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Comparative Analysis of Household Residential Preferences Across Neighbourhood Densities in Nairobi, Kenya

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Rapid urban growth in Nairobi city outstrips demand and provision of adequate housing. The demand for housing in an area is dependent on the satisfaction of the resident's needs and wants. This paper examines the residential preferences of residents in three residential estates, low, medium, and high densities in Nairobi City, Kenya. Data was collected by use of questionnaires that were administered to 267 households. Primary data was collected for this study. The data collected was analysed using factor analysis and ordinal regression. Data was presented in the form of tables. The results indicate residential preferences among high, medium and low-density areas vary. The most preferred factors for low-density residents were safety and security, open spaces and facilities; while the residents in high-density areas preferred housing diversity, local employment and close proximity to the workplace. The least preferred factor for low-density residents was close proximity to work place since they own cars hence they are more willing to commute while high-density residents prioritize proximity to work to minimize transportation costs. Residential preferences varied by density, age, gender, education and years lived in an estate. Preference for safer neighbourhoods with open spaces and facilities was high for residents in low-density areas while preference for neighbourhoods with housing diversity, local employment and close proximity to workplaces was high among the residents in high-density estates. These insights underscore the importance of addressing the varied needs and preferences of different demographic groups in urban planning and housing policy to create more equitable and livable communities in Nairobi in order to limit housing mismatch. This study contributes to the planning studies by firming up empirical evidence from developing countries that have high populations in urban areas.

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INTRODUCTION

The right to adequate housing is recognized by the Universal Declaration of Human Rights (Lutfiana & Widiyastuti, 2022) and by the Constitution of Kenya (RoK, 2010). Adequate housing is a house that is accessible, habitable, with basic services, adequate facilities and infrastructure and has secure ownership (Lutfiana & Widiyastuti, 2022). Housing is an essential need for human beings and a strategic asset irrespective of belief, race or socio-economic status. It has also an influence on the efficiency, health, social behaviour, welfare and satisfaction of the residents as a unit of the environment (Dimuna, 2019). Housing contributes to the economy of a country through employment creation and income generation (Karim, 2009). For this reason, housing is crucial to a country's development (Olima & Onyango, 2008).

The housing problem in Kenya is characterised by demand and supply mismatch between the various socioeconomic strata i.e. the demand for high-income housing is (2%), middle income (15%) and lower income (48%); whereas supply for the high, medium and low-income groups is 48%, 35% and 2% respectively (Kieti *et al.*, 2020). This has led to 60% of the households living in deplorable housing conditions (Kieti *et al.*, 2020). The Kenyan government has come up with policy and programme interventions over the years to address the housing crisis but has failed. These include the National Development Plan of 1964 that aimed at providing decent housing for every family (RoK, 1964), Sessional Paper No 5 (National Housing Policy) that aimed to ensure security, privacy and

health for every Kenyan through the provision of decent homes (RoK, 1966). Sessional Paper No. 3 of 2004 aimed to bridge the gap in housing supply and address the issue of safety in neighbourhoods (RoK, 2004), and Vision 2030 aimed to bridge the gap of housing shortage (RoK, 2018b).

The government through state and non-state actors has tried various initiatives to bridge this gap, from the formal provision of low-cost and affordable urban housing through local authorities, site and service schemes, slum upgrading, civil servant housing scheme fund and Affordable Housing Programme (AHP) (Kieti *et al.*, 2020; Musyoka, 2012). These initiatives have not been successful due to corruption in the allocation and execution process, and scale limitations leading to housing mismatch (Musyoka, 2012). Housing mismatch is caused in situations where the low-income earners cannot afford the low-cost houses or the houses are located far from their source of income leading to them renting out or selling the allocated houses (Huchzermeyer, 2008; Musyoka, 2012). Housing mismatch was evident in slum upgrading. The Kenyan Slum Upgrading Programme (KENSUP) was initiated in 2004 to improve the deplorable housing conditions in Kibera, Soweto. After successfully upgrading Soweto East, more than half of the families relocated back to informal settlements while selling/ renting the new houses citing unaffordability and lack of social networks (Agayi & Karakayaci, 2020). Low-income earners prefer temporary homes since it can allow them to shift when they are seeking economic opportunities since owning a house will mean higher transport costs, inaccessible basic services and a lack of social

networks, which is normal in informal settlements (Musyoka, 2012).

