Urban induced-displacement of informal settlement dwellers: A comparison of affected households' and planning officials' preferences for resettlement site attributes in Kigali, Rwanda

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ABSTRACT

There is an increase of induced displacement of informal settlement dwellers in Kigali city due to the ongoing redevelopment of existing inner city areas and disaster risk mitigation actions in high-risk zones. Local authorities are currently much more interested in compensating the affected households in kind, namely by providing new homes in resettlement sites as a strategy to avoid the creation of new informal settlements. In this context, a resettlement site is an issue of fundamental concern for both the targeted communities and the policy makers. Understanding affected households' preferences regarding resettlement site attributes is crucially important if such relocation projects are to be successful in the long term. This study explores the preferences of affected households for resettlement attributes and compares them to the opinions of professional planning officials. Findings revealed similarities as well as significant differences between the two groups' opinions on what are the important resettlement sites' attributes. The paper further analyses the spatial implications of the two groups' preferences on the suitability of residential areas in the city. Differences in opinions led to different spatial suitability maps of the existing residential areas. Given the substantial spatial implications of the divergent views, selecting a resettlement site based on both stakeholder groups' views would be essential to contribute to more effective and conflict-free resettlement processes.

1. Introduction

Induced displacement and resettlement of informal settlements are increasing in many African cities due to urban processes such as the implementation of new Master Plans, the redevelopment of existing inner-city settlements and urban disaster risk reduction initiatives (Steel, van Noorloos, & Klaufus, 2017; Noorloos & Kloosterboer, 2018; Watson, 2014). Such a planned relocation of a community to a new site may on the one hand create potential macro-level benefits such as providing adequate housing to low-income urban dwellers (Terminski, 2015). On the other hand, induced displacements are often associated with severe adverse impacts on the lives and livelihoods of the displaced households, creating various forms of impoverishment risks (Cernea, 1999). Experiences from different countries show that resettled urban communities often face joblessness, loss of access to common property resources, food insecurity, and social disarticulation risks (Patel, Sliuzas, & Mathur, 2015; Nikuze, Sliuzas, Flacke, & van Maarseveen, 2019;

Abebe & Hesselberg, 2015). It is argued that the resettlement-induced impoverishment risks are related to an unsuitable resettlement site, located far from basic infrastructure and services essential for the livelihood of resettled people (Patel et al., 2015; Nikuze et al., 2019; Ibrahim et al., 2015; Abebe & Hesselberg, 2015; Corsellis & Vitale, 2005; Kinsey & Binswanger, 1993; Bartolome, de Wet, Mander, & Nagraj, 2000). For example, studies found that resettlement far from the main markets contributed to food insecurity and nutrition risks among resettled households (Nikuze et al., 2019). Thus, finding a suitable site constitutes a critical decision problem in planning resettlement. A relocation site that is perceived as unsuitable is a factor of failed resettlement (IFC, 2019) and always a source of dissatisfaction among displaced people and conflicts in displacement and resettlement processes (Nikuze, Sliuzas, & Flacke, 2020).

Resettlement site selection is a complex and potentially conflict-ridden process that requires the participation of the concerned stakeholders, particularly those affected by it (e.g., targeted communities to

be resettled). The involvement of the affected people in resettlement site selection is required to capture their needs and preferences and support their learning about the costs and benefits associated with their relocation (IFC, 2013; ADB, 1998). Lack of such participation can increase feelings of unfairness, marginalisation and distrust, all of which can trigger contestations, poor acceptance of proposed plans and local resistance to resettlement projects (Nikuze et al., 2020). Research in developing countries revealed the willingness to accept resettlement decisions rises with the level of participation of the affected population (Vlaeminck et al., 2016). Selecting a resettlement site also involves the views of those who advise on the decision (e.g., local planners). Perspectives, values and interests from different stakeholders can make the resettlement site selection a complicated decision-making process. However, arguably, incorporating key stakeholders' opinions and preferences in the decision-making is essential for consensus building, reduce potential conflicts, and lead to the success of any development projects (Grafakos, Flamos, & Enseñado, 2015; Higgs & Higgs, 2006). Therefore, understanding key stakeholders' interests and preferences in resettlement processes is a critical step to ensure their incorporation in the decision-making (Baert, Kervyn, Dongmo, & Suh, 2020).

Resettlement site identification also encompasses the evaluation of potential sites based on various criteria, including environmental and socio-economic issues such as ensuring access to health facilities, schools, markets, which are essential to improve or at least reconstruct the livelihoods of resettled people (Correa, Ramírez, & Sanahuja, 2011; Ibrahim et al., 2015; Viratkapan & Perera, 2006). Thus, resettlement site selection involves the choice between alternatives with various positive and negative impacts, leading to complex trade-offs, which are exacerbated by the values and sometimes conflicting interests, perceptions, and stakeholders' preferences (Atay Kaya & Kaya Erol, 2016). Having said this, resettlement site identification requires integrative and transparent methods to support informed decisions based on the stakeholders' values and preferences (Stagl, 2006).

One of the most comprehensive methods used to integrate stakeholders' preferences in site selection is the combination of Geographical Information Systems (GIS) and Multicriteria decision analysis (MCDA) (Malczewski, 2007; Malczewski & Rinner, 2015). GIS-MCDA provides a framework to integrate multiple evaluation criteria and opinions to assess land suitability for different purposes, identify and compare the much more suitable courses of alternatives that can support more informed decision making (Ferretti & Montibeller, 2016; Keenan & Jankowski, 2019). It has been used in several domains, such as transport route planning (Keshkamat, Looijen, & Zuidgeest, 2009), biodiversity conservation (Pert, Lieske, & Hill, 2013), renewable energy (Van Haaren & Fthenakis, 2011), waste landfill sitting (Sharifi, Hadidi, Vessali, Mosstafakhani, & Taheri, 2009), selection of parking sites in cities (Jelokhani-Niaraki & Malczewski, 2015). However, limited research has been done on the use of GIS-MCDA in resettlement site selection. One of the few such studies is provided by Ibrahim et al. (2015), who applied GIS for resettlement site selection based mainly on environmental and physical criteria, for people affected by environmental disaster. In their analysis, they do not consider socioeconomic criteria for the livelihood of affected people. Besides, the relative importance of the different criteria was judged by experts while the opinions of the affected people were not considered. Thus, while incorporating values, interests and preferences of interested stakeholders, especially the affected people, in resettlement site identification is increasingly being encouraged, studies of such stakeholders' preferences and how they can be incorporated in the decision making are still lacking.

Accordingly, this paper aims to analyse key stakeholders' preferences for resettlement site selection criteria and apply multicriteria analysis to map potentially suitable locations in Kigali, Rwanda. The study explicitly compares preferences between two stakeholder groups: resettlement affected people and planning experts and incorporate their preferences into a site suitability analysis. Kigali is especially relevant because of two main reasons. First, there is an increase of informal

settlement dwellers' resettlement projects in Kigali city under the framework of its Master plan implementation and disaster risk mitigation for households living in high-risk zones. Second, studies show that recently the city of Kigali started to face overt opposition and contestation, of the affected people, due to procedural concerns, in general, and precisely dissatisfaction with lack of participation in deciding resettlement sites and the compensated houses (Corburn, Berkeley, & Hall, 2019; Nikuze et al., 2020). Therefore, understanding local stakeholders' preferences, particularly the affected people, and approaches for their incorporation in critical decisions like resettlement site selection is needed. Existing studies in different parts of the world have been focusing on investigating the preferences of housing consumers and real estate practitioners (Opoku & Abdul-muhmin, 2010; Mulliner & Algrnas, 2018; Tan, 2012). Little attention has been given to views of induced-displacement affected people, especially informal settlement dwellers, in the context of the implementation of the recently adopted cities master plans in developing countries.

