19 Towards Equitable Urban Residential Resettlement in Kigali, Rwanda

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CONTENTS

19.1 INTRODUCTION

Rapid urbanization and frequent natural disasters have substantially increased the number of urban households – especially poor households – that have to be relocated away from their homes and communities (Satiroglu and Choi, 2015). Urbanization in developing countries is associated with many challenges, among them poverty and viral growth of informal settlements, many of which are often exposed to various natural hazards (Manirakiza, 2014). Resettlement is one option for reducing the risk of natural disasters that is being adopted both before and after the occurrence of a disaster (Correa et al., 2011). Governments and international agencies increasingly consider resettlement of vulnerable urban communities as a risk reduction strategy (Ibrahim et al., 2015). Disaster–risk

mitigation is an indispensable instrument for protecting people's lives and assets, as well as expanding national and local economies. Poorly executed resettlement may, however, induce loss of livelihood and increase the vulnerability and impoverishment of the displaced population.

Population displacement and resettlement are recognised causes of various deprivation risks, raising issues of inequity and social injustice in the society (Cernea, 1997). According to Cernea (1997), resettlement often leads to impoverishment risks (referring to a worsening of people's welfare and livelihoods) that are manifested through eight interlinked phenomena: landlessness, homelessness, joblessness, loss of access to common property resources, marginalization, food insecurity, morbidity and mortality and social disarticulation. The most critical risks associated with urban displacement and resettlement are loss of employment, or sources of site-related income, and the uncertainty of finding new employment or income in the area of relocation. Recent work by Patel et al. (2015) clearly indicates that, along with other factors, the distance of the relocation site from a person's original place of residence and employment often becomes an obstacle to continuing prior employment – the original source of income of the displaced person. Such issues must be adequately addressed through policy and implementation.

According to ADB (1998), a suitable resettlement site provides opportunities for restoring the livelihoods of displaced households. For example, when Ibrahim et al. (2015) conducted a suitability analysis of resettlement sites for flood-disaster victims, they included environmental factors like climate, soil, slope and geology and also socio-economic factors such as accessibility to roads. Furthermore, they suggested that other socio-economic and infrastructural development issues should be considered in evaluating the suitability of sites for sustainable resettlement. They did not, however, mention which specific issues should be considered.

Given this background, our aim was to develop a methodology for resettlement-site selection that would help restore the livelihoods of affected urban communities and reduce the risks of impoverishment that are often associated with resettlement. We carried out our research in Kigali, the capital of Rwanda. There, the combination of steep terrain, poor drainage, large areas of wetlands, high-density informal settlements (with buildings constructed with non-durable materials) and heavy seasonal rainfall exacerbate the risk of disaster. Every year during the rainy seasons, water-related disasters cause loss of lives and damage to property. In line with its risk prevention and reduction policy, the Rwanda government has started to relocate the most vulnerable households from high-risk zones; a large number of households still need to be relocated.

19.2 METHODOLOGY

19.2.1 STUDY AREA

BOX 19.1   Case Study Area

Kigali is the capital and the largest city of Rwanda. The majority of the country's urban population live in this city, which has an area of 730 km^2. The population of Kigali is growing fast: in 2017 the population growth rate was estimated to be on average 2.5%. The city is divided into three administrative districts – Gasabo, Kicukiro and Nyarugenge. Our study was carried out in *Gasabo* district, which covers an area of 429.3 km^2, approximately 60% of the total area of Kigali city. In 2012, the district's population was slightly more than 500,000 inhabitants. Most residential locations in Gasabo are in the immediate surroundings of Kigali CBD and other

commercial areas, and they include large areas of unplanned high-density housing. Gasabo district was selected for our research because, according to the Rwandan Ministry of Disaster and Refugees, the most critical high-risk zones for disaster are to be found there. The informal settlement of Gatsata, for example, is located on steep slopes that are prone to landslides; it has been prioritised for relocation.

This study was conducted in Gasabo, the largest of the three districts in Kigali (Figure 19.1). Kigali city covers an area of 730 km^2 and comprises three administrative districts – Nyarugenge, Kicukiro and Gasabo – which for administrative purposes are further divided into sectors and villages. The landscape is characterised by a series of hills that are separated by wetlands (rivers, streams and marshes). Some hillslopes have inclines as much as 50%, while slopes in the valleys and wetlands are less than 2% (REMA, 2013). The scarcity of relatively flat, non-hazardous land has led to human settlement taking place on disaster-prone hills and in wetlands areas that are inappropriate for habitation. About 66% of inhabitants of Kigali live in informal settlements. Our study area, Gasabo, covers an area of 429.3 km^2, approximately 60% of the total area of Kigali city. In 2012, its population slightly exceeded 500,000 inhabitants (NISR, 2012). Most residential locations in Gasabo are in the immediate surroundings of Kigali CBD and other commercial areas, and they include large areas of unplanned high-density housing. Gasabo was selected because, according to the Rwandan Ministry of Disaster and Refugees, the most critical high-risk zones for disaster are to be found there. The informal settlement of Gatsata, for example, is concentrated on steep slopes that are prone to landslides. Gatsata has been prioritised for relocation, and as such we consider it in our study as a case of a community to be resettled.

19.2.2 Data and Methods

BOX 19.2   Methods Applied in the Chapter

This chapter illustrates the application of GIS methods, together with qualitative analysis and descriptive statistics, for analysing the suitability of potential resettlement sites in terms of minimizing risks of impoverishment of the resettled households. The GIS methods applied combine accessibility analysis (taking into account the effects of topographical features such as roads, slopes and rivers – done using ArcGIS™) and spatial multi criteria analysis performed in CommunityViz Scenario 360™.

Spatial data (administrative boundaries, road networks, public transport routes and bus stops, health facilities, schools, markets, strategic locations) and non-spatial data were used. The non-spatial data were gathered from a literature review, interviews with households and key informants and field observations. Using the spatial and non-spatial data, first we analysed resettlement requirements with respect to the socio-economic and cultural characteristics of the households to be displaced, as well as their potential risk of impoverishment. Next, we identified potential strategies for reversing risks, which we then used as criteria for analysing the suitability of potential resettlement sites. The results of suitability analysis were influenced by the criteria selected. For example, if non-spatial criteria such as affordability of services, e.g. the cost of public transport to the city centre (which was not considered in this study) is included, the suitability analysis would yield different results from those if it was not included. The methodology applied here in the case of a resettlement programme could be applied to any other planning process in which site suitability and accessibility are issues,

for example, for analysing non-serviced and serviced areas of existing health facilities and identifying a suitable site for proposed new facilities.