Kenya's population is growing at 2.2% annually (KNBS, 2019a), with those in urban areas being 31.2% (KNBS, 2019b), and more than a third total urban population residing in Nairobi (JCWG & SJPTWG, 2022). Nairobi is the capital city of Kenya, its population grew from 0.8, 2 and 4.3 million in 1979, 1999 and 2019 respectively (KNBS, 2019a). Rapid urban growth has created a challenge to the demand and provision of adequate housing in urban areas, especially in Nairobi (RoK, 2018a). Housing challenges in Nairobi city are shortage of habitable shelter, overcrowding, construction of substandard housing, and the inadequate provision of communal facilities and infrastructure (Olima & Onyango, 2008). The provision of adequate housing will be a fulfilment of the New Urban Agenda (NUA) that aims at improving human settlements (RoK, 2018a) and Sustainable Development Goal (SDG) goal 11, target 11, which aims to provide access to adequate, safe and affordable housing by 2030 (UN-Habitat, 2022).

As demand surpasses supply, there is a need to reduce the gap between housing demand and supply, but bridging this gap is dependent on satisfying the needs and wants of the residents (Alago *et al.*, 2019). When demand and supply are spatially at odds, building more residential houses without defining the demand and needs of the residents cannot solve the problem (Alago *et al.*, 2019). Residential preference refers to choices residents make in the residential environment in terms of housing type, price and quality, neighbourhood characteristics, and accessibility of services and facilities provided (Fattah *et al.*, 2018). Residential preferences can be categorised into stated or revealed preferences. Stated preferences are the qualities of a residential environment that residents prefer to live in. Revealed preferences are the actual choices residents make causing them to live in that residential environment (Akinbamide &

Adegoke, 2022; Li *et al.*, 2019; Vasanen, 2012). For recent residents who have moved, this can represent priorities they considered when looking for a place to live, and for long-term residents, this can be the reason why they continue to live in their residential neighbourhood (Li *et al.*, 2019).

When choosing a residential place, residents can make two choices based on the type of house and type of neighbourhood which is guided by preference and restricted by income (Jabareen, 2005). Residential preferences such as location closer to the workplace, availability of facilities such as education, health or commercial (Alago *et al.*, 2019) and affordability (Owoicho & Ogwuche, 2018) can contribute to a decision residents can make when choosing a residential location. Being familiar with the neighbourhood can also be a factor, as the person has grown up in the area and has adopted the lifestyle or is emotionally attached to the place (Owoicho & Ogwuche, 2018). Conditions such as an increase in rental houses, and insecurity on the other hand can reduce the value and cost of the houses (Alago *et al.*, 2019) and hence can lead to residents moving out of the area.

Socioeconomic and demographic variables have been identified as primary determinants of residential preferences in many studies (De Vos *et al.*, 2016; Hartono *et al.*, 2022; Oluwole *et al.*, 2022). Demographic variables have an influence on residential preferences, in that when the size and composition of a household change, residential preferences may change as well (Hasanzadeh *et al.*, 2019), for example, single and childless households can reside in the city whereas households with children can change from city to a suburban location (Jansen, 2020). When the income and education of a household increase the household tends to choose a more integrated residential environment (Hasanzadeh *et al.*, 2019) whereby preference for a low-density area is associated with high housing status and is considered attractive (Vasanen, 2012). Socio-economic factors such as household income, age, and education level had an influence on

