difficulties in covering other basic needs;
2. The PIR beyond 3.0 to 4.0 shows that the house is “moderately unaffordable”, but its cost does not have much negative impact on further household consumption;
3. The PIR beyond 4.0 to 5.0 shows that the house is “seriously unaffordable”. Households must adjust the housing type to their income levels, otherwise the cost for housing can seriously affect their living conditions;
4. The PIR beyond 5.0 portrays a situation where the housing is “severely unaffordable”, even if the household may extend the loan period.

Since affordable housing programmes address the question of access to housing for low-income people, the affordability trends are ascertained by referring to 30% of the household monthly income that should be spent on housing. This standard is applied in assessing housing affordability from the perspective of public policy on housing to estimate the housing cost burden in the case the monthly carrying costs of a home exceeds the 30% of the household’s income [61]. It is also a threshold suggested by the Rwandan affordable housing scheme for assessing if a housing unit is affordable or not [26,27]. In addition, it is the benchmark that banks consider when approving the mortgage capacity of people who apply for housing loans [29,62]. Still, most households rely on a bank loan which involves a regular repayment until the end of the loan term. In this case, the calculation of affordability includes the loan dimension and the related variables [63]. Therefore, it is assessed based on the cost repayment, using the following formula

$$AI = \frac{P * \left(i + \frac{i}{(1+i)^n - 1} \right)}{I} \quad (2)$$

⁴ This type of zoning is applied in urban fringes, which are still rural areas.

³ Ground floor.

In the Equation (2), AI is the affordability index (which is also the monthly repayment amount), P the housing price (which is equal to the mortgage amount), i is the bank loan interest rate, n is the loan term (or duration in months) and I the monthly income [59,64]. In applying this formula, we used the down-payment ratio 30% of the household income, the loan term or repayment period of 20 years, and the loan interest rate of 10%, as set in the current affordable housing schemes of Rwanda [26]. In this model, the affordability is judged good if the households can spend less than 30% of their monthly income to buy the house. It is moderate if they pay between 30% and 40%, and severely unaffordable if they pay more than 50% [65]. Households that pay more than that share are said to be “cost-burdened.” Families that spend more than 50 percent of their household income on housing are considered “severely cost-burdened” [55]. Beside these indices, the analysis of housing affordability is largely extended to its redistributive equality which requires balancing the affordability rates among the target beneficiaries, based on their income ranges, to decrease the affordability gap among all categories of people who are in need of decent houses [66]. In this case study, the redistribution equality is assessed based on the percentage of low-income households who can afford the available housing units produced under the affordable housing schemes which are supported through public funds [8,57,67,68]. In the next section, we present the sources of data used for this study.

4. Data Sources

This study is based on the exploratory approach to ascertain trends in housing affordability in Kigali city, following the adoption of government-supported affordable housing programmes to promote access to low- and middle-income people and understand whether the housing affordability burden for these urban dwellers is really being mitigated. Primary data for this paper were collected during two periods: from July to September 2018 and from January to March 2019, on the ongoing three projects of affordable housing development in Kigali city. During the first period, some projects had not yet been approved, and their proposal and related data could not be disseminated. We, therefore, had a second field work to collect these data. These projects are equally distributed in the three constituent districts of Kigali city, as shown in Figure 1.

Figure 1 shows the spatial distribution of the sites for the affordable housing projects approved in the last three years, on which this study is grounded. The identification of these projects was based on the reports, accessed from Rwanda Housing Authority (RHA), which foresees the implementation of all activities related to affordable housing development in Rwanda. These three projects are owned by different real estate developers, namely *Abadahigwa Kuntego Ltd* (in Kicukiro district), *Groupe Palmeraie Développement* (in Gasabo district) and *Shelter Afrique* (in Nyarugenge district). The *Abadahigwa Kuntego Ltd* is a local real estate developer which operates in this project of affordable housing. Other agencies are foreign firms which collaborate with the BRD, one of the leading commercial banks that support the development of affordable houses in Rwanda. It is worth noting that, at the time of our survey, the projects were under development in two sites and some houses were already sold to the public (this applies for the *Abadahigwa Kuntego Ltd*). The *Groupe Palmeraie Développement* had not yet started construction works, although its project was approved by RHA and the site was already cleared after the expropriation of the former landowners. To assess housing affordability for Kigali city inhabitants, we conducted household surveys in three low- and middle-income residential neighbourhoods, close to these project sites. We believed that their inhabitants were aware of these projects and could respond to questions related to the type, price and affordability of housing units delivered to the public by the projects' owners. In addition, these residential neighbourhoods were the targets for our survey because their inhabitants comprise two income categories: the tenants (who live in rented houses) and landlords who reside in their own houses, mostly developed through self-constructions [69]. The former are among the targets for the affordable housing projects as prospective buyers [26,27]. The survey was administered to 196 heads of households. They represent the population of 214 households counted in the neighbourhood of *Shelter Africa*, 187 households recorded in the neighbourhood of *Groupe Palmeraie Développement* and 193 households recorded in the neighbourhood of *Abadahigwa Kuntego Ltd*,

as Figure 1 shows. The sample population was randomly selected using sampling formula applied to selecting the sample from the finite population as suggested by Krishnaswamy, Sivakumar [70], as follows

$$n = \frac{z^2 * p(1 - p) / e^2}{1 + (z^2 * p(1 - p)) / z^2 * N} \tag{3}$$

In Equation (3), Z = is the value assigned for the confidence level of 95%, with 1.96 as a confidence level score; p is the desired proportion for the sample size n, which is 0.5; e is the tolerable error (10% in this study); and N the population size (for the whole study area).