In our study we followed three main steps to develop a methodology for equitable resettlement, i.e. an equitable resettlement process that is guided by concerns of fairness and justice by seeking to mitigate the various forms of impoverishment that are commonly associated with resettlement. The objective of such an equitable resettlement process is that resettled households should not experience increased, long-term economic and social deprivation as a result of resettlement. First, we identified potential resettlement requirements; second, we analysed the risks of various forms of
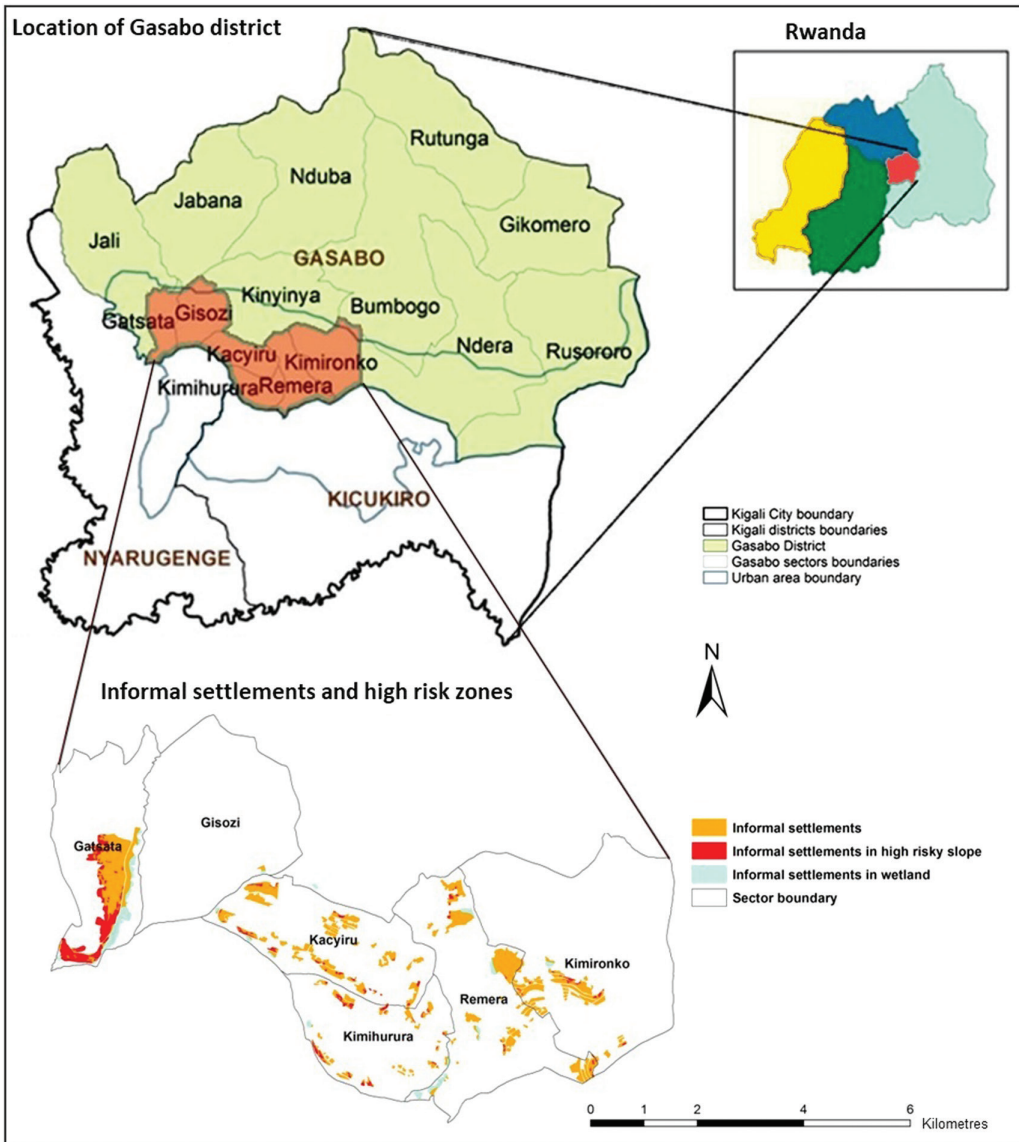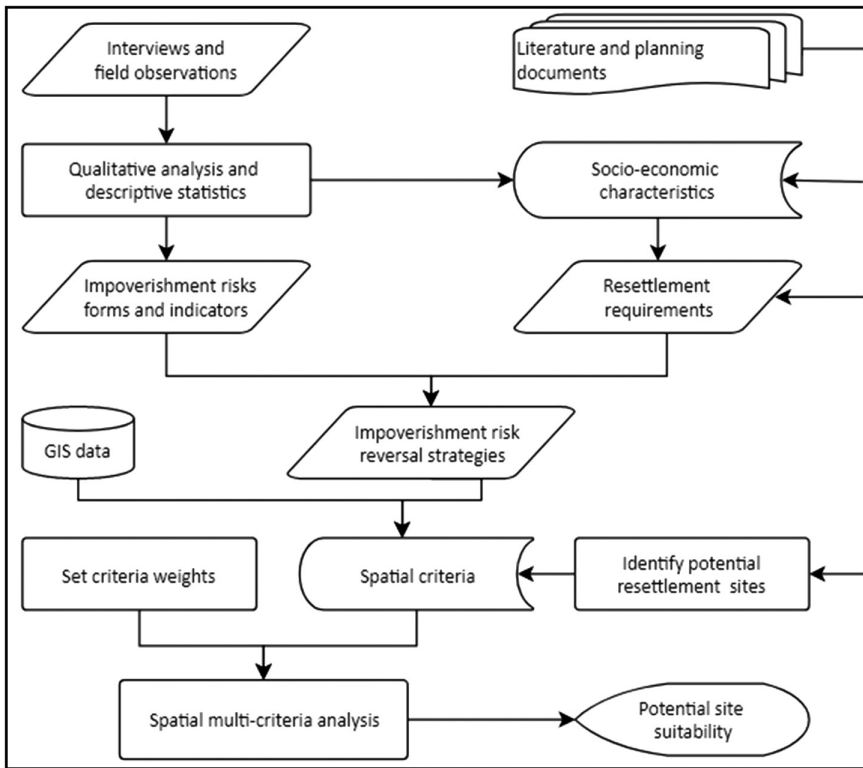

FIGURE 19.1   Study area.

FIGURE 19.2   Methodological approach.

impoverishment and their indicators; and third, we developed a model for analysing the suitability of potential resettlement sites. To this end, we used a mixed-methods approach that combines qualitative and quantitative methods and techniques (Figure 19.2). In the following sections, the data, methods and analysis are described in detail.

19.2.2.1   Data

For the study, we used primary and secondary data collected from fieldwork conducted in the study area from 23 September until 12 October 2015. Primary sources included:

- interviews conducted with 90 households to be displaced;
- interviews conducted with 20 resettled households living on two resettlement sites: ten households in each;
- in-depth interviews with ten key informants;
- field observations in both the settlement to be displaced and the two resettlement sites chosen.