The paper is structured as follows. In the following section, we give the background to the study area and the selected research site. In section three, we introduce the criteria for resettlement site selection identified in the literature and describe the methods used for data collection and analysis in this research. Subsequently, the results are presented in section four and discussed in section five. The paper concludes in section six with practical interventions to improve resettlement site selection processes and future research recommendations.

2. Study area, research context and research site

This research was conducted in Kigali City, the economic and political capital of Rwanda. The city covers an area of 730 km^2 and it is divided into three administrative districts: Nyarugenge, Kicukiro, and Gasabo (see Fig. 1). According to the national administrative structures, each of these districts is divided into three lower administrative entities: sectors, cells, and villages.

Kigali is among the fastest-growing cities in East Africa in terms of economic and infrastructural development (The World Bank, 2018). In partnership with the private sector, Kigali City has seen remarkable growth in various areas, including commercial buildings, housing estates, universities, industries, hotels and conference halls (Manirakiza, Mugabe, & Nsabimana, 2019). However, like in many other cities in the Global South, this development was not without challenges. In the last three decades, rapid demographic growth has been associated with an increase in informal settlements (Manirakiza et al., 2019). Due to the city's topography, many of these informal settlements are concentrated in environmentally hazard-prone steep slopes and wetlands, known as high-risk zones (Un-Habitat, 2010). In 2009, the city adopted its first Master Plan for 2025 to stop and address unplanned settlements and developments in disaster risk areas. According to the Master Plan 2025 (recently revised into Master plan 2050), the informal areas located in hazard-prone areas are planned to be demolished, while for other informal settlements, the priority will be given to the upgrading strategy. The demolishing and upgrading of these old urban settlements is leading to induced displacement and resettlement processes.

In terms of the displacement and resettlement of dwellers from high-risk zones, the city of Kigali, through its districts and the central government's support, has an annual budget to resettle a small number of vulnerable households (RHA, 2013). Concerning the settlements to be redeveloped or upgraded, the city currently relies on its partnership with private property investors to acquire and redevelop the developable land occupied by these informal settlement areas (MININFRA, 2016). Consequently, there has been a boom in real estate and construction projects during the past ten years (Goodfellow, 2014). In the context of informal settlement dwellers displacement, city authorities currently enforce compensation in-kind, namely replacement homes in resettlement sites over cash compensation, to mitigate new growth of informal residential areas by the displaced urban dwellers (Nikuze et al., 2020;
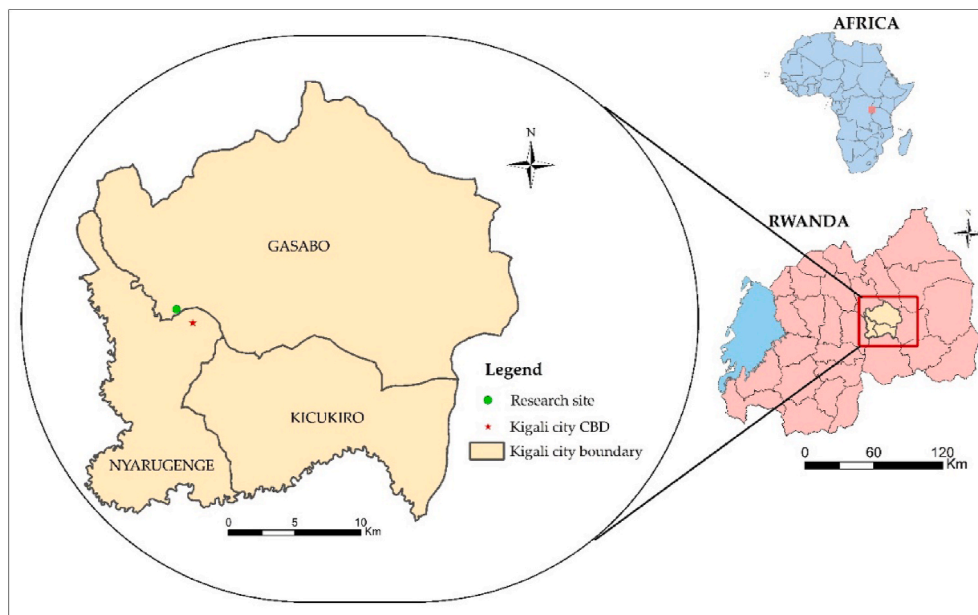
Fig. 1. Map of Kigali City and the location of the study site, Source: Authors.

Uwayezu & Vries, 2020). However, some resettlement projects are associated with contestation, where affected people reject the proposed compensation packages, including the houses and resettlement sites (Nikuze et al., 2020).

There is no existing national, provincial or local resettlement policy guiding these resettlement processes both of the poor from high risks zones and those conducted in relation to urban redevelopment projects. However, in the context of redevelopment-induced displacement, land acquisition by investors is interpreted by the local authorities as an act of public interest for the purpose of implementing the city Master Plan. Therefore, the expropriation law is the main policy instrument guiding the land acquisition and resettlement of targeted informal settlements. This is because the expropriation law assumes that all activities to implement the Master Plan are considered as of public interest. In the

expropriation law it is explicitly stated that the landowners i.e. those who possess land lease title, have a right to be compensated either in monetary terms or with real property, equivalent to the affected property and based on agreement between them and the expropriator. Evidence from the past shows that the Kigali city authorities negotiate with the investors and carry out expropriation on their behalf, to insure that the targeted communities do not resist the investors (Goodfellow, 2014). Therefore, the negotiations happen solely between the Kigali city authority and the targeted communities. In the context of resettlement sites identification, city planning officials are delegated the power by the city decision makers to advice on potential sites, while ensuring the compliance of any new development with the city Master Plan requirements. Although we acknowledge the presence of investors as important, previous studies have argued these actors as invisible

Fig. 2. Image showing the location of the research site. Image source: Google Earth 2019

stakeholders in land acquisition processes and related compensation aspects (Nikuze et al., 2020).Therefore, this study focuses on the opinions of the visible stakeholders: the planning officials and the affected people.

An informal settlement covering two cells (Fig. 2): Nyamabuye and Nyamugari, Gatsata Sector, Gasabo District, was selected as a research site. The area is located close to Nyabugogo main commercial center and about 5 km from the central business district. A large part of this informal settlement has been classified as areas with worse living conditions and high disaster risk-prone area because of constructions on steep areas with slopes above 40% (RHA, 2013).