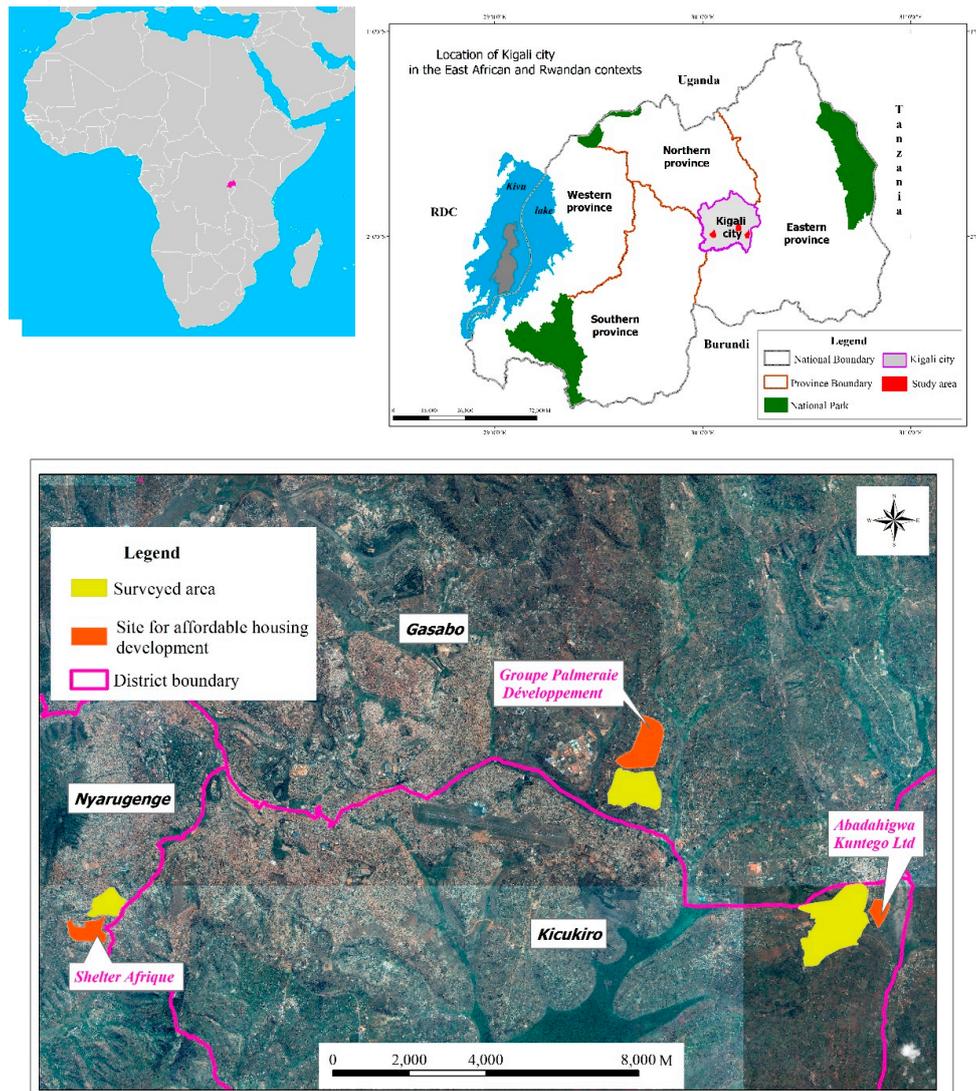


Figure 1. Location of the study area. Data source: Field survey, July to September 2018 and January to March 2019, and proposals for housing development projects approved by Rwanda Housing Authority (RHA).

In this study we used the face-to-face questionnaire to collect empirical data on housing costs (through self-help development and purchase from the real estate developers), households’ incomes, access to bank loans and the different options that Kigali city inhabitants apply for to have access to housing and various strategies that have the potential to promote housing affordability in this city. Other data were collected through the interviews conducted with 23 key informants from public and private agencies intervening in affordable housing development in Kigali city. These interviewees

include urban planners, civil engineers, architects, and heads of units and their collaborative officers from RHA, Rwanda Development Board (RDB) and Kigali city who approve different proposals related to affordable housing development presented by different investors. Other interviewees include civil engineers and marketing officers and managers from the real estate developers, and loan agents from different banks who finance the affordable housing projects. The interviews covered the following topics: (i) goals of affordable housing projects, (ii) cooperation between the government and housing developers, (iii) target beneficiaries of affordable houses, (iv) housing packages under development, (v) housing prices and the payment models, (vi) access to bank loans for housing purchase, (vii) affordability of housing units developed under the affordable housing schemes, and (viii) possible options to promote housing affordability for Kigali city inhabitants. Data on housing prices were compiled through the review of the existing studies on housing market and finance in Kigali city, different housing designs and price lists held by engineers and architects, affordable housing development proposals held by the real estate developers, and some government agencies such as RHA, RDB and Kigali city, which approve (or monitor the implementation of) different proposals related to affordable housing development, presented by private investors in the real estate sector. Other agencies include *Banque Rwandaise de Développement (BRD)* or the Development Bank of Rwanda (DBR), which are among the loan providers for affordable housing development, and Rwanda Social Security Board (RSSB), which is the frontrunner in real estate development. Through the triangulation approach, we also reviewed socio-economic census reports and government reports to validate the data on households' incomes collected during the household surveys. The assessment of the affordability was undertaken based on the affordability indices generated through an analysis of collected data that consisted of calculating the ratio between each housing unit price and household income, by applying the formulae presented in Section 3. Qualitative data compiled through the household survey, interviews and literature review were analysed using the content analysis approach. Our findings are presented and discussed in the section that follows.

5. Results Presentation and Discussion

In this section, we first present and discuss the main findings in the analysis of housing affordability in Kigali city. Thereafter, the different options which can be adopted to promote housing affordability for all categories of dwellers in this city is discussed. As for housing affordability, our results reveal that the housing units which are being developed alongside the affordable housing schemes are not affordable for the overwhelming number of target beneficiaries. Table 4 shows the distribution (in percentage) of households which can afford a housing unit from the different packages proposed by the three real estate developers which constitute the unit of analysis in this study.

As stated in Section 3, the affordability index which is equal to or below 3 ($PIR \leq 3$) exhibits a good situation, in which the different housing units available on the market are affordable for the buyers. The PIR between 3.0 and 4.0 shows a situation where households can moderately afford these housing units, without compromising other needs required for their daily livelihood. A PIR which is above 4.0 shows an alarming situation where the households cannot afford the housing units proposed by the real estate developers. These results presented in Table 4 portray very low trends in affordability, since less than 30% of households can afford a house from the housing packages proposed by the real estate developers in Kigali city. In contrast, these results show a drastic increase in the percentage of the households which cannot afford these houses, with a drop from 15.32% for the situation of serious unaffordability to 60.54% of severe unaffordability. These findings show that the affordable housing schemes under-implementation Kigali city hardly address the needs in decent houses for the low-income urban dwellers who should be the main recipients. In the next sub-section, we discuss in detail these trends of housing affordability and factors associated with the unaffordability for most target beneficiaries.

Table 4. Trends in housing affordability based on the housing-price-to-income ratio. Data source: field survey (July to September 2018 and January to March 2019) and review of housing price lists held by real estate developers.

Real Estate Developer	Housing Package	Housing Price in US Dollars	PIR: ≤ 3.0 (Affordable)		PIR: $>3.0 \leq 4.0$ (Moderately Unaffordable)		PIR: $>4.0 \leq 5.0$ (Seriously Unaffordable)		PIR: > 5.0 (Severely Unaffordable)	
			% of Households	Income Range	% of Households	Income Range	% of Households	Income Range	% of Households	Income Ranges
Abadahigwa Kuntego Ltd.	3-bedroom house	30,535	19.62	902.93–1354.41	15.89	677.20–846.50	9.35	564.33–620.77	55.14	225.73–507.90
Groupe Palmeraie Développement	2-bedroom, 1st and 2nd floor	32,500	19.62	902.93–1354.402	15.89	677.2–846.5	9.35	564.33–620.77	55.14	225.73–507.9
	2-bedroom, 2nd and 3rd floor	36,500	15.17	1015.8–1354.402	12.15	790.07–959.37	13.54	620.77–733.63	60.75	225.73–564.33
	2-bedroom, ground floor	39,000	10.28	1128.67–1354.402	13.08	846.5–1072.23	12.15	677.2–790.07	64.49	225.73–620.77
	3-bedroom, 1st, 2nd & 3rd floor	42,500	8.41	1185.11–1354.41	11.21	902.93–1128.67	12.15	733.63–846.50	68.23	225.73–677.20
Shelter Afrique	1-bedroom	22,953	35.51	677.20–1354.41	14.02	507.90–620.77	14.02	395.03–451.47	36.45	225.73–338.60
	2-bedroom	42,627	8.41	1185.11–1354.41	11.21	902.93–1128.67	12.15	733.63–846.50	68.23	225.73–677.20
	3-bedroom	55,743	0.00	-	8.41	1185.11–1354.41	23.36	733.63–1128.67	68.23	225.73–677.20
	4-bedroom	68,859	0.00	-	0.00	-	31.77	1185.102–1354.41	68.23	225.73–1,128.67
Mean			16.7		12.73		15.32		60.54	
(Un)Affordability trends			Affordable		Moderately unaffordable		Seriously unaffordable		Severely unaffordable	