In this research, the pre-resettlement and post-resettlement characteristics of households' livelihood were fundamental in identifying crucial resettlement requirements that need to be met by future relocation programmes, as well as understanding the risk of impoverishment faced by the relocated households. For this reason, two questionnaires were used for the interviews: one for the households from Gatsata that were to be relocated, to capture their socio-economic and cultural characteristics, including their physical, social, financial, human and natural assets (Baud et al.,

2008), their perceptions about potential risks of impoverishment that would result from their relocation and their preferences regarding resettlement sites; and the other for the households already resettled on two existing resettlement sites, Bumbogo and Kinyinya, to collect data on their experiences with risk of impoverishment due to displacement. The latter interviews covered a wide range of topics, including employment, income, land location and housing, access to common property resources and social organization before and after resettlement. The households that had already undergone resettlement were selected to triangulate potential risks of impoverishment for those households from Gatsata that were to resettle. In doing this, we assumed that the characteristics of households to be resettled out of high-risk zones within the district were similar to those that had already been resettled.

Interviews with key informants involved in the planning and implementation of various resettlement programmes were set up to corroborate our findings from other research instruments in relation to resettlement requirements, impoverishment risks, their causes and possible recommendations for future relocation. Furthermore, at all sites we also intensively observed general social and economic conditions and the existing spatial location and conditions of physical elements that are important in the daily life of households, for example roads and transportation services and facilities. Secondary data used were mainly GIS data (Table 19.1) and data collected from a review of the literature and documents on national and international policy related to resettlement.

19.2.2.2 Methods and Analysis

First, we analysed resettlement requirements. With reference to Correa et al. (2011), we identified and summarised crucial resettlement requirements of Gatsata households that would have direct implications for the mitigation of risks of impoverishment: requirements in relation to economic development; access to infrastructure and basic services; and the protection of the social networks of affected households. To this end, descriptive statistics and qualitative data analyses of key elements of their socio-economic characteristics, social organization, occupational structure and access to public services – i.e. information defining which households need to be relocated, what they do for living and what they are likely to lose following displacement – were carried out. On the basis of these analyses and the general provisions of the Rwanda Human Settlement Policy, the

TABLE 19.1
Secondary Data Collected

Data	Source	Comment
Administrative (district, sector, village) boundaries of Kigali city	COK	
Transport infrastructure: road network, bus routes, bus stops	COK	Existing development (2013) and developments proposed in the master plan
DEM, 10 m resolution	COK	
Detailed land use and zoning, township boundaries, some important places in Kigali	COK	Existing developments (2013) and developments proposed in the master plan (2025)
Social infrastructure: trade centres, markets, schools, health centres	RNRA	Rwanda base map 2013
High risk slopes, wetlands, informal settlements	ITC; RHA	Informal settlements identification project 2013
Field study report on informal settlement, Kigali city	MIDIMAR	Informal settlements identification project 2013

COK: City of Kigali; RNRA: Rwanda National Resources Authority; RHA: Rwanda Housing Authority; ITC: Faculty of Geo-Information Science and Earth Observation, University of Twente; MIDIMAR: Ministry of Disaster Management and Refugees.

National Housing Policy, the Kigali City Master Plan and a literature review of international publications, the resettlement requirements for the relocation of the Gatsata community were identified.

Next, the potential impacts the resettled households would face and the likely risks of impoverishment of those to be displaced from Gatsata, such as loss of jobs, income, land and housing, access to common property resources and social disarticulation, were identified once again using descriptive statistics and methods of qualitative data analysis. An impoverishment risks model (Cernea, 1997) was used as a framework for summarizing the forms of risk identified and their indicators, although our study brought new forms to light.

Lastly, we identified mitigation strategies for impoverishment risks and used them to analyse the suitability of potential resettlement sites. As described by ADB (2012), the location of a resettlement site is a key element in minimizing the risks of impoverishment faced by relocated families. Using both ArcGIS™ and CommunityViz scenario 360™ (City Explained Inc., 2018), we developed a five-step GIS-based multi-criteria model for site suitability analysis:

Step 1 – Identify Suitability Criteria

These are criteria that we consider would be able to minimise impoverishment risks and therefore include the risk-reversal strategies obtained by reversing the impoverishment-risk indicators (see section 19.3.2) into positive actions to be taken (see Table 19.5). Further, we checked whether the strategies developed aligned with the identified resettlement requirements (see section 19.3.1). Although in our study we only proposed spatial strategies, we recognise that there are other, non-spatial factors that could also help to minimise the risk of impoverishment. For instance, loss of income from renting small houses (discussed in Section 19.3.2) should be compensated by other means.

Step 2 – Select Criteria for Spatial Multi-Criteria Model

Multi-criteria techniques are powerful tools for analysing the suitability of areas with respect to one or more activities (Kumar and Biswas, 2013). The main steps of suitability analysis include the establishment of criteria datasets, criteria weighting and aggregation of criteria (Ibrahim et al., 2015; Zucca et al., 2008). For our study, we selected suitability criteria (Table 19.2) from the potential risk-reversal strategies shown in Table 19.5.

Indicator maps, which were represented as distance maps in a GIS database, were prepared using an accessibility model (Zucca et al., 2008). To be able to consider the various topographical features present in the study area, e.g. rivers, slopes and road surfaces (paved/unpaved), and their effect on accessibility to services and facilities (Karou and Hull, 2014), an appropriate accessibility model (see Figure 19.3) was developed.

TABLE 19.2
Criteria for Site Suitability Analysis

| Goal	Criteria	Indicator	Requirements	Impact
Improved livelihood; minimum impoverishment risks	Access to job opportunities	Distance to city centre Distance to commercial centres Distance to original settlement	Minimum distance, time and cost of transport	Reduce travel time and cost of transport
	Access to social facilities	Distance to health Distance to education Distance to market	Minimum distance, time and cost of transport	Reduce distances and cost of transport
	Access to public transport	Distance to bus route Distance to bus stop	Minimum distance, time and cost of transport	Reduce distances and cost of transport
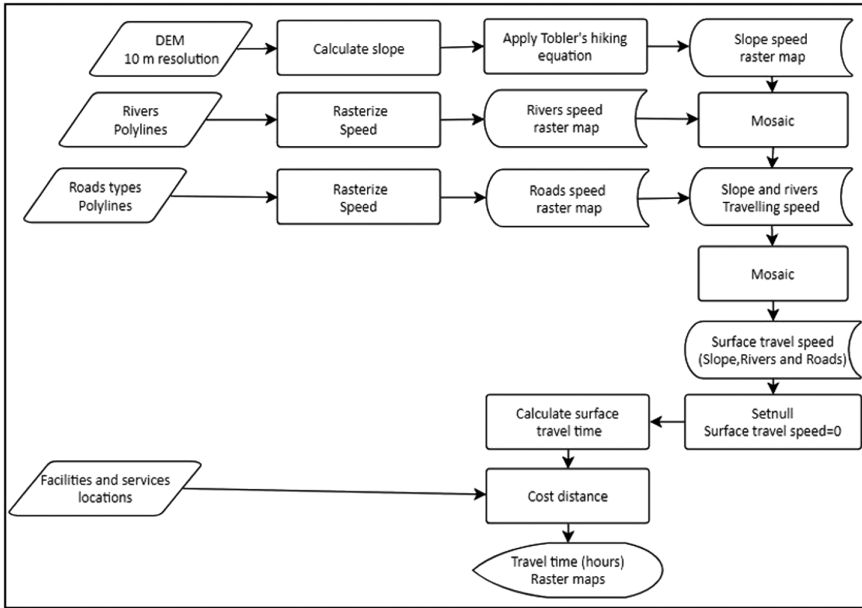
FIGURE 19.3 Accessibility model.