3. Materials and methods

3.1. Preliminary list of criteria for resettlement site selection

Building upon literature on housing, residential location preferences, resettlement, relocation, and studies specific to the context of Kigali regarding livelihood impact of resettlement on the affected informal dwellers, a preliminary list of criteria relevant for resettlement site selection was compiled. Scholars have identified various housing and residential attributes important to consumers' preferences. These are classified as intrinsic factors such as house size, internal design and extrinsic factors such as building quality and materials (Tan, 2012). There are also environmental and location attributes (Hurtubia & Bierlaire, 2010; Kam, Sheng, Lim, Al-obaidi, & Shwan, 2018). This study focuses on location attributes, and the identified criteria are as follows:

Proximity to education facilities, health facilities and markets. These social infrastructure are valuable assets that households, in general, prefer to live close to (van Vyvere, Oppewal, & Timmermans, 1998; Axhausen, Scott, Locations Commitments and Activity Spaces, K. WScott, & König undJürgens, 2001; Zondag & Pieters, 2005; Hurtubia & Bierlaire, 2010; Mulliner & Algrnas, 2018). The opportunity given to resettled people to have reasonable access to health facilities and places of education, especially the households with children, contribute to the success of a resettlement project (Schmidt-Soltau, 2003; Correa et al., 2011; Reddy, Smyth, & Steyn, 2015). Similarly, access to fair markets or shopping areas is necessary to minimize food insecurity among displaced urban households (Nikuze et al., 2019).

Proximity to the city centre and employment places. Distance from the city centre constitutes another important criterion in selecting a resettlement site for informal urban dwellers. Low-income people like to live close to places that offer employment opportunities (Tan, 2012; Guo & Bhat, 2007; Axhausen et al., 2001; van Vyvere et al., 1998; Zolfaghari, Sivakumar, & Polak, 2012; Zondag & Pieters, 2005). In this regard, living close to Central Business Districts (CBD) has been one of the strategies for securing employment opportunities among urban dwellers (Sina, Chang-richards, Wilkinson, & Potangaroa, 2019; Schirmer, Eggermond, & Axhausen, 2014). Several resettlement studies reported the loss of jobs among the displaced urban informal settlement dwellers due to being resettled far from the places of work, including the city centre (Nikuze et al., 2019; Patel et al., 2015). Hunter and Posel (2012) found that specifically, the involvement of informal settlement dwellers in low-wage employments poses a challenge to their relocation further away from urban centres. Other studies showed that basic infrastructures such as schools tend to be concentrated in central areas and people living in inner cities enjoy better access to such facilities compared to those living in the suburbs (Gebre, 2008).

Proximity to origin settlement. It is argued that living close to the previous location is essential for resettled households (Reddy et al., 2015). Studies found that, in general, people like to stay close to the previous settlement to maintain their existing social networks and accessibility to workplaces (van Vyvere et al., 1998; Axhausen et al., 2001). Scholars found that long distances from the original settlement become an obstacle to maintaining prior employment and income among resettled urban dwellers (Patel et al., 2015). In many cases, the

economic activities such as home-based businesses and other informal survival strategies of urban poor are linked to their living neighbourhoods. Distant relocation may lead to income loss due to loss of such opportunities or additional transport costs (Cernea, 1999). According to Correa et al. (2011), one of the social development requirements is to support and promote the existing formal and informal socioeconomic organization of resettled households.

Proximity to roads and bus stops. Although living close to a road can have its disadvantages, it is, in general, argued that people like to live close to roads and bus stops for accessibility (Ardeshiri, Willis, & Ardeshiri, 2018; van Vyvere et al., 1998; Axhausen et al., 2001; Zondag & Pieters, 2005). Accessibility to these two critical physical infrastructures has been identified as essential for both livelihood resilience and socio-economic development of the resettled households, enabling resettled people to travel to workplaces and other different services (Sina et al., 2019; Correa et al., 2011). As Nikuze, Sliuzas, and Flacke (2018) argued, resettlement sites with easy connections to public transport facilities such as bus stops are crucial for the mobility of the displaced households and greatly influence the perceived suitability of a resettlement site by the resettled families.

Land price and compliance with existing land use plans. Land value can also influence the resettlement site selection. As reported in various studies, often the limited budget forces many governments to relocate people in rural areas where the land is cheap (Uwayezu&de Vries, 2019). Complying with land use plans (residential, commercial, agricultural, etc.) and related restrictions is essential to ensure safe conditions for human settlement (Correa et al., 2011; Reddy et al., 2015).

3.2. Stakeholder interviews

During the period of November 2020 to February 2021, the preferences of two groups of stakeholders: households to be displaced (from the research site) referred to here as affected people and governmental officers referred to here as planning officials, were elicited using face-to-face household interviews and an online survey, respectively. Online survey was considered due to Covid-19. However, this option was only used for the planning officials because they had the ability to fill the questionnaires by themselves, including their education level and access to internet. Systematic sampling was used to select respondents for the interviews with the households in the research site. As mentioned in section 2, the research site is an informal settlement whose large part is considered as a disaster risk-prone area. It is on the priority list among the communities that will be displaced. Thus, all the interviewed households were aware of their imminent displacement which can happened at any time. A two-stage cluster sampling was followed: 1) clusters were created according to two administrative boundaries: first cells and then villages; 2) respondents were randomly sampled in proportion to the number of the households within the two cells and their respective villages. The sampling unit is the household and the heads of the households were interviewed, representing themselves, their households and their stakeholder group. In total, 99 households were interviewed.

Participants representing the planning officers group were identified based on their position as planning officers, their respective institutions, and their involvement in resettlement, especially of informal settlement dwellers. Using snow-balling sampling (Kumar, 2011), planning officials were selected purposively according to whether they have been indirectly or directly involved in the planning and implementing displacement and resettlement projects in Kigali. We elaborated a preliminary list of 25 planners known to be directly related to resettlement issues in Kigali and through them, we identified other relevant officials. We sent an online survey to 25 planners and we received 14 valid responses. Although a small group, this represents a substantial number of the planning officials involved in resettlement decisions.

Through these interviews, the respondents were presented a

preliminary list of criteria (Table 1), established through literature review and asked to indicate the importance of each criterion, considering the need to minimize the adverse livelihood impacts and impoverishment risks for resettled households. A total of 13 criteria were presented to participants. Each criterion was rated using a five-point Likert scale method from highly important (1) to highly unimportant (5). Criteria with similar importance should therefore have similar scores. Using open-ended questions, we also gathered other criteria missing from the list and that the respondents thought to be important to them and relevant to the context of Kigali.

3.3. Data analysis

The data analysis's main objective was to explore the importance attached to each criterion by both stakeholder groups' participants and identify if any significant differences in perceptions/preferences exist between planning officials and affected people. Therefore, three primary analyses were undertaken: a) analysing differences in preferences within each individual stakeholder group; b) inter-group comparison to analyse whether the group's preferences were different between both groups and c) spatial multi-criteria analysis to model the spatial effects of the stakeholder's priorities.

Table 1
Spatial Criteria for site suitability assessment in this study.