5.1. Trends in Housing (Un)Affordability Based on Households' Incomes

The results summarised in Table 4 are presented in detail in Table 5 below. These detailed results reveal that a good affordability index, which is equal to or less than 3.0, starts from households which earn 902.9 US dollars per month. It shows that only 19.62 % of the low- and middle-income people who participated in our survey can afford the three-bedroom house developed by the *Abadahigwa Kuntego Ltd* or a two-bedroom on the 1st or 2nd floor among the housing units proposed by *Groupe Palmeraie Développement*. This percentage falls to 15.17% of households whose monthly income is greater than 1000.00 US dollars. They can afford the two-bedroom house proposed by the same investors. For the remaining housing units (two- and three-bedroom apartments), proposed by *Groupe Palmeraie Développement* and *Shelter Afrique*, the percentage of households which can afford them falls between 8% and 10%. They are households whose monthly income is relatively high, ranging between 1015.8 and 1354.41 US dollars. However, 38% of households whose monthly incomes vary between 677.20 and 1354.41 US dollars can afford a one-bedroom housing unit. Although this percentage seems to be higher than the percentage of households which can afford a two- or three-bedroom house, most surveyed households, representing 50%, cannot afford a one-bedroom housing unit. Even if a large number of people can afford the one-bedroom house, it is not attractive to most Kigali households (more than 85%), whose family size varies between four and five people on average [43,71]. During the discussion on the affordability of this type of housing unit, 87% of our respondents argued that it is attractive for single tenants only. These people generally earn less than 450.0 US dollars and therefore cannot even afford a one-bedroom housing unit, as revealed by this study. This imbalance between the number of rooms in a housing unit on sale and the household size has been largely mentioned in housing studies among the factors which preclude the attractiveness of various houses for the low-income families, even if these houses are affordable [72]. Therefore, most large families are much interested in purchasing housing units whose bedroom number is proportional to the family size. Unfortunately, between 64.49% and 80.38% of them can afford neither a two- nor a three-bedroom housing unit. They are among the households with a monthly income ranging between 225 and 900 US dollars, as Tables 4 and 5 show.

Table 5 shows that a high percentage of households which cannot afford the housing units proposed by real estate developers in Kigali city have low incomes, compared to the small percentage of households which can afford these houses: more than 70% of households in our case study are in the situation of *serious* and *severe unaffordability*, with an unaffordability index which is greater than 5.0. The results presented in Tables 4 and 5 reveal a significant degree of unevenness across the income ranges. A great proportion of developed affordable housing units are not affordable for most of the target beneficiaries. As stated previously, people who cannot afford them are the lowest-income groups (47%), whose income is below 400 US dollars per month. Consequently, these people do not benefit from the current affordable housing schemes, because their incomes are incommensurate with the prices of all housing units developed under these schemes. This unveils some trends of inequity in access to housing for Kigali city inhabitants. Inequity issues related to the limited access to affordable houses for the low-income groups, when the development of these houses is legally backed by the government, through various funding schemes and public policy [73]. In a Kigali city development context, these trends show that the national aspirations of promoting inclusive city through the development of mixed-income urban neighbourhoods as stated in the national urbanisation policy [17,49] may hardly be attained. The reason for this is that most of the low-income people in need of decent housing cannot afford decent houses in the planned residential neighbourhoods from this perspective of affordable housing schemes which are supported through public funds. As Table 5 shows, these people cannot afford any of the one- to three-bedroom housing units. Our results also reveal that the four-bedroom houses proposed by *Shelter Afrique* are not affordable for all low- and middle-income households. However, such a housing unit is suggested among the affordable houses in the current affordable housing packages under development. Though it represents 2.6% in these packages in our unit of analysis, it should not be out of reach for these categories of urban dwellers, since its accessibility can help in curbing the problem of housing for parent families whose household size can reach up to six people or more [43,71].

Table 5. Housing affordability indices based on housing price and gross annual household income. Data source: Field survey (July–September, 2018 and January–March, 2019) and review of housing price lists held by real estate developers.

Household Details				Housing Developer								
				Abadahigwa Kuntego Ltd.	Groupe Palmeraie Développement				Shelter Afrique			
Percentage of surveyed households	Monthly income in \$	Annual income in \$	Cumulative percentage of surveyed households	3 bedroom	2 bedroom, 1st and 2nd floor	2-bedroom 2nd and 3rd floor and Parking	2-bedroom Ground floor and parking	3-bedroom 1st, 2nd & 3rd floor	1-bedroom	2-bedroom	3-bedroom	4-bedroom
				Number of Units and Unit Price								
				54	264	246	234	566	866	982	719	107
				30,535	32,500	36,500	39,000	42,500	22,953	42,627	55,743	68,859
15.89	225.73	2,708.80	100.00	11.27	12.00	13.47	14.40	15.69	8.47	15.74	20.58	25.42
11.21	282.17	3,386.00	84.11	9.02	9.60	10.78	11.52	12.55	6.78	12.59	16.46	20.34
9.35	338.60	4,063.21	72.9	7.51	8.00	8.98	9.60	10.46	5.65	10.49	13.72	16.95
7.48	395.03	4,740.41	63.55	6.44	6.86	7.70	8.23	8.97	4.84	8.99	11.76	14.53
6.54	451.47	5,417.61	56.07	5.64	6.00	6.74	7.20	7.84	4.24	7.87	10.29	12.71
4.67	507.90	6,094.81	49.53	5.01	5.33	5.99	6.40	6.97	3.77	6.99	9.15	11.30
5.61	564.33	6,772.01	44.86	4.51	4.80	5.39	5.76	6.28	3.39	6.29	8.23	10.17
3.74	620.77	7,449.21	39.25	4.10	4.36	4.90	5.24	5.71	3.08	5.72	7.48	9.24
3.74	677.20	8,126.41	35.51	3.76	4.00	4.49	4.80	5.23	2.82	5.25	6.86	8.47
4.67	733.63	8,803.61	31.77	3.47	3.69	4.15	4.43	4.83	2.61	4.84	6.33	7.82
3.74	790.07	9,480.81	27.10	3.22	3.43	3.85	4.11	4.48	2.42	4.50	5.88	7.26
3.74	846.50	10,158.01	23.36	3.01	3.20	3.59	3.84	4.18	2.26	4.20	5.49	6.78
2.80	902.93	10,835.21	19.62	2.82	3.00	3.37	3.60	3.92	2.12	3.93	5.14	6.36
1.87	959.37	11,512.42	16.82	2.65	2.82	3.17	3.39	3.69	1.99	3.70	4.84	5.98
2.80	1015.80	12,189.62	14.95	2.51	2.67	2.99	3.20	3.49	1.88	3.50	4.57	5.65
1.87	1072.23	12,866.82	12.15	2.37	2.53	2.84	3.03	3.30	1.78	3.31	4.33	5.35
1.87	1128.67	13,544.02	10.28	2.25	2.40	2.69	2.88	3.14	1.69	3.15	4.12	5.08
1.87	1,185.102	14,221.22	8.41	2.15	2.29	2.57	2.74	2.99	1.61	3.00	3.92	4.84
2.80	1,241.535	14,898.42	6.54	2.05	2.18	2.45	2.62	2.85	1.54	2.86	3.74	4.62
1.87	1,297.968	15,575.62	3.74	1.96	2.09	2.34	2.50	2.73	1.47	2.74	3.58	4.42
1.87	1,354.402	16,252.82	1.87	1.88	2.00	2.25	2.40	2.61	1.41	2.62	3.43	4.24
(Un)Affordability trends				Affordable	Moderately unaffordable		Seriously unaffordable			Severely unaffordable		

In the analysis of affordability, the discussed results were obtained using the housing-price-to-income ratio, based on the total prices of a house unit and the median household annual income. Since most of the households in Kigali city use bank loans to fund and purchase their houses, as confirmed by 73% of our respondents and the existing studies [29], we undertook an in-depth analysis on affordability, using the bank loan at 30% of the household incomes and for 20 years as the bank loan term, as stated in the current Rwandan affordable housing schemes [74]. The results of the analysis reveal similar trends, portraying a high degree of unaffordability indices, as presented in Table 6. As suggested in this analytical approach, a good affordability index should be equal to or below 30%. However, our results show that the percentage of households which can afford any housing unit among the house proposed by all real estate developers is very low. In the housing package of the *Abadahigwa Kuntego Ltd*, this percentage is less than 15%. These households earn more than 1000 US dollars per month. The percentage of people who can enjoy the moderate affordability index is 12.15 % only. Generally, these figures show that less than 28% of households in Kigali city, which earn more than 790.07 US dollars per month, can afford the housing units proposed by *Abadahigwa Kuntego Ltd*. This percentage is even lower than the percentage of households (35.51%) which can afford these housing units using the gross annual income, as shown in Table 4. This is linked with an increase in each housing unit price, driven by the loan interest rate and various transaction costs associated with the bank loans. Thus, the number of people who can afford the housing unit in this case decreases [13]. These trends of housing unaffordability for a large number of Kigali city inhabitants is observed through the housing units proposed by *Groupe Palmeraie Développement* and *Shelter Afrique*, as Table 6 shows.