In this accessibility analysis, we compared two modes of transport – walking and public transport – both of which are frequently used by low-income populations. Table 19.3 summarises the speeds that were used in both modes of transport for each type of surface.

Speed in relation to terrain was calculated using the hiking equation (Tobler, 1993). For both walking and bus transport modes, rivers overrule slope, while roads overrule the combination of slope and rivers. In public transport mode, an average speed of 21 km/h (Niyonsenga, 2012) was used as an extra factor for the 2012 bus-route network, and this overrules the three other factors considered in the walking mode.

Step 3 – Criteria Weighting

The third step is criteria weighting, using a stepwise method of ranking preferences (Voogd, 1982). We used the preferences named by the households because allowing people affected by policies to participate in the design is important to them, as well as being a strategy to minimise risk of impoverishment. Once the ranking of the preferences was completed, ranked sum weights were calculated using the following formula:

$$W_k = \frac{n - p_k + 1}{\sum_{j=1}^{n} (n - p_j + 1)}$$

where:

W_k is the kth criterion weight

n is the number of criteria under consideration (k = 1,2,3,…,n)

p_k is the rank position of the criterion.

Table 19.4 presents the relative importance (weighting) of the selected criteria.

Step 4 – Identify Potential Resettlement Sites

Potential resettlement sites were identified from the land-use zoning proposed in the Kigali master plan for Year 2025. Land for potential resettlement sites had to meet three criteria, which were:

TABLE 19.3
Selected Speeds According to the Type of Surface and Mode of Transport

Surface Type	Speed (km/h)	
	Walking	**Public Transport**
Slope	Tobler's hiking equation	
Rivers	0	0
Paved roads	5	5
Unpaved roads	3	3
Public transport network	Not applicable	21

- the land had to be zoned for residential use;
- the land had to be proposed for high-density development; and
- that land had to be affordable for low-income groups.

19.3 RESULTS

This section presents results related to: resettlement requirements (subsection 19.3.1) that enable economic development, access to infrastructure and basic services, and those for providing protection of social networks of affected households. In the following subsections, the identified impoverishment risks (subsection 19.3.2); strategies for reducing these risks (subsection 19.3.3); potential resettlement sites (subsection 19.3.4); and the results of suitability of potential resettlement sites (subsection 19.3.5) are also presented.

19.3.1 RESETTLEMENT REQUIREMENTS

19.3.1.1 Economic Development

The main objective of economic development is to re-establish economic activities and the incomes of affected households. The socio-economic characteristics of affected households in Gatsata's

TABLE 19.4
Suitability Criteria Weightings

| Rank	Weight	Subset	Indicator	Rank	Partial Weightings	Overall Weightings
1	0.667	Site location preferences	Distance to city centre	1	0.5	0.33
			Distance to commercial centres	2	0.33	0.22
			Distance to original settlement (Gatsata area)	3	0.167	0.11
2	0.33	Social and public services	Distance to markets	1	0.33	0.11
			Distance to schools	2	0.267	0.089
			Primary schools	*1*	*0.133*	*0.045*
			Secondary schools	*2*	*0.09*	*0.029*
			Universities	*3*	*0.044*	*0.015*
			Distance to health facilities	3	0.2	0.067
			Distance to bus route	4	0.133	0.044
			Distance to bus stop	5	0.067	0.022
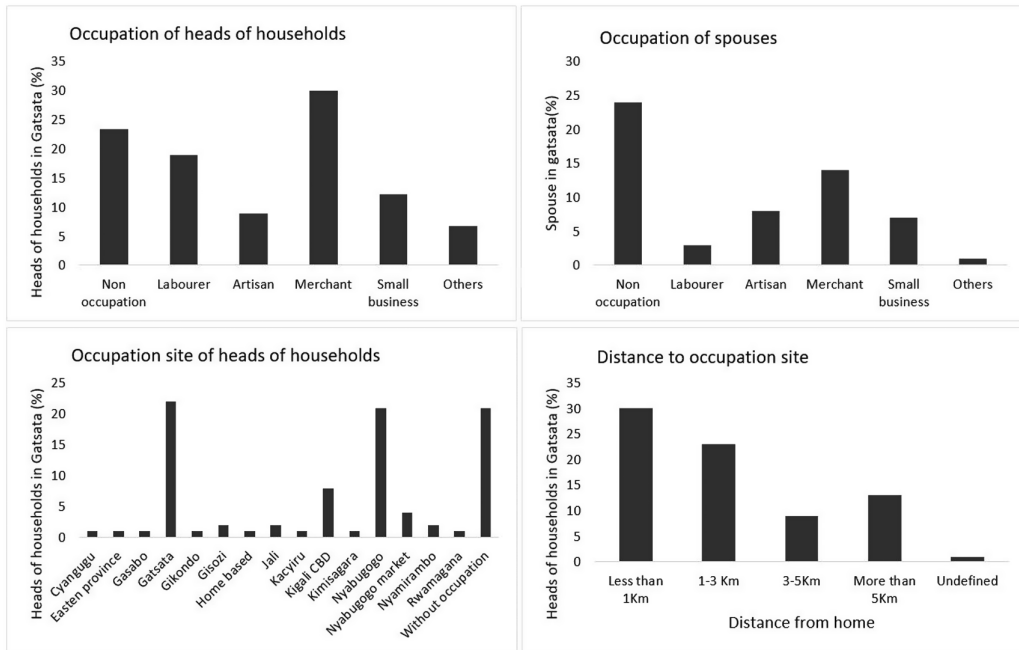
FIGURE 19.4 Selected characteristics related to economic development and income generation for the affected households from Gatsata.

high-risk zone highlight the link between the income-generating activities of the households and their surrounding environment. As seen in Figure 19.4, most heads of Gatsata households have jobs in the same neighbourhood or in the nearby commercial area of Nyabugogo. They mostly travel a distance of 1–3 km to Nyabugogo, where they or their spouses are self-employed as merchants or owners of small businesses. The educational level among the workers revealed that most do not possess any special skills beyond those that allow them to find work in the informal economy. Therefore, any resettlement programme should ensure that low-skilled jobs are available in new resettlement areas. Specifically, for merchants, the resettlement program should ensure that the new site also has a need for additional market services. If insufficient demand is available in or near the new settlement, impoverishment risk will be high. This requirement is also recognised in the Rwanda National Housing Policy, which encourages access to housing for the low-income urban population by supporting their housing within or near economically viable neighbourhoods.