Criteria	Rationale	Sources
Proximity to primary schools	Families with children prefer to live close to educational facilities.	(van Vyvere et al., 1998; Axhausen et al., 2001; Zondag & Pieters, 2005; Hurtubia & Bierlaire, 2010 Schmidt-Soltau, 2003; Reddy et al., 2015; Nikuze et al., 2019; Tan, 2012; Clark, Deurloo, & Dieleman, 2010)
Proximity to secondary schools		
Proximity to health centres	Health care services are a basic need for all citizens	
Proximity to hospitals		
Proximity to trade centres	Distance to grocery shops and distance to shopping centres are often included in residential location choice models	
Proximity to commercial centres		
Proximity to markets		
Proximity to city centre	Securing accessibility to job opportunities	(Guo & Bhat, 2007; Axhausen et al., 2001; van Vyvere et al., 1998; Zolfaghari et al., 2012; Zondag & Pieters, 2005; Nikuze et al., 2019; Patel et al., 2015; Hunter & Posel, 2012)
Proximity to employment[a] places	Ease of access to job opportunities, especially for low-income people due to transport costs	(Guo & Bhat, 2007; Axhausen et al., 2001; van Vyvere et al., 1998; Zolfaghari et al., 2012; Zondag & Pieters, 2005; Nikuze et al., 2019; Patel et al., 2015; Hunter & Posel, 2012; Tan, 2012)
Proximity to the previous location	Familiarity with the local setting and ability to maintain local social networks	(Axhausen et al., 2001; Correa et al., 2011; Patel et al., 2015; Reddy et al., 2015; van Vyvere et al., 1998)
Proximity to bus stops	Public transport facilitates access to multiple services in the city	(Ardeshiri et al., 2018; van Vyvere et al.,1998; Axhausen et al., 2001; Zondag & Pieters, 2005; Sina et al., 2019; Correa et al., 2011; Nikuze et al., 2018)
Proximity to major roads	Both advantages (accessibility) and disadvantages (noise and air pollution)	
Land price	Affordability for acquiring land for resettlement	(Uwayezu&de Vries, 2019)
Residential zone[b]	Hazard free residential zone	(Correa et al., 2011; Reddy et al., 2015)

[a] Spatial data not available.
[b] Residential areas in this study.

a) Analysis of stakeholders' preferences within groups

Descriptive statistics (the mean rating) were calculated to explore the importance attached to each criteria. We assessed the statistical differences of criteria importance rating among participants in each stakeholder group. The Friedman rank-sum test was used to identify if any significant differences in opinions/preferences exist among participants of each stakeholder group. Friedman test is a non-parametric, two-way analysis of variance by ranks statistic, which helps test differences between more than two conditions for which the same entities have provided the scores (Pallant, 2001). Furthermore, content analysis of the open questions was done to identify other criteria that the stakeholders mentioned.

b) Inter-group comparison of stakeholders' preferences

Second, we conducted an inter-group comparison to analyse whether preferences were similar or different between both stakeholder groups. For that, we used the Mann-Whitney U rank-sum test to assess differences in preferences among the two stakeholder groups. Mann-Whitney is also a non-parametric statistical test that does not make any assumptions about the data's underlying distribution (Pallant, 2001). The test was used to compare statistical differences among two groups for given criteria and determine which criteria were significantly rated higher.

c) Mapping the suitability of residential areas based on the stakeholder's preferences

In Kigali city, all land-use planning should comply with the city master plan. In this research, based on the identified preferences, we assessed the suitability of all residential land use in the Master plan. We followed four main steps of Spatial Multi-criteria Analysis (SMCA) to map the spatial effects of the stakeholder's preferences.

Maps of criteria to be used in the suitability analysis were first prepared. Except for the land price, all other criteria are proximity criteria and were prepared using an accessibility model based on cost distance analysis (Nikuze et al., 2018). Then, the criteria' original values were standardized and transformed to comparable units (Malczewski & Rinner, 2015). In the present study, standardization was performed by using maximum standardization (Malczewski, 1999), by converting original criteria scores (each expressed in its unit of measurement, i.e, distance, price of land) into dimensionless scores ranging from 0 (less preferred location) to 1 (most preferred location). For the criterion that has a positive relationship with the suitability of an area (i.e., the higher the criterion value, the higher the suitability). In case the opposite applied (i.e., the higher the criterion value, the lower the suitability). Land price was the only criterion considered to have a negative relation according to planning officials' preferences: the higher the land price value, the less the location is preferred. Whereas, according to the affected people, the land price has a positive relation with the suitability of a site: the higher the land price value, the more the site is preferred.

Out of 13 rated criteria, only twelve for which spatial data were available were included in the suitability analysis. Proximity to workplaces was not included in the suitability analysis. Also, additional criteria mentioned during the interviews, such as availability of water and electricity, green spaces and recreation areas, were not incorporated in the analysis.

Once all the maps were standardized to the same value range, their corresponding relative importance, known as weights, were assigned. Weighting represents a critical stage aimed at including into the analysis the preferences of stakeholders. In this study, we applied the rank method (Malczewski & Rinner, 2015) to translate participants' preferences into quantitative values of importance. We first ranked the twelve criteria based on the geometric mean of the Likert scale responses (Awasthi, 2009; Jones, Tefe, & Appiah-opoku, 2015). After establishing

the ranking list, quantitative weights for each criterion were determined using the rank-sum weights method (Malczewski & Rinner, 2015) using the formula below:

$$w_k = \frac{n - p_k + 1}{\sum_{k=1}^{n}(n - p_k + 1)}$$

W_k is the kth criterion weight, n is the number of criteria under consideration ($_k = 1,2,3, …,n$), and p_k the criterion's rank position.

Finally, the standardized and weighted maps were aggregated to generate overall suitability maps, showing the degree of suitability to host a resettlement site. A weighted linear combination method was used according to the following formula:

$$S = \sum_{i-1}^{n} w_i x_i$$

S is the suitability score, n the number of criteria; w_i the weight assigned to criteria i, x_i is the normalised criteria i. This aggregation process was done using CommunityViz 5.2.1 (City Explained Inc., 2020), a planning support system software and extension of ArcGIS.

4. Results

In this section, the characteristics of the interviewed households and their preferences are presented first, followed by the profile of the interviewed planning officials and their preferences. Subsequently, the preferences of both groups are compared. Lastly, the spatial implications, presented as the suitability of residential zoning in Kigali based on affected people's and planning officials' preferences, are described.

4.1. Targeted peoples' preferences

Table 2 summarises the characteristics of the interviewed households. More than half of respondents fall into the working group, aged between 31 and 50 years old. Regarding occupation, the primary income earner in about half of the surveyed households (45%) were waged employees. The majority of waged employees reported that they have casual jobs in the same neighbourhood and the surrounding commercial area. One-third of the heads of the households interviewed were

Table 2
Characteristics of the interviewed households.

Category	Number of respondents	Percentage (%)
Gender		
Male	39	39.4
Female	60	60.6
Age		
Younger than 30	15	16.0
31-40	28	29.5
41-50	23	24.0
Older than 50	29	30.5
Occupation		
Self-employed	17	17.2
Employed	45	45.5
Unemployed	31	31.3
Agricultural activities	6	6.10
Children going to school		
None	21	21.2
One	18	18.2
Two	30	30.3
Three	13	13.1
Four	11	11.1
More than four	6	6.0
Time spent in the settlement		
<10 years	30	30.3
10–19 years	24	24.2
20–29 years	22	22.2
30–39 years	14	14.1
40–49 years	4	4.0
≥ 50 years	5	5.1

unemployed at the time of our interviews, whereas a small proportion (17%) reported being self-employed, manly as small business owners in commercial activities. As an unexpected finding, about 6% of the interviewed households earn income from agricultural activities. The majority (79%) have at least one child going to school. About one-third have two children at the age of going to school. In terms of the time lived in the settlement, one-third have been living in the settlement less than ten years and two-third reported to have been living there between ten and forty-nine years.