As Table 6 shows, the percentage of households which can afford the housing units proposed by *Groupe Palmeraie Développement* varies between 12.15% and 27.1%, if we consider the good and moderate affordability indices. As for *Shelter Afrique*, its housing units are mostly not affordable for Kigali city dwellers, except for the one-bedroom house, which can be afforded by 44.86% of the city households. Nevertheless, this type of housing unit does not attract buyers, since it cannot fit a large family size, as mentioned previously. Generally, these figures demonstrate that the percentage of households which can afford the housing units developed under the affordable houses schemes is very low. They also show that the very-low-income households cannot afford any housing unit, since this requires that they pay more than 100% of their income for all housing units proposed by the real estate developers. Therefore, the affordable housing schemes under implementation in Kigali city do not solve the problem of housing for the people who should be the beneficiaries of these schemes. Our findings concur with the opinions of most participants in this study. They contend that the total cost of most of housing units developed under the affordable housing schemes is very high and this makes them unaffordable. This was stated by our key interviewees and 76% of the heads of households who participated in the survey. In commenting on these costs (and by referring to the use of bank loans), they argued that the high price of each housing unit is driven by the loan interest rate and other bank charges paid by the buyers. As they stated, they find the price of any unit of the so-called affordable houses very prohibitive when compared to the cost of a housing unit developed through the self-help construction approach. In criticising the costs of these affordable houses, some of our respondents maintained that *“it is surprising to hear that a 4-bedroom house is being sold at the price of 68,000 US dollars or more, while it may cost less than 40,000 US dollars, land price included, through self-help construction”*. Departing from this argument, 100% of the respondents stated that *“besides being unaffordable for most of Kigali city inhabitants, these houses are very expensive, when compared to the costs of housing units built-up using similar material and which are on sale on the general local market”*. Based on this trend of unaffordability, participants in our household survey have suggested that the government and the real estate developers should find another term to use, instead of calling it *“affordable”*. These respondents stated that *“the prices for most of these houses are very high, if one could relate these prices to what affordability really means.”* They went on to assert that *“affordability means that someone can purchase a housing unit, using part of his/her income and reserve another part for other needs. However, even if most of Kigali city inhabitants should use their entire income, they cannot afford these houses. They are being developed*

for rich people". However, these respondents pointed out that the housing units developed by the *Abadahigwa Kuntego Ltd* (one of the three agencies under study) are affordable for some categories of Kigali city dwellers, as Tables 4 and 5 show. This was stressed by six respondents, who mentioned the names of people that they know who live in houses purchased from this real estate developer.

The question of housing unaffordability was not pointed out by Kigali city households only. Through our interviews, four out of six government officials who follow up the implementation of affordable housing schemes were also cognisant of the high prices of the housing units developed throughout these schemes. They asserted that low-income groups cannot afford these houses. They commended the idea that other options for promoting housing affordability in Kigali city should be investigated. Apart from the high cost of construction material, these key informants contended that other factors of unaffordability include expensive internal installations, comprising the kitchen and bathroom. This is consistent with the existing studies echoing that the high costs of imported construction materials and internal installations are among the factors for housing unaffordability in Kigali city [16,29]. The investment profit set by the real estate developers was also questioned by our key informants. Based on data we collected from the real estate developers and through the review of the existing studies on housing affordability in Kigali city, this profit varies between 18% and 20% of the construction cost of each housing unit [12,29]. Our informants critically maintained that this profit expected by the real estate developers makes the cost of each housing unit very expensive. In addition, the high salaries of the foreign engineers and local experts employed in the construction of these houses is also a factor contributing to increases in the current housing prices. In the discussion about the triggering effect of this factor on the sale price of each housing unit, our interviewees referred to *Abadahigwa Kuntego Ltd*, which employs local experts only, while the experts and technicians hired by other agencies include foreigners whose salaries are relatively high, as stated by these informants. This effect is captured in the prices of their houses, which are higher than the price of houses developed by *Abadahigwa Kuntego Ltd*, as Table 4 shows. The issue of the prohibitive prices of the affordable housing units received much momentum during our interviews with researchers and policy makers. Like participants in our household surveys, these interviewees contended that *"the concept of affordability is abused. The housing schemes under implementation should be termed differently, because they deliver housing units which are not affordable for most Kigali city inhabitants"*. This problem of unaffordability was stressed by one of the participants in the interviews who had been a university lecturer. He is currently a consultant for urban development, planning and management. He stated: *"how can these houses be affordable since none of the more than 74% of public servants can afford any housing unit among them?"* He was referring to the incomes of most of Kigali city dwellers who are employed in education and health sectors and security forces (police, military), and whose salaries vary between 109.92 and 329.75 US dollars per month.

Limited access to affordable housing for poor and low-income urban dwellers is a global challenge. These categories of people are generally excluded from the general housing market in many developing countries. In African cities, the existing studies on housing affordability assessed using the price-to-income ratio approach show a mean affordability index of 12.5, which is very high, and reveal limitations in access to the available housing units for the overwhelming number of urban dwellers [41,75]. Generally, across Africa cities, low-income households are severely overburdened by high housing costs, as pointed by Bah, Faye and Geh [76]. Similar trends are reported in East Africa, where Kigali city is located. In this region, the price-to-income ratio of 9.3 and 22.3 for 40 and 80 m² houses, respectively, has been recorded for the low-income groups [76]. This trend of housing cost burden is consistent with our findings on Kigali city, as presented in Table 5. The main factors for housing unaffordability in this region are summarized in Table 7.

Table 6. Housing affordability indices based on bank loan at 30% of the household's monthly income. Data source: Field survey (July to September 2018 and from January to March 2019) and review of housing price lists held by real estate developers.