19.3.1.2 Infrastructure and Access to Basic Services

Access to markets, schools and health and sanitation services are universal basic human rights. Since the households that need to be relocated live in a high-risk, informal settlement, there is a need to improve their general living environment, especially in relation to sanitation. Nevertheless, because of the location of their settlement, these households benefit from opportunities that are available in their surrounding environments. Our analysis reveals that most of the school-age children are enrolled in a public primary school to which they walk since they generally live nearby. The study also revealed that households in Gatsata also have relatively good access to healthcare and other basic services such as public transport. In general, because Gatsata is located in an inner-city area, its residents are able to take maximum advantage of the public facilities available; there are more facilities in the inner city than in other parts of the district. National statistics confirm that accessibility to basic services in Gasabo is higher in urban areas than in rural ones (NISR, 2011). Thus, meeting the principle of improving or at least maintaining current levels of service can only

be achieved if well-serviced relocation sites are available. There is a need to ensure that availability in terms of the quality and quantity of services such as schools, health facilities and markets present in the resettlement area can meet demand, such that children will continue their education and continue to use the walking mode within acceptable distance. Likewise, basic healthcare services should be no more than one hour's travel away, as proposed by the Ministry of Health (2009).

19.3.1.3   Protection of Social Networks

Social networks can influence the choice of a household about where to live. People often prefer to settle close to their relatives and close, trusted friends, from whom they can get assistance such as watching over children when parents are not around. Many people may also rely on such networks for financial assistance. The time spent by a household in a place is a factor in forming such social networks. Figure 19.5 shows that almost half of the interviewed households have resided in their settlement for more than ten years. In that time, they were able to construct both social and economic networks. The study also revealed strong social and economic networks based on community financial organization (mutual money lending), as well as community trading (merchants–customers). Those networks and ties are key ingredients for a community's socio-economic development and well-being, and they can be easily damaged by poorly planned and implemented resettlement.

19.3.2   Impoverishment Risks

19.3.2.1   Landlessness and Joblessness

According to Cernea (1997), 'land is the foundation upon which people's productive activities, commercial activities, social networks and livelihoods are constructed and its expropriation is a form of impoverishment'. Patel et al. (2015) showed that the importance of land in urban contexts is given by its location with respect to opportunities for livelihoods and common facilities such as education, health services and markets. Figure 19.6 shows the impact of resettlement on the occupations of heads of households resettled in Kinyinya and Bumbogo.

   The number of heads of households with no occupation increased after resettlement, while the number of labourers and artisans before relocation decreased slightly after resettlement. All those who had been merchants and small business owners before relocation completely stopped with those activities after resettlement. These changes in occupations are attributed to the increased distance to a place of job opportunities, lack of job and business opportunities in the new area,
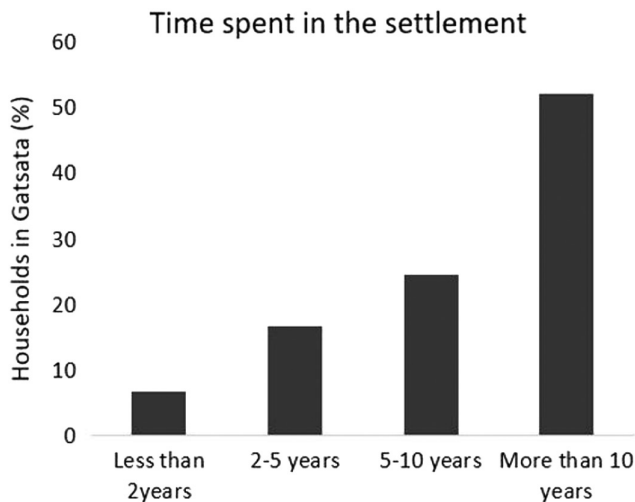

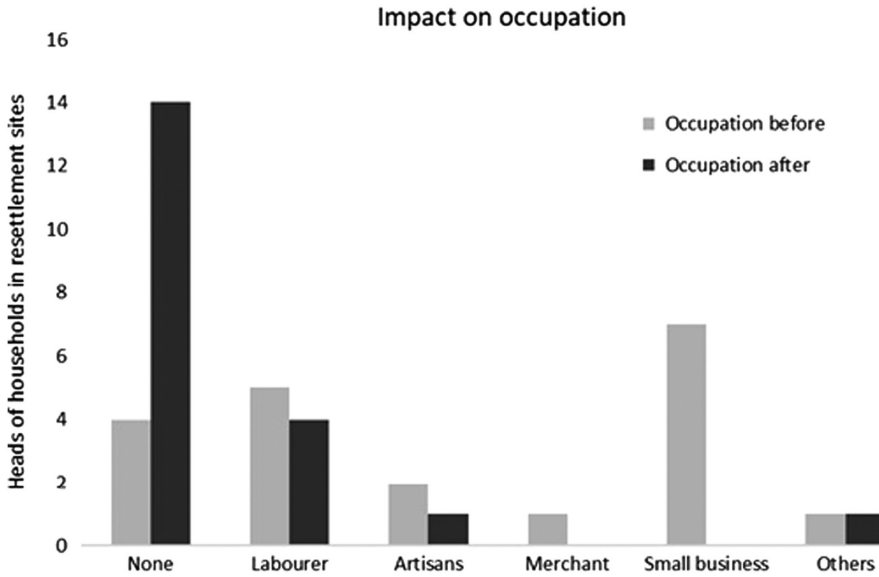**FIGURE 19.5**   Time living in high-risk zones of Gatsata.

FIGURE 19.6 Impact of resettlement on occupations of head of households relocated on sites in Kinyinya and Bumbogo.

increased distance to market places, increased distances from customers, unfamiliar communities, cost of transport to areas of job opportunities and loss of capital through reconstruction.

Other scholars have reported similar findings of landlessness and risk of joblessness after relocation of slum dwellers. Hunter and Posel (2012) emphasised that most households displaced from informal urban settlements face the risk of job loss and a weakening of their livelihoods. Many informal settlements also accommodate immigrants who come to seek jobs and other income opportunities. Because of their low and irregular income, they often prefer to live closer to their job location and income-generating activities to avoid the cost of transportation to and from their place of work. Therefore, relocation far from their original settlements and urban areas offering job opportunities is likely to lead to loss of income and increased risk of impoverishment.