A Friedman test was used to determine whether the preferences for thirteen criteria are statistically different among the affected people. Results in Table 3 show that the test is statistically significant $p = 0.00$. The observed test statistic ($\chi 2$) was greater than the critical value (21.03), suggesting that the criteria were statistically differently rated by the interviewed households.

The preferences attached to each criteria by the affected people are shown in Fig. 3. It shows that almost all the respondents in the affected people had a firm agreement on the high importance of two criteria 1) the proximity to health centres and 2) to primary schools. (96%) gave the highest priority to proximity to health centres, rating it as highly important. Similar, 98% of respondents rated proximity to primary schools as important, 89% rating it as highly important. Affected households expressed a firm agreement that the low price of land should be the least important criterion in selecting their resettlement site.

On the other hand, the affected people expressed generally mixed preferences regarding proximity to CBD, hospitals, bus stops, major roads and original settlement. The rating of these criteria was diverse and poorly agreed upon by the affected people. The Proximity to CBD, specifically received low rates compared to all other criteria. The number of the people who believe it less important (34%) is close to the number of those who rated it as highly important (40%), making it the most debated criterion.

In addition to the thirteen rated criteria, many respondents mentioned the proximity to water and electricity, green areas, and sports fields or recreation areas as important and relevant to their context. A small number claimed the opportunities to carry out agricultural and livestock activities as criteria that need to be considered in selecting their resettlement sites.

4.2. Planning officials' preferences

The respondents were planning officials from five organisations (Table 4). More than half of them reported having been involved in the process of selecting a resettlement site.

The Friedman test was also utilised to determine if the ratings of the thirteen criteria among the planning officials were statistically different. Table 5 shows that the test is statistically significant $p = 0.00$. The observed test statistics ($\chi 2$) is also greater than the critical value (21.03), suggesting that the criteria were statistically differently rated by the interviewed planning officials.

Results revealed a consensus among planning officials on the majority of the rated criteria but also mixed preferences for some criteria

Table 3
Friedman test statistics for the rating of the criteria by the stakeholder's groups.

	Affected people
Number of participants*	92
The test statistic ($\chi 2$)	156.055
Degree of freedom (df)	12
Significance (*p*)	0.00

Note: * Because of missing data, the number of participants corresponds to 92 valid responses. At a 5% significance level, *p < 0.05* for significant difference. Critical value F = 21.03 for df = 12, df = k-1, k = number of criteria.
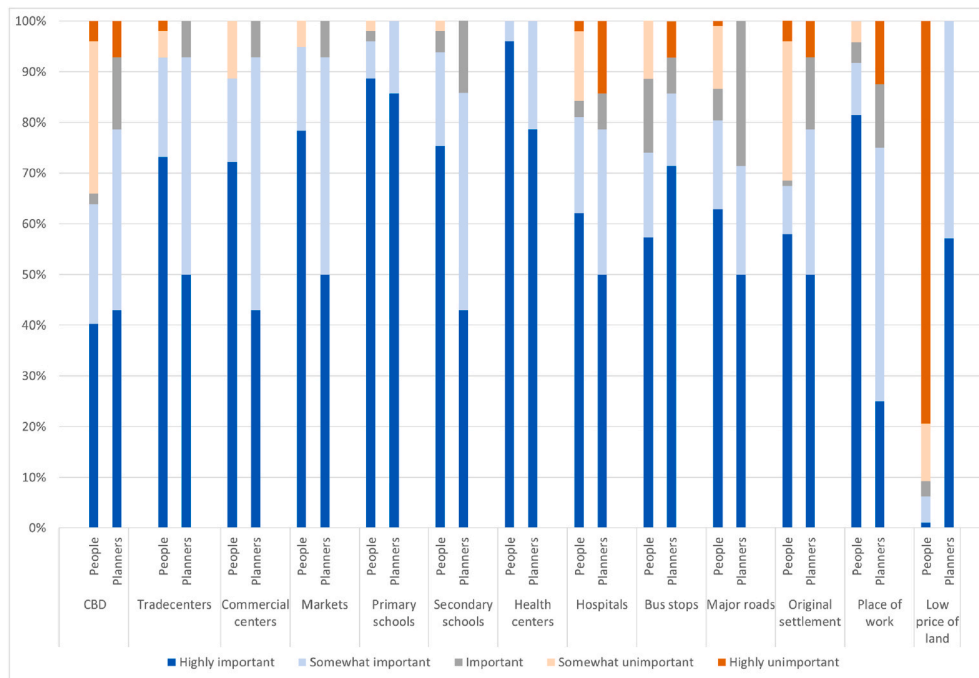
Fig. 3. *Affected people and planning officials' preferences for criteria.*
Note: Except the low price criterion, all other criteria are represented by the proximity to the concerned facility/service.

Table 4
Characteristics of the interviewed planning officials.

Category	Number of respondents
Organization	
City of Kigali	**4**
Nyarugenge District	2
Gasabo district	1
Rwanda Housing Authority (RHA)	5
Ministry in charge of Emergency Management	2
Ever participated in resettlement site selection	
Yes	8
No	6

Table 5
Friedman test statistics for the rating of the criteria by the stakeholder's groups.

	Planning officials
Number of participants*	8
Test statistic (χ2)	37.390
Degree of freedom (df)	12
Significance (*p*)	0.00

Note: Because of missing data, the number of participants corresponds 8 valid responses. At a 5% significance level, $p < 0.05$ for significant difference. Critical value F = 21.03 for df = 12, df = k-1, k = number of criteria.

(see Fig. 3). Proximity to primary schools received the first highest consensus where the majority considering it as highly important while proximity to health centres received the second-highest consensus of respondents considering it as highly important. Almost all planning officials rated proximity to health centres as highly important and very few as somewhat important. Slightly more than a third of respondents rated proximity to health centres as highly important. There is a great agreement among the planning officials on the high importance of the low price of land when selecting a resettlement site.

Criteria such as proximity to trade centres, commercial centres and

markets were rated almost similar among the planning officials. About half of respondents rated each of these three criteria as highly important and another significant proportion rated them as somewhat important, whereas very few respondents considered these criteria as relatively important. The planning officials expressed mixed preferences for proximity to CBD, hospitals, bus stop, original settlement and workplace. In contrast to other criteria, some planning officials believe these criteria to be the least important.

The planning officials mentioned water and electricity utilities as additional essential criteria that need to be included in resettlement site selection. Moreover, all interviewed planning officials firmly believe that residential areas in the City master plan allowing high-rise constructions play a significant role when selecting a resettlement site.

4.3. Comparison of preferences: inter-group analysis

A Mann-Whitney *U* test was used to determine if the differences between affected people and planning officials' ratings of the resettlement site selection criteria were statistically significant. Table 6 provides the results of the Mann-Whitney *U* test. Highlighted are the criteria whose rating is statistically different between the two groups at 5%

Table 6
Mann Whitney test statistics for the rating of the criteria in the two groups of stakeholders.