Household Details					Housing Developer									
					Abadahigwa Kuntego Ltd.	Groupe Palmeraie Développement				Shelter Afrique				
Percentage of surveyed households	Monthly income in \$	Annual income in \$	Percentage of surveyed households	Cumulative percentage of households	3 bed room	2 bedroom, 1st and 2nd Floor	2-bedroom 2nd and 3rd Floor and Parking	2 bedroom Ground Floor and parking	3 bedroom 1st, 2nd & 3rd Floor	1 bed room	2 bed room	3 bed room	4 bed room	
					Number of Units and Unit Price									
					54	264	246	234	566	866	982	719	107	
					30,535	32,500	36,500	39,000	42,500	22,953	42,627	55,743	68,859	
17	225.73	2708.80	15.89	100	130.68	139.11	155.94	166.57	181.63	98.35	182.08	238.34	294.60	
12	282.17	3386.00	11.21	84.11	104.55	111.28	124.75	133.25	145.31	78.68	145.66	190.67	235.67	
10	338.60	4063.21	9.35	72.9	87.13	92.74	103.96	111.05	121.087	65.56	121.38	158.89	196.39	
8	395.03	4740.41	7.48	63.55	74.68	79.48	89.11	95.18	103.78	56.20	104.04	136.19	168.34	
7	451.47	5417.61	6.54	56.07	65.35	69.55	77.97	83.28	90.82	49.17	91.04	119.17	147.30	
5	507.90	6094.81	4.67	49.53	58.08	61.82	69.31	74.03	80.73	43.71	80.92	105.93	130.94	
6	564.33	6772.01	5.61	44.86	52.28	55.64	62.37	66.63	72.65	39.34	72.83	95.34	117.84	
4	620.77	7449.21	3.74	39.25	47.52	50.58	56.71	60.57	66.05	35.76	66.21	86.67	107.13	
4	677.20	8126.41	3.74	35.51	43.56	46.37	51.98	55.53	60.54	32.78	60.69	79.45	98.19	
5	733.63	8803.61	4.67	31.77	40.21	42.81	47.98	51.25	55.88	30.26	56.03	73.34	90.64	
4	790.07	9480.81	3.74	27.1	37.34	39.74	44.56	47.59	51.89	28.09	52.03	68.09	84.17	
4	846.50	10,158.01	3.74	23.36	34.85	37.09	41.58	44.42	48.44	26.23	48.55	63.56	78.56	
3	902.93	10,835.21	2.80	19.62	32.67	34.77	38.98	41.64	45.41	24.58	45.52	59.58	73.65	
2	959.37	11,512.42	1.87	16.82	30.75	32.73	36.69	39.19	42.74	23.14	42.85	56.08	69.32	
3	1,015.80	12,189.62	2.80	14.95	29.04	30.91	34.65	37.02	40.36	21.85	40.47	52.97	65.46	
2	1,072.23	12,866.82	1.87	12.15	27.52	29.28	32.83	35.06	38.24	20.71	38.34	50.18	62.03	
2	1,128.67	13,544.02	1.87	10.28	26.14	27.82	31.18	33.32	36.33	19.67	36.42	47.67	58.92	
2	1,185.102	14,221.22	1.87	8.41	24.89	26.49	29.71	31.73	34.59	18.73	34.68	45.40	56.12	
3	1,241.535	14,898.42	2.80	6.54	23.76	25.29	28.35	30.28	33.03	17.88	33.11	43.34	53.57	
2	1,297.968	15,575.62	1.87	3.74	22.73	24.19	27.12	28.97	31.58	17.11	31.67	41.45	51.24	
2	1,354.402	16,252.82	1.87	1.87	21.78	23.18	25.98	27.76	30.27	16.39	30.35	39.73	49.10	
(Un)Affordability trends					Affordable			Moderately unaffordable			Unaffordable			
					Less than 30% of household income			Between 30% and 40% of household income			Over 40% of household income			

Table 7. Main factors affecting the high cost of a housing unit in Eastern Africa.

Factors for Housing Unaffordability	City and Country				References
	Nairobi (Kenya)	Kampala (Uganda)	Dar Es Salaam (Tanzania)	Kigali (Rwanda)	
Low household income	++ ⁵	++	++	++	
High construction costs	++	++	++	++	[29,41,65,75–78]
Limited access to bank loan	++	++	++	++	
Construction materials	+ ⁶	++	++	++	
Taxes on the investment	++	++	++	++	

Table 7 shows different factors, including low household income, high construction costs, limited access to bank loan, construction materials, and taxes on the investment, which commonly affect housing affordability in East African cities. Apart from the cost of construction materials, whose industry is highly developed in Nairobi and therefore moderately influences the cost of the construction of a housing unit, other factors highly and similarly affect cost in all cities. As a consequence, only the high- and the top-tier middle-income groups can afford the housing units which are produced by the real estate agencies in these cities. The livelihood of the low-income urban dwellers is generally threatened by limited access to decent and affordable housing, necessitating investigation into various options to curb this problem through housing studies. The next section presents and discusses different options which can be applied in Kigali city to decrease the high housing prices and promote access to housing for all categories of its inhabitants.

5.2. Strategies to Promote Housing Affordability in Kigali City

Curbing the problem of housing affordability in Kigali city is crucial, since the prices of the available housing units on the market are very prohibitive. This is mainly due to the very low monthly wage of most households, 253.00 US dollars on average [16]. This section foregrounds on the above findings and builds upon the provisions of policies, laws, and strategic development plans related to land management and socio-economic development in Rwanda, which are presented in Section 2.3 of this paper, to suggest various approaches for promoting housing affordability. This affordability should be promoted not only from the perspective of the affordable housing schemes under implementation, but also the general framework of promoting access to decent houses for all Kigali city inhabitants. These approaches include the development of low-cost housing units which can be rented by low-income people, progressive housing ownership rights acquired through a rent-to-own approach, self-help construction using local construction materials, and improving the existing housing units through upgrading informal settlements. Other approaches could consist of decreasing the costs of affordable houses through tax exemption on imported construction materials and housing sale, and setting low-profit interests in combination with an increased supply of low-cost housing units to various income categories. Decreasing housing costs should generally consist of developing various housing units which can be afforded by the lowest-income urban dwellers interested in acquiring decent houses from the affordable housing schemes [79]. It also constitutes a mechanism to promote the integration of this group of urban inhabitants into the urban fabric.

⁶ Moderately affects the housing affordability.

⁵ Highly affects the housing affordability.

5.2.1. Access Through Private Low-cost Rental Housing

The development of low-cost houses that can be afforded by low-income people through a rent arrangement has been conceived among various possible options to promote their access to decent housing. This option was supported by our key informants during the survey. They suggested that Kigali city authorities and the Government of Rwanda should set up housing schemes that facilitate the development of a large number of housing units that Kigali city dwellers can access through long-term rent. This approach is largely applied in many countries that support the rental housing development project and therefore promote long rental tenancies for poor and low-income groups who are unable to own their dwellings due to limited financial resources. For instance, various European countries have housing development regulations which require real estate developers to reserve at least 20% of the zoned for residential land for low-cost houses that can be rented by the poor and low-income people [80]. It also requires setting up regulations which permit the preservation of affordability for people, at or below the 30% of household income [81,82]. This approach to low-cost housing development is commonly referred to as inclusionary housing, which tends to maintain housing units within the reach of low-income groups, and therefore promote their integration in the growing urban fabric [83–85]. In any country, the inclusionary housing approach could be a government choice, by making it mandatory or voluntary for real estate developers, with respect to existing housing policy or affordable housing schemes [86,87]. Respondents to our survey questionnaires and participants in our interviews suggested that the government of Rwanda can introduce this affordable housing development option in collaboration with real estate developers. Some of the most applied options include the release of government-owned land within the urban footprint and the provision of housing development subsidies in order to curtail the costs of each housing unit [7]. In the Kigali city context, our key informants suggested that the government should apply the housing subsidies approach and collaborate with different agencies such as RHA, RSSB and BRD, which are among the key actors in housing sector, to develop affordable houses which can be accessed by low-income households.

5.2.2. Progressive Housing Ownership through Rent-to-Own

The rent-to-own option is among the other practical alternatives for low-income households whose financial resources are very limited and do not allow them to directly purchase their own houses through a down-payment. It is applied to enhance access to housing for a large number of households, within the limits of their employment contracts or incomes, which are the main conditions for rent payment [53,88]. It may be introduced in Kigali city through public housing funding schemes. This housing scheme is also encouraged by the Rwandan national housing policy which highlights the crucial role of the government in supporting the housing market to foster access to housing for all income groups, with specific consideration of the lowest income earners [17]. However, the introduction of the rent-to-own approach requires the revision of the current affordable housing loan schemes, so that real estate developers may be granted long-term loans at low interest rates, since it will also take a long time for the buyers to cover the total cost of the house. Participants in this study suggested that RSSB, which manages the pension contribution paid by all public and private employees, as well as the BRD, which manages large funding schemes related to country development, might contribute to the development of these houses, which could be sold to low-income earners through the rent-to-own approach. To promote housing accessibility for a large number of households through the rent-to-own housing ownership approach, a long-term affordability period is suggested [89]. In developed countries, and countries with emerging economies, the affordability is generally set at 30 years to provide different low-income groups with a long enough period to cover the cost of housing [90]. In fact, the long affordability duration increases the likelihood that households will be able to pay for their housing units within the limit of their incomes.