The households to be relocated are living in locations that provide them strategic access to opportunities for income generation and to basic services. These households are therefore likely to face risks of becoming landless as a result of their relocation away from the Gatsata area. Further, our study revealed a remarkable link between this area and the income-generating activities of its residents. Gatsata settlement is located near Nyabugogo, an economically vigorous area upon which the majority of households to be resettled depend. If, therefore, those households are relocated far from Nyabugogo, they are likely to lose accessibility to income opportunities and basic services. As a result, their landlessness may contribute to their joblessness. Households resettled in Kinyinya and Bumbogo sites reported significant impoverishment as a result of these issues.

19.3.2.2 Loss of Income from Houses for Renting

Many households from Gatsata are likely to lose significant income from renting houses. More than 75% of the households sampled have on average one to three small houses that they rent out. For some households, those rental houses also secure the capital they need for running their small businesses or merchant activities. Loss of their rental houses would bring serious financial complications, including loss of income, loss of a substantial amount of invested capital and, as a consequence, a drop in their credit-worthiness.

19.3.2.3 Homelessness

Each of the households that were resettled in Kinyinya and Bumbogo received a house as a form of compensation, yet some of these beneficiaries closed their houses and returned to the city to look for jobs. Because they could not afford the cost of transport, they returned to the city and rented houses in areas offering job opportunities, leaving their own, new houses unused. Thus, with relocation far from job opportunities, the risk of homelessness might become a grim reality – for households to be resettled from Gatsata as well. Clearly, the risks of homelessness that relocated households face shows that compensation in terms of land, cash or houses only cannot adequately deal with the losses caused by displacement – a conclusion that has been demonstrated by other scholars (Cernea, 2003).

19.3.2.4 Marginalization

Households to be displaced from Gatsata are likely to become marginalised if they are not able to use their previous skills, maintain their income-generating activities and quickly regain their full economic strength. Experience of the households that have already been resettled in Bumbogo and Kinyinya shows that 18 out of 20 heads of households interviewed were not able to use their previous skills after resettlement. Their loss of income increased the vulnerability of these households. The majority of interviewed households in Kinyinya replied that they did not find any job opportunities in their resettlement area except for running a small business or becoming a merchant. However, starting a small business was also not possible for them because their income decreased after relocation and their loss of capital and income was a barrier for establishing such activities. In the Bumbogo resettlement site, which is more of a rural area than Kinyinya, respondents mentioned that working as a daily agricultural labourer was the only available job opportunity in the area. Such work is, however, poorly paid and seasonal. Moreover, labouring opportunities do not fit their skills, which were more attuned to jobs in an urban economy.

19.3.2.5 Loss of Access to Common Facilities (Common Property Resources)

Access to common property was interpreted in the context of Gasabo as access to facilities such as public primary schools, public health centres and public hospitals. We found that 18 of the 20 resettled households sampled in Kinyinya and Bumbogo sites had had children studying at local primary and secondary schools. Some of these households were obliged to transfer their children to new primary schools closer to their resettlement sites. Unlike in Kinyinya, most of the households resettled in Bumbogo complain that the distance to primary schools increased significantly after relocation. For the residents of both Kinyinya and Bumbogo, having children attending secondary schools and university means high transport costs because most secondary schools and universities are concentrated in the inner city.

Concerning accessibility to health facilities, the Bumbogo resettlement site is located adjacent to a health centre, while most respondents at the Kinyinya site reported that there was no change in accessibility when compared with their previous settlements. However, most households to be resettled from Gatsata perceive that they might experience loss of accessibility to health facilities after relocation in view of Gatsata's strategic location with – potentially – access to numerous basic services in the vicinity.

19.3.2.6 Health Risks (Morbidity and Mortality, Food Insecurity)

Health risks as a consequence of malnutrition go in hand with food insecurity. We found that drop in income, increased distance to main markets and fairs and change in monthly expenditure are indicators for health risks that may be induced by poorly executed relocation. Nyabugogo is one of the main wholesale markets for food crops in Kigali where people can find fresh fruit and vegetables at low prices. When accessibility to fairs and markets is reduced and at the same time income decreases, there is a risk of undernourishment. The evidence from households already resettled

reveals that monthly expenditures in nine of the 20 resettled households increased, while ten households reported a decrease in monthly expenditures. The explanation for this has two linked causes. On the one hand, households replied that their expenditures decreased because they no longer had the money to spend. On the other hand, an increase in monthly expenditures was associated with a higher cost of living resulting from the higher price of commodities found in local shops: there were no markets near the resettlement sites where inhabitants could find cheap fresh vegetables, and the cost of locally supplied food was high due to increases in transport costs. In both cases, because of loss of income and higher food prices due to a lack of markets, the resettled households were deprived of some types of foods they used to eat before relocation; in some cases, these households only ate once a day. The increase in expenditures for them meant a change in living conditions that had negatively impacted their health. In the context of Gasabo's resettlement programme, these results show how health risks are linked to risks of landlessness and joblessness. Terminski (2015) has also argued that health risks might be a consequence of landlessness or reduced access to common resources.

19.3.2.7   Risk of Social Disarticulation

Households that need to be resettled from Gatsata are likely to face the risk of destruction of their social and economic structure. In the time they have spent in the Gatsata area, they have been able to build social and financial community structures. And regular customers of shop owners also come from the same neighbourhood. Looking at what was experienced in Bumbogo and Kinyinya, 14 households interviewed indicated that they could not maintain their social and economic networks simply because of the increased distance from their original settlements. The distance brought higher transportation costs while their income had decreased. Only six respondents out of the 20 households interviewed in Bumbogo and Kinyinya replied that they had been able to maintain contact with their relatives and friends solely by telephone. Our study also reveals that many resettled households experienced risks of loss of livelihood because of being resettled far from their customers. This shows how the risk of social disarticulation is associated with the risk of becoming jobless, and vice versa. Similar findings have been reported by Patel et al. (2015), who found that shop owners, artisans and small businessmen resettled in Ahmedabad (India) experienced stronger effects of displacement through loss of customers.

19.3.2.8   Loss of Mobility

Reduced personal mobility, as a result of an inefficient transport system, is a new risk of impoverishment to be associated with the Gasabo resettlement programme. Resettled households in both Kinyinya and Bumbogo need to reserve additional funds to travel to their workplaces, the city centre, markets, secondary schools and other places that form part of their daily lives. Moreover, residents of Kinyinya have to walk 15–20 minutes to reach the nearest bus stop, where they must queue for a bus for an indefinite period, inducing stress among commuters. Eighty percent of respondents from Kinyinya reported that the distance to the bus stop had increased compared to their previous residence. Mobility in Bumbogo is worse still: there is no bus stop nearby and residents reported that they must use a motorbike to travel about 10 km over unpaved roads to the nearest bus stop, adding substantially to their mobility costs. Reduced mobility for Bumbogo residents exacerbates the effects of other impoverishment risks, as important trips may be postponed or even cancelled, further contributing to impoverishment.