Criteria	Test statistic U	z	Significance (*p*)
Proximity to the city centre	590.50	−0.829	0.407
Proximity to trade centres	821.50	1.580	0.114
Proximity to commercial centres	842.00	1.770	0.077
Proximity to markets	**862.00**	**2.145**	**0.032**
Proximity to primary schools	695.00	0.255	0.799
Proximity to secondary schools	**897.00**	**2.441**	**0.015**
Proximity to health centres	**796.50**	**2.479**	**0.013**
Proximity to hospital	745.00	0.827	0.408
Proximity to bus stop	575.00	−0.981	0.326
Proximity to major road	746.00	0.682	0.495
Proximity to original settlement	652.50	−0.127	0.899
Proximity to place of work	**603.00**	**3.539**	**0.000**
Low price of price	**1079.00**	**4.552**	**0.000**

significant level ($p < 0.05$ for significant differences).

The Mann Whitney test results indicate that there are statistically significant differences between affected people and planning officials with regards to five criteria: proximity to markets, secondary schools, health centres, place of work and the land price. For these criteria, the Mann-Whitney test yielded a significance value of $p = 0.000$, indicating that the opinions of both the affected people and planning officials differ in a statistically different sense. As can be seen in Fig. 3, a large number of affected people placed a higher importance on these five criteria in comparison to the planning officials. A strong disagreement between both stakeholder groups emerged regarding the importance or relevance of the land price criterion. The affected people prefer a high land price at the resettlement site, whereas the planning officials prioritise resettlement sites with a low land price.

There was no statistically significant difference found between affected people and planning officials for the remaining eight criteria. However, on average, the affected people placed significantly higher importance on more criteria than the planning officials. Compared to the affected people, the planning officials gave higher rates to four criteria: proximity to primary school, bus stop, original settlement and the CBD.

Overall, Fig. 3 shows that although participants in each stakeholder group have their specific preferences of the criteria, there are some similar patterns between the affected people's and the planning officials' preferences. Both stakeholder groups rated, in general, the proximity to primary schools and health centres as being within the very most essential criteria. The similarity is also present concerning proximity to the city centre, original settlement and bus stops. There is a visible mixture of preferences among participants in the affected people group and in the planning officials' group for these three criteria.

4.3.1. Spatial effects of the preferences: affected people versus planning officials

Fig. 4 and Fig. 5 present the suitability results of all residential land use, based on the affected people's and the planning officials' preferences, respectively. Suitability scores range from 0 to 100, with higher scores representing more suitable areas and lower scores showing less suitable locations. Fig. 4 shows that affected people's preferences resulted in a suitability map for which suitability scores range predominantly between 61 and 80 (about 12000ha) with very few and scattered highest scores (80–100) near the city center. Contrary to the affected people, Fig. 5 shows that planning officials' suitability scores range between 61 and 100 for the large part of the city. Unlike the affected people, planning officials' preferences resulted in more highly suitable locations around the city's core and eastern part. The high importance the planning officials gave the proximity to bus stops is the main reason for high suitability scores around the main roads, which also constitutes the city's current bus lines. For both stakeholder groups, the areas with low suitability values are located in the north part of the city, in the Gasabo district. This north region is more rural and thus has few basic infrastructures compared to the rest of the city.

Fig. 6 presents the level of agreement between the affected people's and planning officials' preferences concerning the very high suitable locations (scores above 80 on a scale from 0 to 100). The map shows a fair agreement (difference of suitability scores less than 10) between the two stakeholders for a big part of the very highly suitable areas (about 700ha), mainly areas located in the inner-city along the public transport lines. It also reveals an increased level of difference (difference between suitability scores greater than 10) between the two groups for some areas in the inner-city and the outskirt eastern part of the city.

5. Discussions

The results from the study revealed convergent and divergent preferences between the planning officials and affected people as well as different preferences for some criteria across participants within each group. Similar to the work of Vlaeminck et al. (2016), the affected people and planning officials strongly agree on the importance of education and health-related criteria. Not surprisingly, affected people's preferences revealed that proximity to health centres was almost unanimously considered as highly important, while proximity to primary schools received the second-highest consensus as highly important. Likewise, the planning officials' responses revealed that proximity to primary schools comes first, followed by the proximity to health centres. These results regarding proximity to primary schools are consistent with other studies showing that households, especially those having children going to school, prefer to live close to schools (Clark et al., 2010; Hurtubia & Bierlaire, 2010). Further, the results regarding proximity to health centres align with the literature which generally
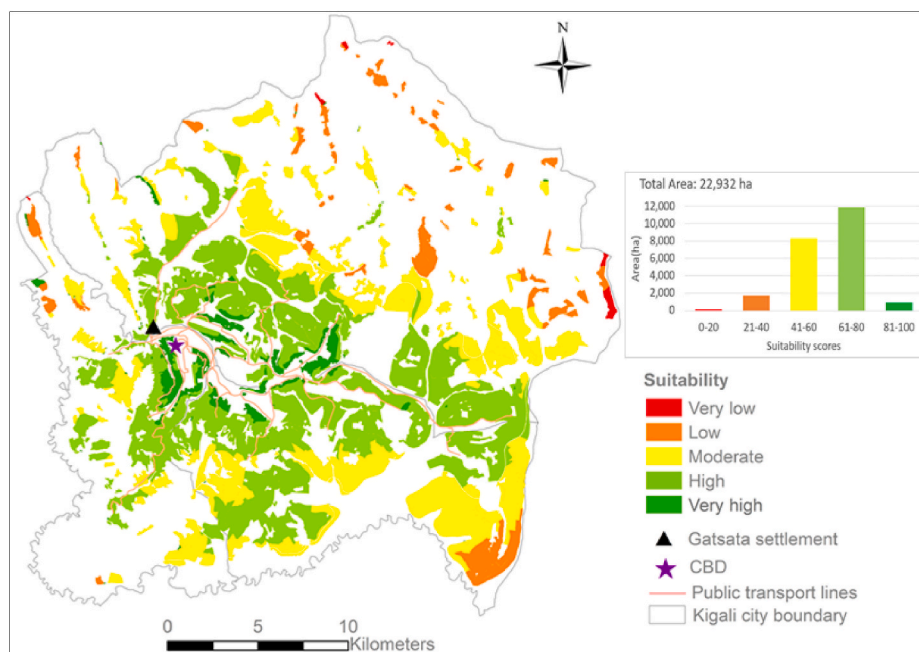