5.2.3. Decreasing Housing Costs and Change in Investment Strategies

As suggested by different studies on the housing market in Kigali city [14,91] and our key informants, real estate developers should shift from developing very expensive houses to low-cost houses which can be purchased at reasonable prices. For instance, 86% of the participants to this study criticized the RSSB, which is the main actor in real estate development, and its partner called the Ultimate Developers Ltd (UDL), for developing very expensive and luxury houses whose prices are out of reach for most Rwandans. Based on data collected from the offices of these organisations, the prices of some of their houses are set as follows: 71,600 US dollars for a two-bedroom apartment, 107,600 US dollars for a three-bedroom apartment, 208,600 US dollars for a three-bedroom apartment, and 226,460 US dollars for a four-bedroom apartment⁷. The analysis of their affordability using the PIR ratio suggests that to obtain a good affordability index, which is equal to or less than 3, the buyer should have a monthly income ranging between 2000 and 6300 US dollars. Notwithstanding, less than 4% of Kigali city households earn a monthly gross income greater than 1000 US dollars [13,29]. This means that Kigali city inhabitants cannot afford these luxurious housing units. This problem of unaffordability has already been experienced by these agencies, which reduced the initial prices up to 60% of the developed housing units, but they remain unaffordable for Kigali city dwellers⁸. Based on these non-promising experiences, these agencies were largely criticised by our interviewees. One of them stated that: *“Decision makers from RSSB are aware of the incomes of employees in public and private agencies through their contribution to pension schemes. However, this (RSSB) agency develops housing units that none of these employees can afford, not even a one-bedroom apartment among the developed housing units”*. Around 78% of our informants recommended that the RSSB and UDL revise their business models so that they can develop low-cost houses which are affordable for most of employees in public and private sectors, since they (these employees) are among the target clients for whom these houses are developed. Our informants stated that Kigali city inhabitants use their own incomes to develop their houses through self-help construction so that real estate developers should invest in low-cost houses, affordable for low and middle incomes, otherwise the investments of these agencies will vanish due to lack of buyers.

As suggested in many studies, there is a need to shift from high-cost housing units to the development of massive and low-cost residential buildings (at a low profit, like 10% or less, as suggested by our interviewees) which can be sold to a large number of Kigali city inhabitants. The cost of the construction material also inhibits housing affordability. As stated by the World Bank, the cost for a housing unit is 20 to 30 percent higher in Rwanda than in Nairobi (Kenya) and Johannesburg (South Africa). The reason for this is that some of the construction materials are imported from East and South Africa, United Arab Emirates (UAE) and China. The most imported materials are cement, steel products, porcelain, and many interior installations such as plumbing and electrical goods [12,16,29]. These materials are more than 50 percent more expensive than the same products in East and South Africa [16]. This requires strategies that can help to decrease their cost, in order to make the produced housing units affordable. For instance, there could be options for the substitution of cement with cheaper alternatives. Some studies have estimated the substitution of cement with the fly ash or pozzolana material could be up to 35% without compromising the quality of the houses [92]. Studies carried out by *Skat Consulting Rwanda*, a Swiss company operating in housing sector in Rwanda, have demonstrated that using the modern brick duplex comprising the RCC-reinforced Rowlock-Bond made of modern bricks (see Figure 2) can contribute to the decrease in the cost of each housing unit [93].

⁷ Data were acquired from the price lists on different housing packages which are developed by RSSB.

⁸ <https://www.newtimes.co.rw/news/prices-vision-city-homes-slashed-60-civil-servants>.



Figure 2. Modern Brick Duplex and model houses proposed by Skat. Data source: Skat Consulting Rwanda Ltd [93].

Skat Consulting Rwanda proved that these construction materials can be used in constructing both single houses and apartments of up to four floors. Their experiments show that the construction of a three-bedroom unit can cost less than 13,544 US dollars and a five-bedroom unit can cost 28,216 US dollars⁹, including all installations, tax and profits, with land excluded [93]. Compared to the prices of housing units developed by real estate developers using the cement blocks or burned bricks, the cost for these housing units varies from 28,950 to 42,500 US dollars and from 68,000 and 68,859 US dollars for the three- and four-bedroom housing units, respectively (field survey, January–March 2019). These prices are very high, so changes in construction material need to be adopted in order to decrease housing prices. As suggested in the existing studies, decreasing the cost of construction materials should also consist of promoting the local construction industry through strengthened professionalism and skills that can result in increased local material production at moderate prices. Employing local professionals during the construction works has also been suggested as a mechanisms to decrease the price of each housing unit [16,17,91].

Along these lines, participants in our survey have suggested the exemption of the tax levy on construction materials imported by real estate developers who actively participate in the implementation of affordable housing schemes. As stated in the introduction, investment law grants the preferential corporate income tax rate of zero per cent (0%) to real estate agencies whose investment capital is equal to or greater than 10,000,000 dollars [18] to encourage investment in different sectors of socio-economic development in Rwanda. This tax exemption may also be applied to all investors in affordable housing (including companies whose capital is lower than the above-mentioned amount), in order to encourage investment in housing and promote its affordability for low-income people. Tax exemption can also result in increased incentives for real estate developers to invest in affordable housing programmes in Kigali city. Based on our field survey data, by the year 2018, more than 14 agencies had registered with the RDB for investment in affordable housing development. They intended to launch the development of 25,000 housing units by 2016 [91]. However, eight of these agencies have been discouraged by the high cost of housing construction and therefore have not yet started their projects, due to fear of not selling the developed houses, since they are not affordable for Kigali city inhabitants, as stated by our key-informants during the field surveys. Other currently operational real estate developers who have

⁹ The exchange rate was 886 Rwandan Francs for 1 US dollars on 17 January 2019.

been running their projects since the year 2015 are expected to produce 5598 housing units¹⁰. As the annual demand is 20,000 housing units [16], the current rate of housing production is insufficient to satisfy this demand. Therefore, tax exemptions should be applied for real estate developers who are interested in producing low-cost housing units which can be accessed by the lowest-income segments either through sale or long-term rent. This has a further advantage of preventing informal settlement growth if the beneficiaries can no longer use the informal housing development as an alternative to accessing housing in urban areas.

Taxation can significantly affect the cost of a housing unit in Kigali city. For example, the proposals for affordable housing development accessed from two of the agencies which participated in this study show that a tax levy of 14.80% of the total project budget is included in the housing cost. Similarly, the World Bank mentions that a value-added tax of 15% is included in the housing cost [16]. This tax has been mentioned among the factors contributing to the high cost of each affordable housing unit. If this tax is exempted, the price for each housing unit will decrease. However, the tax exemption may raise debate. Still, it could be discussed from the perspective of a win-lose or lose-win approach, asserting that one can attain the desired positive outcomes at the expense of the other interests in order to solve crucial social problems [94,95]. It is in this context that various developed countries adopt this tax exemption approach in order to meet the housing needs of the low-income people and achieve the national aspiration of social welfare [96]. Political leaders and decision-makers in Rwanda may choose the lose-win approach, through tax exemption, in order to achieve the national goals of inclusive urban development and promoting access to housing for all categories of Rwandans, as stated in the current urbanisation and housing policies [17,49]. This can be combined with the adoption of zoning regulations which permit poor and low-income households to develop their houses through a self-help construction approach. The tax exemption strategy has been applied in developed countries through tax-exempt bonds which allow for the development and supply of low-cost housing units. However, its application requires strict regulations and control so that the recipient agencies cannot invest in the luxury houses which are not affordable for the low- or moderate-income groups [97].