   Our research has revealed that the reduced mobility of resettled households has reduced their household budget and weakened their social networks. Some households in Bumbogo reported that their children stay with relatives or friends in the city to be close to secondary schools and to reduce transportation costs. Similar findings of limited access to schools in resettlement sites, leading to separation of children and parents, were discussed by Takesada et al., (2008). Reduced mobility poses a significant threat to the well-being of households who may be resettled from Gatsata.

19.3.2.9 Uncertainty

Uncertainty is another impoverishment risk that was identified in the Gasabo resettlement programme. According to Patel et al. (2015) in their study of Ahmedabad (India), this form of impoverishment occurs when resettlement distracts a community from pursuing income-generating activities and a strong perception of negative impacts and stress arises due to a lack of community participation and transparency in a resettlement programme. We found such a situation in Gatsata. A lack of information about the resettlement programme, such as where households were to be resettled, what compensation would be offered and an absence of policy guidelines, magnified the negative perceptions respondents had about their relocation. Uncertainty was high, especially among those households that had small houses for renting. They perceived resettlement as a direct threat to a major source of household income.

19.3.3 Strategies for Reversing Impoverishment Risk

Spatial strategies for reversing potential impoverishment risks were identified. Most of the resettlement risks identified had a clear spatial component. Issues concerning access and mobility are, therefore, of paramount importance when selecting potential resettlement sites; see Table 19.5. In addition, the identification and analysis of potential sites should be a collaborative process that involves the City of Kigali and targeted households so that concerns about uncertainty can be addressed through a more transparent decision-making process. Level of accessibility is a function of modes of transport, so access to bus services should be considered in addition to walking when evaluating resettlement sites.

19.3.4 Potential Resettlement Sites

Figure 19.7 shows potential resettlement sites in Gasabo. Potential residential areas in Gasabo were identified on the City of Kigali master plan (City of Kigali, 2013). Three residential types, one of which was not available in Gasabo, were found to be the most appropriate for resettlement of low-income households:

- low rise residential district (R2);
- low rise residential district (R2A);
- high rise residential district (R4) (not available).

19.3.5 Suitability of Potential Resettlement Sites

Figure 19.8 clearly shows that the suitability of potential sites is very high near to Kigali's CBD and decreases toward the periphery. Due to the increased mobility provided by public transport, the

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TABLE 19.5

Spatial Strategies for Reversal of Impoverishment Risk

| Risks	Reversal Strategies
Landlessness, joblessness and homelessness	Stabilise income generation by prioritizing relocation sites with access to the CBD and other commercial centres that provide opportunities for small businesses and trading
	Minimise transport costs, prioritise locations close to previous locations of residence
Health and education	Prioritise locations with access to established cheap fresh-food markets, public health services and primary and secondary schools
Social disarticulation	Facilitate the maintenance of social networks by prioritizing locations with ready access to households' previous residential locations
Mobility	Prioritise locations that have easy connections with, or can be easily connected to, bus services
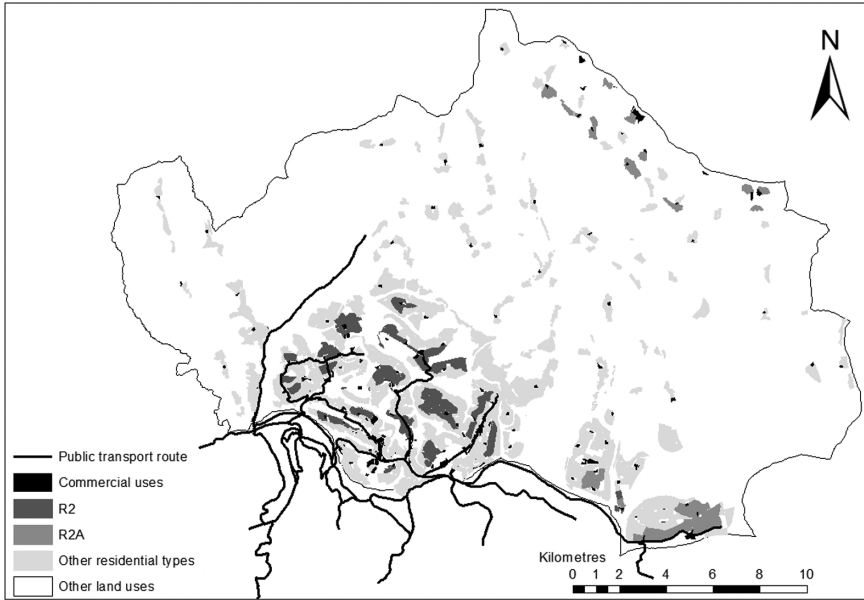
FIGURE 19.7   Identified potential resettlement sites in Gasabo.

use of this mode generates more 'highly suitable' and 'suitable sites'. Many potential sites are only moderately suitable for walking because they are a bit too far away from the city centre, Nyabugogo or the original site of Gatsata, but these sites become much more accessible when travelling by bus. Nevertheless, even when using the public transport, the northern periphery of Gasabo is far from suitable because the level of public transportation services is low (Niyonsenga, 2012) and, as a peri-urban area, it has few basic services due to its low population density and more rural lifestyle. These suitability results show that improving the quality of transportation services could increase the options for potential resettlement sites. If both transport modes are taken into account – walking
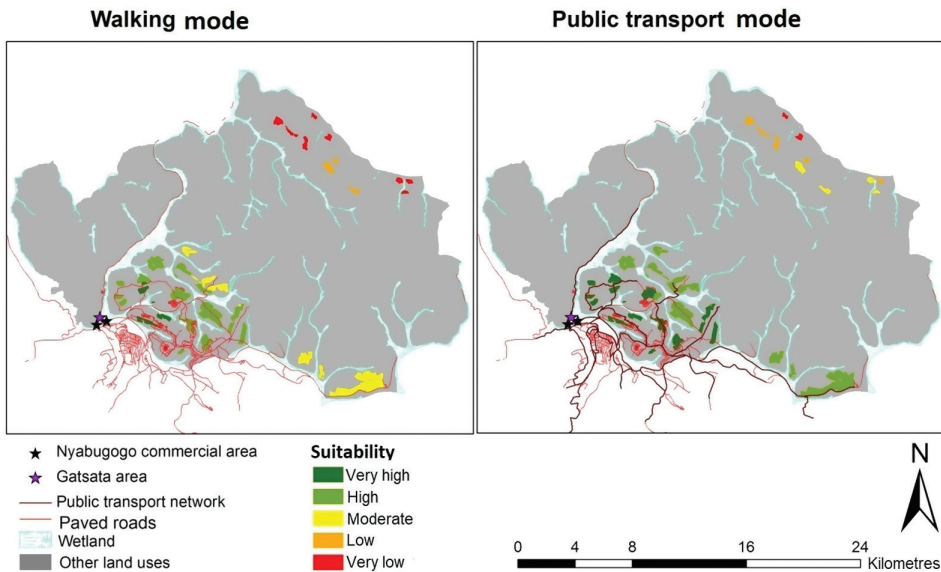