Fig. 4. Residential land suitability based on the preferences of the affected people.
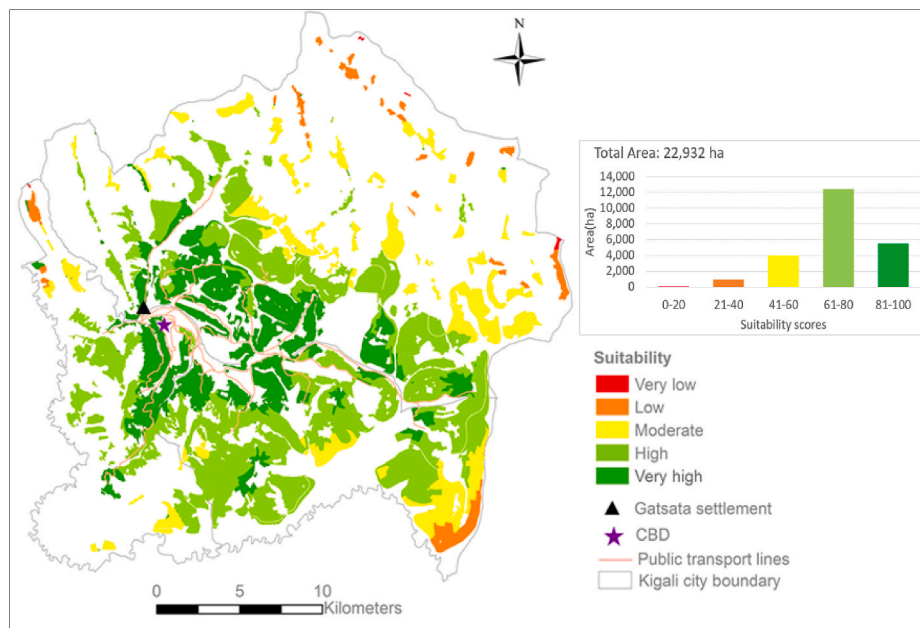
Fig. 5. Residential land suitability based on the preferences of planning officials.
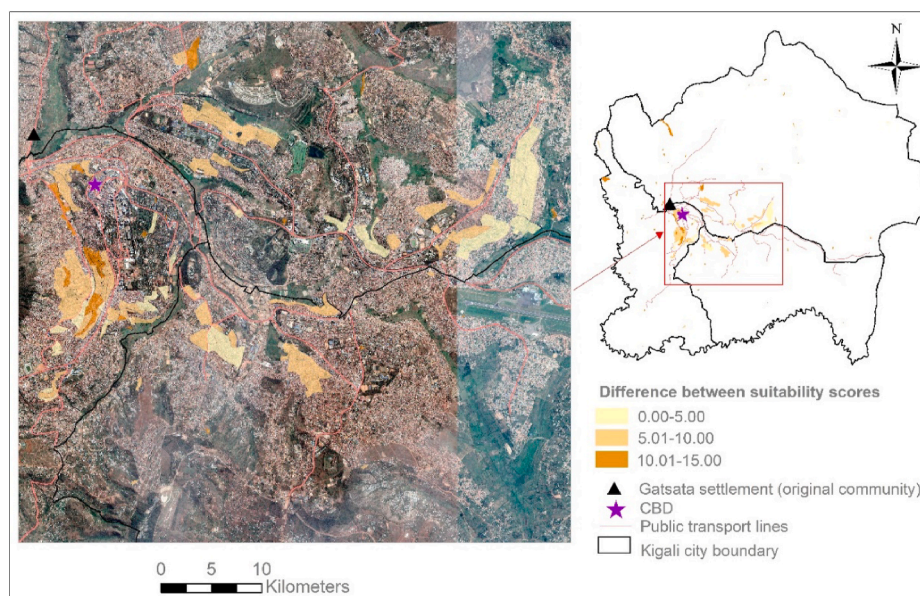

Fig. 6. Map showing the differences between affected people's and the planning officials' suitability scores for the very high suitable areas.

argues that health care services are basic needs and thus influence preference of a residential location (Axhausen et al., 2001; Clark et al., 2010; Tan, 2012; Zondag & Pieters, 2005). Our study, however, adds to these findings that, in the context of mass relocation it is vital to recognize specific needs of a given community to be relocated regarding education or health facilities. In this study, in comparison to health centres and primary schools, affected people gave a relatively low importance to hospitals and secondary schools. The fact that the health centres provide basic health care services and that the majority of the interviewed households had children going to primary school potentially played a role in giving priority to both criteria. Not considering this issue, resettlement may fail to address the needs of the concerned community. Therefore, the study findings highlight the importance of analysing the preferences of affected people in the early stage of resettlement site selection and how erroneous it might be to aggregate the criteria to be considered.

The findings suggest that preferences between affected people and planning officials are statistically significantly different for some criteria, including land price or land value criteria. While planning officials attach importance to affordable and location with low land price, the affected people prefer expensive places to ensure tenure security and fair compensation. In generally, the planning officials' preferences regarding the land price criteria support findings in other studies. As Uwayezu and de Vries, (2019) have observed, Kigali city officials and decision-makers give priority to resettlement sites in areas with a low land price when resettling informal settlement dwellers. The evidence that both stakeholder groups exercised a strong disagreement on the land price criterion suggests that this current policy practice of focusing on cheap land could exacerbate perceived tenure insecurity and dissatisfaction among the affected people.

Moreover, open-ended questions revealed that the residential zoning categories appeared to significantly influence resettlement site selection as expressed by the planning officials. In Kigali, all new development should comply with its current master plan. Most planning officials suggested the zoning categories that allow high-rise construction to be potential locations that would provide resettlement opportunities for informal settlement dwellers in Kigali. However, the affected people responses in over 90% of the interviewed households were not aware of the different residential categories, although interviewed expressed the preferences for single-family houses. This lack of awareness regarding the residential zoning and related technical requirements among the affected people can be partly attributed to the fact that experts have elaborated and revised the current city master plan with limited participation of low-income residents, including informal settlement dwellers (Corburn et al., 2019). Therefore, our study suggests a need to raise awareness about the different residential zones among the concerned communities, introduce them to other residential zones, to deal with expectations among the affected people. If such lack of information and knowledge is not addressed, it can exacerbate conflict of interests between the planning officials and the targeted people. The interviewed households also placed the most importance on proximity to markets. However, in contrast, the planning officials perceived this criterion as less important. The finding of higher importance given to markets by the affected people supports other studies indicating that markets as shopping places are vital for households (Mulliner & Algrnas, 2018). In this study, the high importance placed on markets could also be explained by many income earners involved in small selling business activities and casual jobs taking place in markets.

Scholars have found that middle and low-income classes prefer to live close to a bus stop to access public transport since their income status does not allow them to afford private transport (Ardeshiri et al., 2018). Further, it argued that access to bus stops influences livelihood resilience and reconstruction of the displaced households (Correa et al., 2011; Sina et al., 2019). However, our results indicate that in contrast to planning officials, affected people gave a less importance to proximity to a bus stop. Although not directly resulting from our study, social, economic characteristics, and planning context could have influenced people's preferences in this particular context of resettlement (Baert et al., 2020). There seems to be a strong dependency on motorcycles due to their flexibility and speed compared to public transport buses among the Kigali citizens (Zyl, Swanepoel, & Bari, 2014). The preferences of motorcycles might have led to less focus and low perceived importance of proximity to bus stops among the people. As expressed by Mulliner and Algrnas (2018), where there is a dependency on other means of transport, people tend to give a less importance to criteria such as proximity to a bus stop. Furthermore, the low importance of bus stop may also be related to the fact that many informal settlement dwellers prefer to live close and often walk to their employment areas (Hunter & Posel, 2012), what is also the case in Kigali according to Uwizeye, Irambeshya, and Wiehler (2020).