5.2.4. Access through Self-help Housing Development with Local Materials

To curb the problem associated with the financial burden for Kigali city inhabitants in accessing decent houses, other options should be considered. This can consist of using low-cost materials such as adobe bricks and self-help construction, in combination with the incremental housing development approach, as shown in Figure 3.

Figure 3 shows that it is possible to develop a single-family house using local materials like adobe bricks and improve it until it looks as good as a house constructed using cement blocks or burned bricks. Based on our field data, the cost of the construction of the former is estimated at 19,785.02 US dollars, compared to 32,975.12 US dollars for the latter. The cost analysis using the housing-price-to-income ratio approach shows that this low-cost house (in adobe bricks) can be affordable for all households whose income is at least 400.00 US dollars per month. However, this self-help housing construction option using local materials has limitations that can inhibit its application by most Kigali city inhabitants. It requires large tracks of land while the buildable land in Kigali city is very limited. The current masterplan for Kigali city allocates a ratio of 12% of the buildable urban land to these low-cost houses [25]. This study, therefore, suggests other options that may consist of developing multistory houses over a limited space. These houses may be developed for middle-income and rich people through a condominium approach, as suggested in Figure 4.

¹⁰ See also <https://www.newtimes.co.rw/news/shelter-afrique-brd-revive-low-cost-housing-project>.



Figure 3. Model for single-family houses under development in Kigali city. Data source: field survey (July to September 2018 and January to March 2019).



Figure 4. Self-help construction using durable material in a condominium approach. Data source: authors’ design.

Figure 4 proposes a model for shifting from single houses to multistory houses for the sake of promoting densification and access to decent houses for most urban dwellers. This approach is also encouraged in the current masterplan of Kigali city. Based on our findings, which revealed that the prices of the so-called affordable houses proposed by real estate developers are very prohibitive, this

study suggests that different families can buy one plot of land and develop such a model of multistory houses using their funds, within the framework of the condominium ownership arrangements. This option is grounded on the analysis of the price of a three-bedroom apartment housing unit, proposed by two real estate developers (*Groupe Palmeraie Développement* and *Shelter Afrique*). The mean price is 49,121.50 US dollars. If three families buy land at 10,991.67 US dollars (based on the land prices collected during our survey and Uwayezu and de Vries [20]) they can develop a two-floor house at 113,799.87 US dollars. If we add the cost of the land, the total cost can, therefore, be 124,791.54 for three housing units, against the 14,7364.5 US dollars that they would pay if each of them purchased a single house from these real estate developers. For a three-floor house, self-constructed by four families, the total cost is estimated at 179,702.22 US dollars, against the 196,486.00 US dollars that they would pay to private developers if each family purchased one apartment unit¹¹. In each of these two scenarios, one family can occupy the housing unit on the ground floor. It is also worth noting that this study found that the price for a three-bedroom apartment sold by real estate developers operating on the general housing market in Kigali city can culminate to up to 74,607.05 US dollars (see also¹²). Generally, our study reveals that Kigali city dwellers can develop their own houses through the self-help construction of these forms of multi-storied houses at prices which are lower than those proposed by most private real estate developers, who are also among the providers of so-called affordable houses. Therefore, the self-help housing development option, through the condominium form of tenure, can be cost-effective for Kigali city inhabitants if they collaborate in meeting their needs in housing. Besides, this form of tenure is supported by the current Rwandan land and condominium law and urban development policies. These legal instruments promote condominiums to counter the shortage of residential land and promote the urban densification that would result in optimal use of the limited residential land [47,49,98]. However, this option requires change in the individuals' tenure structure, through a shift from a private to a common property system, which also spurs the social mix in urban (re)development. In this fashion of promoting a social mix, this study recommends the improvement in the existing residential housing units through informal settlement upgrading in a bid to promote the integration of poor and low-income people in the urban fabric.

5.2.5. Improving the Existing Houses through Informal Settlements Upgrading

Since more than 70% of Kigali city inhabitants live in informal settlements and constitute the majority of people who are highly in need of decent houses [99], the practical option to mitigate their problem of access to decent houses should consist of upgrading the existing houses in these settlements. Clearing most of these settlements, as recommended in the current masterplan of Kigali city, can result in another burden, consisting of increased demand in new houses whose supply remains very limited [30,91,100]. Still, many studies have proved that informal settlement upgrading operations in various countries have contributed to the curbing of the housing affordability problem, for poor and low-income urban dwellers in developing cities [101,102]. In Kigali city, this operation would consist of providing some basic amenities, such as good road networks, public lighting, sanitation and drainage systems and the protection of hazard-prone areas, preceded by the relocation or expropriation of the affected people. It should also consist of setting up urban renewal regulations which allow the property owners to improve or consolidate their houses. This option of informal settlement upgrading is propelled by the increasing demand for affordable housing that the current housing supply does not satisfy, as stated in various studies on the housing market in Kigali city [14,27,103,104]. On the government side, upgrading informal neighbourhoods can be cheaper than developing new urban

¹¹ These costs were calculated based on different housing designs and estimates of their costs collected from different engineers and architects operating on the housing market in Kigali city.

¹² <https://www.newtimes.co.rw/news/prices-vision-city-homes-slashed-60-civil-servants>.

neighbourhoods, which require many investments in the provision of basic infrastructure in new residential areas.

As stated by housing development scholars, realizing a new housing development requires many investments from the government in terms of providing infrastructure and other public services such as roads, water, electricity, waste management systems, health and education facilities, and other services which become a public burden [105]. Some of these scholars estimate the cost for land and infrastructure at 60% of the total cost of any large-scale housing development project [65,90]. To decrease this cost, it would be better to upgrade the existing houses when some of these basic facilities such as water, electricity, public transportation services exist. Therefore, this should be applied in Kigali city's informal settlements, since more than 80% of the existing houses have connections to water and electricity supply systems, with access to education and health facilities, and road networks in most of these neighbourhoods [20,32,43]. Informal settlement also has an added advantage of promoting a participatory approach to urban space co-production, since their dwellers can take part in the transformation of their neighbourhoods, improving their conditions and feeling integrated in the urban fabric [51,106–108]. Central to the implementation of this option is the increased recognition of the rights of poor and low-income dwellers to housing and their integration into the urban fabric, which also become drivers for sustainable and inclusive cities.

5.2.6. Slum Conversion into Shared Residential Apartments

As stated in the previous section, one way of minimising the costs of the basic amenities and services required for the implementation of affordable housing projects would be the transformation of the existing informal settlements which are close to these amenities and services. As an alternative to their upgrading, these settlements can be converted into modern houses, in the form of shared apartments. This option for affordable housing development can be attractive to real estate developers, since most of the informal settlements are located in the proximity of urban employment centres which are generally suitable locations for low-income groups who are the prospective buyers of affordable houses [56,105]. Some experiments that consisted of converting informal settlements to affordable houses were successful in Maputo, Mozambique, and Nairobi, Kenya, and Ahmedabad, India, through land adjustments and the development of multistorey apartments. Property owners were provided with units of houses built on their plots based on the market values, while the other units were sold to other urban inhabitants at prices determined according to the requirements of affordable housing schemes [29,68,109]. Reducing the costs of basic amenities and services may, therefore, result in low housing prices, and thus increased the opportunity for many low-income dwellers to afford decent houses. However, the existing amenities and services may need to be upgraded, while the cost for land can be exchanged with the provision of new housing units to the existing informal settlers. If this housing development option is implemented through a partnership between the government, real estate developers and property owners, the balance of funds which could be allocated to the provision of the basic amenities and services may be allocated to property owners whose property values are lower than the cost of the developed houses in order to help them to access new housing units within the developed apartments. Its implementation can be carried out according to the resources allocation theory [110,111], which suggests the following main steps: (1) temporary evacuation of a limited number of the affected property owners in other areas through rent tenure in other urban neighbourhoods, (2) development of a part of the neighbourhood under conversion, (3) return of the displaced property owners and their resettlement in new houses as well as other property owners who were not displaced, (4) development of the other part of the neighbourhood, whose housing units will be sold to other urban dwellers. We suggest this approach among the possible options for developing affordable houses in Kigali city. In fact, the sites identified by RHA and Kigali city for the development of affordable houses are all located in the urban fringes, with a limited availability of basic amenities and services which are already developed in informal settlements, as shown in Figure 5.