FIGURE 19.8   Potential resettlement sites' suitability in both walking and public transport modes.

and bus transport – the southern region of Gatsata would be the most suitable area for resettlement of Gatsata's households. It is part of the existing urban area of Kigali and directly adjacent to the city's core, and this part of the district offers many locational advantages due to the concentration of basic facilities there, as well as enjoying the possible benefits from basic facilities in the neighbouring districts of Nyarugenge and Kicukiro.

19.4   DISCUSSION AND CONCLUSIONS

Our research links the socio-economic characteristics of affected households with their resettlement requirements and the risks of impoverishment they are likely to face, and it shows how these risks might be minimised by systematic analysis of the suitability and the selection of potential resettlement sites. The findings show that households' original choice to settle in Gatsata was mainly linked to their workplaces and accessibility to basic services. The productive activities, jobs, social networks and general livelihood of these households are linked to the location of their place of residence and its surrounding environment. Location matters: it is a critical factor in determining the impact of resettlement on resettled households. Our study shows that all eight forms of impoverishment proposed by Cernea (1997) have emerged in the case of those already resettled in Gasabo and could also emerge for the households to be relocated away from the Gatsata high-risk area. Among all the risks, landlessness and joblessness are the two most critical relocation risks to be faced. Relative location plays an important role in most of the impoverishment risks identified: distances, time and cost aspects associated with mobility are critical, particularly for low-income households. The argument that the socio-economic problems faced by resettled communities are linked to the spatial location of the resettlement sites is therefore confirmed. Finding an appropriate site that provides good access to all amenities and basic services is crucial for successful resettlement. Uncertainty among the households and reduced mobility emerge from our study as additional forms of risk in the Gasabo district resettlement program.

The systematic analysis of socio-economic characteristics and impoverishment risks of households to be relocated allows spatially based risk-reversal strategies to be developed. The identification of potential resettlement sites should explicitly consider their location, taking into account the two modes of transport most used by low-income groups: walking and buses. Such an approach emphasises that relocation take place close to the original settlement, the CBD or other vigorous commercial areas to reduce the range of potential resettlement risks. Our study shows that the impoverishment risks are interdependent and that risk-reversal strategies can also be built upon the same interdependencies. The stated preferences for selected strategies and their spatial indicators show that households are very much concerned with the location of the resettlement site which offers access to job opportunities before the basic infrastructure to be provided. Households emphasised three criteria: being near to the city centre (CBD); being near their original settlement; and being near to other commercial centres could contribute in some way to the suitability of the resettlement location.

Suitability analysis revealed a large amount of 'highly suitable' and 'suitable' land in the southern part of the district (around the core of Kigali city) for both the walking and public transportation modes. Improving the efficiency of public transport would further increase levels of suitability of potential resettlement sites, but investments in mobility should be synchronised with resettlement, or even precede it, in order to avoid impoverishment of the resettled population.

Notwithstanding the foregoing considerations, we acknowledge that some other factors also need to be considered. For instance, in the case of Gasabo, the limited availability of cheap land close to the original settlement and the CBD will need to be taken into account as the cost of land is an important component in total project cost. Nevertheless, choosing cheaper, more peripheral locations does not reduce total cost, but rather transforms and transfers it to the relocated households, most of whom can ill afford the additional burden. Also, resettlement policy could be tied to residential zones identified in the Kigali city's new master plan and be used as a means for implementing the plan. Suitability analysis of resettlement sites involves a number of criteria, including

compliance with land-use plans, safety, location with respect to workplace opportunities, access to public services and land values – as recommended by Correa et al., (2011). Our study did not include land value and land tenure issues due to a lack of relevant data. Land value and tenure are also essential criteria that influence the selection of the suitable sites. Current owners of suitable land need to be involved as stakeholders in the process of final site selection in order to minimise possible resistance. Further, the 'highly suitable' areas might be located in areas that are already built up (urban areas). Therefore, there is a trade-off to be made between choosing for redevelopment of existing housing areas (as per Kigali city's master plan) or acquiring available vacant land. In all the cases, areas close to the original site could be the potential candidates since they can reduce the indirect effects of resettlement, such as increased travel costs to employment opportunities.

Consideration of standards or stakeholder agreement regarding acceptable travel time is essential because this will influence the outcomes of our multi-criteria model for site suitability analysis. For instance, in Rwanda the standard of geographic accessibility states that no one should have to travel more than one hour for basic healthcare (Ministry of Health, 2009). Therefore, areas within a one-hour travel time to healthcare facilities score higher than other areas. The use of such threshold will affect the number of initially suitable areas. Because of that, the oversimplified practice in which planners consider only "the closer, the better" as sufficient for suitability analysis should be avoided. Furthermore, the amount of spatially available opportunities constitutes an uncertainty that would affect the outcomes of the site suitability analysis. If sites do not possess the services and infrastructure required, then these would need to be provided before relocation, to ensure site suitability.

Only spatial indicators were used to develop a spatial multi-criteria model of site suitability. However, we recognise that strategies to overcome risks of impoverishment following a resettlement process need to address more than just spatial factors. Other, non-spatial dimensions of 'access' (Obrist et al., 2007), such as affordability of, for instance, food on available markets and adequacy (synchronizing the organization of supplied resources with the need and expectations of the relocated households) of, for instance, public transport schedules and market opening times, should be considered when devising strategies for reversal of risks of impoverishment. In addition, the loss of income coming from renting out small houses, rising levels of uncertainty and the availability of public transport all depend on non-spatial factors and related interventions.

Suitability analysis here assumes that people will always travel to the nearest facilities available for particular services. In practice, however, they might be inclined to use more distant facilities and services thought to provide better quality services or perhaps offer cheaper prices in the case of markets. Despite the above limitations, the results from the overall methodology and the model of site suitability we developed are useful and have the potential to support more equitable resettlement since they provide a basis for the evaluation of resettlement sites. The analysis shows that efficient public transport can significantly increase suitability levels of potential resettlement sites. A coordinated group of policies for resettlement planning that include public transportation services will, therefore, influence the suitability of potential resettlement sites more than any single action.

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