This study results provide insights into mixed preferences regarding proximity to CBD and origin settlement. Proximity to the CBD and the original settlement was the most debated criteria and was perceived to some extend as less important by a considerable number of interviewed from both the affected people and the planning officials. Other researchers have previously theorised about the significance and preferences of proximity to city centres and the original settlement in the context of informal settlement dwellers. As argued, living close to the city center is advantageous in terms of employment opportunities, especially for informal urban dwellers (Qian, 2017). This is surely the case in Kigali as well, where the CBD is the place that supplies informal jobs and income opportunities to many residents of informal settlement dwellers in Kigali. Specifically, the livelihood of many households in the study area is intertwined with income opportunities found in the CBD and the neighbouring Nyabugogo commercial area (Nikuze et al., 2018). Similarly, it is argued that resettlement far from the original settlement

becomes an obstacle to maintaining prior employment and income among resettled urban dwellers (Patel et al., 2015). Vlaeminck et al. (2016) found that distance to original settlement as a proxy for cultural, economic and social livelihood influence resettlement preferences among the affected households. Resettlement of informal settlement dwellers far from the CBD and the origin settlement is said to be associated with several adverse impacts on the displaced households (Nikuze et al., 2019; Patel et al., 2015). Unexpectedly, however, these two criteria appear less critical or in priority for many of the affected people, as is evident from our results. A possible explanation of low preferences for proximity to the CBD and original settlement could be the adopted city master plan and its implementation, which has resulted in the clearance of many old settlements near the city center. Due to such demolitions, affected people feel that resettlement close the CBD is currently not possible, even if it would be beneficial. Another possible explanation of low rate of proximity to the CBD, especially among the affected people could be the socio-economic characteristics such as age, old people would prefer to live away of the city center and the agriculture and livestock preferences among few households, which are not easy to practice in the inner-city areas.

Spatial multi-criteria is applied to produce residential land suitability maps and compare the spatial effects of the preferences (or opinions) of the planning officials and the residents in our study area. Our findings suggest that there are few residential areas with low suitability scores based on both affected people and the planning officials' opinions. This is not surprising since the suitability analysis was carried out on residential land uses defined in the city master plan. However, affected people's preferences resulted in spatial effects different from one of the planning officials, with low suitability scores in the former scenario compared in the latter. An investigation of the spatial patterns shows a mixture of minor and significant differences for the very high suitable areas clustered in the inner-city. Other locations with significant differences appear in the outskirt and eastern party of the city.

The attempt was to assess suitability based on social and economic factors involved in the site selection. Due to lack of digital data not all rated criteria were incorporated into the suitability model, while the affected people perceived it as necessary. From the original list of the rated thirteen criteria, twelve were included in the suitability assessment model. Proximity to the workplace is not incorporated into the analysis. There was no spatial data available for this criterion considered by both stakeholders because informal dwellers often choose to live close to where they work or find a job. Our analysis did not also include criteria regarding access to water and electricity and proximity to green spaces or recreation areas, although the affected people insisted on these infrastructures and services during the interviews. Other scholars suggested that the lack of digital data could limit GIS and multi-criteria analysis (Strager & Rosenberger, 2006). To fully represent the actual stakeholder's perceptions and support resettlement sites' prioritization, one could further enhance our suitability model by including criteria such as proximity to workplace, green spaces and recreation areas, electricity and water availability.

Nevertheless, the divergence between the affected people and the planning officials and the resulting spatial implications found in this study appears to support the claim of a relationship between conflicting interests, contestation behaviours and low acceptance of the proposed resettlement plans among the affected dwellers in our study area (Nikuze et al., 2020). However, the planning officials' opinions do not entirely misalign with the preferences of the affected people and this could be a starting point in the search for consensus if the views of both stakeholders are taken into account.

6. Conclusions

Increasing numbers of resettlement projects of urban informal settlement dwellers due to urban development and disaster risk reduction actions are among the most significant challenges to authorities in

developing countries. Urban-induced displacement and resettlement projects negatively impact the affected households and communities' livelihoods. Failure to consider their preferences in the decision-making may be a barrier to the satisfaction, leading to conflicts and local social opposition or low acceptance of resettlement decisions proposed by the planning officials alone. The purpose of this study was twofold. First, the study used a case of one informal settlement area to investigate affected households' preferences for resettlement site selection in Kigali and compare these to the opinions of planning officials to identify whether the views of both stakeholder groups are aligned. Second, the spatial implications of the preferences of both stakeholder groups were examined.

With respect to the first purpose, results reveal significant discrepancies as well as agreement between the affected people's and planning officials' views on what the households believe to be essential criteria. As notable strong divergences, the affected people prefer a high land price location, associating this criterion with fair compensation and tenure security, whereas the planning officials prioritise areas with low land price for affordability reasons. Affected people also expressed preferences for single houses, while the planning officials give priority to residential zones that allow high-rise residential buildings. The planning officials placed less importance on proximity to markets and high importance on proximity bus stops, whereas the affected people believed the opposite. These findings emphasise that such different opinions need to be negotiated to reach consensus if local opposition are to be addressed and misperceptions of each stakeholder group towards another are to be clarified.

Results suggests agreement between affected people and planning officials regarding the importance of education and health-related criteria. With the apparent increase of contestation in current resettlement projects, the convergent views indicate that local authorities may experience resistance while preferences and opinions of the planning officials and affected people do not entirely misalign, emphasizing the need for improved communication between the two groups during resettlement processes. Furthermore, the study revealed intra-groups diversity or heterogeneous preferences, with varying preferences among the affected people for criteria such as proximity to CBD and origin settlement, which also requires attention in resettlement processes.

Findings in this research extend the existing knowledge on resettlement and housing preferences, focusing on location attributes of the new settlement. To the best of our knowledge, this research is the first to investigate the preferences of the resettlement affected urban households in Kigali. Thus, from a practical perspective, the research findings can be valuable to the local decision-makers in resettlement processes, by enhancing their understanding of location attributes and the preferences of the affected people. A list of thirteen attributes/criteria considered in this research might be insufficient considering that other criteria might exist and findings from one targeted informal settlement might not be generalised. Nevertheless, authorities should be sensitive to targeted people's needs, such as living close to workplaces, markets, health centres, schools in the ongoing induced resettlement projects to minimize impoverishment risks, dissatisfaction and mitigate contestations.

Concerning the second purpose, this research shows that differences in the preferences between the affected people and the planning officials resulted in substantial spatial implications in terms of different spatial suitability levels of the residential areas. Therefore, resettlement site selection should be based on both stakeholder groups' views to contribute to more effective and conflict-free resettlement processes. The planning authorities should seek opportunities to use spatial multi-criteria analysis and related maps to investigate where their suggestions align with affected people's preferences and perceptions. Future research or practical applications might want to focus specifically on exploring the use of such suitability maps or assessment tools in an interactive environment for stakeholder negotiations in the resettlement

site selection process.

Declarations of interest

None.

CRediT authorship contribution statement

Alice Nikuze: Conceptualization, Methodology, Formal analysis, Visualization, Writing – original draft, Writing – review & editing. **Johannes Flacke:** Writing – review & editing, Supervision. **Richard Sliuzas:** Writing – review & editing, Supervision. **Martin van Maarseveen:** Writing – review & editing, Supervision.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.habitatint.2021.102489.

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