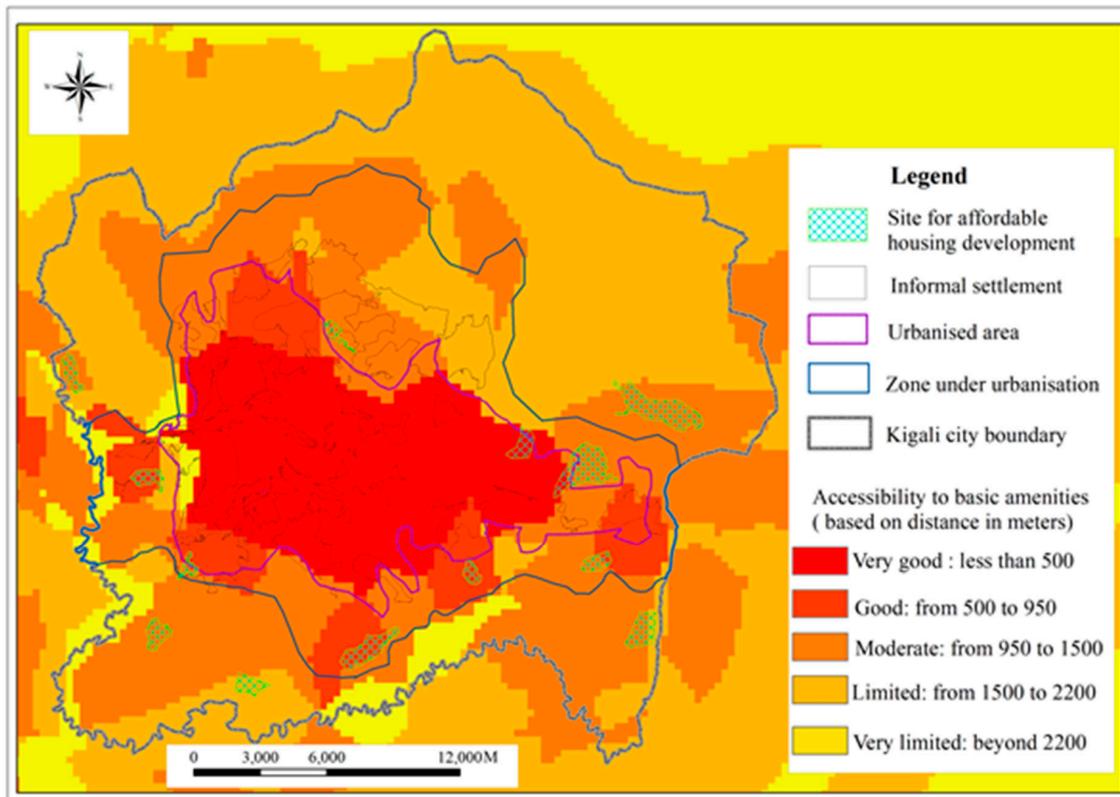


Figure 5. Spatial distribution of the affordable housing projects and informal settlements in Kigali city. Data source: field survey (July to September 2018).

Figure 5 shows that the current informal settlements are located in the core urban area, where access to basic amenities and services such as water, electricity, transportation networks, education, and health facilities is very good and decreases towards the urban fringes, where some of the affordable housing units are planned. By referring to Figure 5 we believe that the conversion of informal settlements into multi-storey affordable housing has also the advantage of reducing the consumption of residential land through densification. In studies carried out by *Skat*, the average number of housing units recorded in informal settlements in Kigali city is 55 per Ha, while the current building regulations recommend a minimum of 120 units per Ha [98]. The same studies demonstrated that if informal settlements are converted into multistory houses with at least two floors, 120 housing units with parking places and basic facilities can be developed on 1 Ha. This approach could, therefore, be a possible option for developing high-rise residential houses, which can accommodate many urban inhabitants. Their development can be conceived in a mixed-property regime approach where a single land parcel is divided horizontally (and often vertically) into separate and specific residential units, which are individually owned by diversified households (from the socio-economic statuses), while the ownership of the land and other common properties is shared [112]. Additionally, it has also an advantage of decreasing the risk of displacement associated with informal settlement clearance. We acknowledge that this option of developing affordable housing through the conversion of informal settlements is not easy. However, it has been successfully implemented in some countries, as mentioned previously. Its application requires structural changes in urban planning and (re)development, including a fair negotiation of the compensation options, with due consideration of the social and economic conditions of the informal settlement dwellers, and close collaboration between government actors, real estate developers and urban dwellers [113–117]. All the options suggested for enhancing access to housing in Kigali city exhibit the need for policy intervention and practical strategies to ensure that affordable housing schemes, as well as various urban (re)development programmes, promote the integration of

the urban poor and low-income households into the urban fabric. Central to this inclusion is increased recognition of their right to housing.

6. Conclusions

Through this study, we have proven that the current prices for housing units developed for affordable housing schemes are out of reach for low-income people who face the burden associated with their prohibitive prices. This has been demonstrated through the analysis of affordability, using the housing-price-to-income ratio approach, based on the gross household income and the use of long-term bank loans at 30% of the household monthly income. The results of our analysis revealed that none of the lowest income households in Kigali city can afford these housing units. Ironically enough, this income category is the main target in the household groups for which the affordable housing schemes have been conceived. These results show that the current housing development projects are rather responsive to the housing needs of middle- and high-income households whose incomes are relatively aligned with the prices of their houses. In most cases, these low-income households cannot afford these housing units. Therefore, they are excluded from the housing market and deprived of opportunities to access decent housing, while the affordable housing schemes supported by government funds do not help them to access decent housing. To the question posed in the title of this paper, of whether the so-called affordable houses under development in Kigali city are really affordable, the answer is No. A number of factors driving the unaffordability of these housing units for the low-income categories include the high cost of construction materials, and the high profits expected by the housing developers.

Against these backdrops, this study suggests different strategies for boosting access to housing in Kigali city, through the revision of affordable housing development approaches and setting up housing development regulations that can promote self-help-based housing construction. These strategies include: the decrease in housing cost through a taxation exemption on the imported construction materials and housing sale, decrease in the profit interest rate and the increase in the number of low-cost housing units (in the real estate developers' proposals for affordable housing development) which can be afforded by a large number of urban dwellers. The self-help housing construction approaches can consist of using low-cost materials through incremental housing development and the condominium approach, which can allow the middle-income groups to develop their houses in the form of multistory residential houses. Informal settlement upgrading is also suggested among the options that can be applied to curb the problem of housing shortage in Kigali city. It can open opportunities for a shift from the neoliberal to a co-production approach of urban space development. This can advance the integration of poor and low-income people into the urban fabric, as stated in various regulations related to housing development land management in Rwanda, presented in Section 2.3 of this paper. Generally, the findings of this study shed light on the limits of affordable housing schemes regarding access to decent housing for the lowest-income urban dwellers. This issue is not specific to Kigali city, since it is discussed in various studies on the question of housing affordability in other cities across the world. Therefore, some of the strategies suggested for decreasing the costs of housing units developed under the affordable housing schemes in Kigali city can be applied in other cities in East Africa. This study shows that factors which affect housing affordability for low-income urban dwellers in this region are quite similar, therefore most of the strategies suggested in this paper can be applied in any of these East African cities.

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