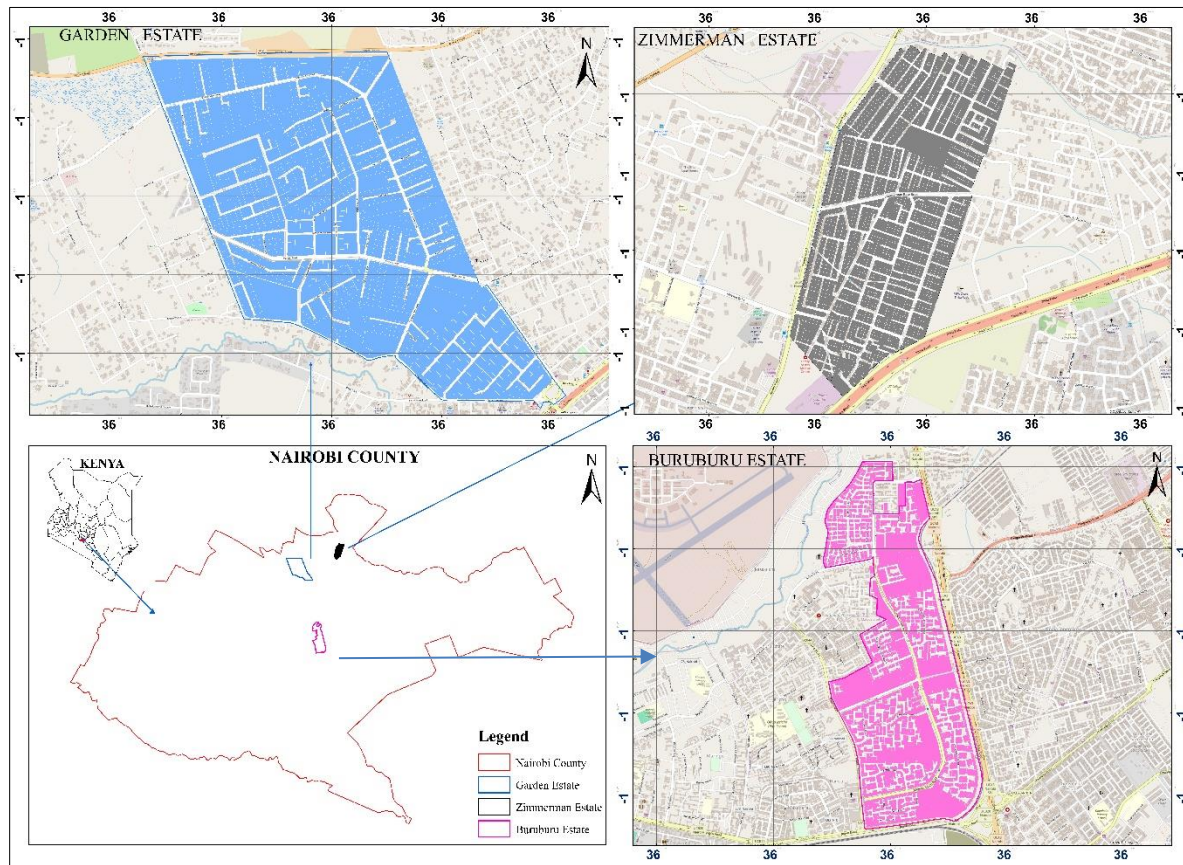
housing preference in Kenya (Kipngeno, 2014), also in South Western Nigeria, the socioeconomic status of the households was the most significant factor of residential preference (Olayiwola & Adeyemi, 2019). Older residents are likely to prefer smaller homes with easy access to services, which results in a preference for denser houses in walkable neighbourhoods (Jansen, 2020). Attitude, socio-economic characteristics and awareness of environmental matters can determine household preference for a residential location. The choice a household can make to settle in an area can be based on neighbourhood characteristics, socio-demographic factors, access and proximity to jobs and facilities (Cockx & Canters, 2020).

Residential land use is the major land use in urban areas. The land use is divided into zones. The zones depend on the land potential of the land, accessibility, infrastructure, environment, development and housing growth potential (Petkar & Macwan, 2018). Depending on the characteristics listed, different zones develop at a different scale and pace and have different property values. Based on demographic and socio-cultural factors urban residents can choose to reside in these zones (Petkar & Macwan, 2018). Effective planning of residential areas requires knowledge of residential preference as the preference is heterogeneous (Petkar & Macwan, 2018). These preferences can be used by planners, developers and policymakers to inform future development of residential areas, especially in Nairobi city. Hence this paper aims to shed light on stated residential preference among high, medium and low-density areas in Nairobi.

MATERIALS AND METHODS

Study area

The study was carried out in Nairobi city, which is the capital of Kenya. The major land use in Nairobi is residential, which is characterized by disparity in the form of housing typology and access to infrastructure and services, leading to the segregation of residential areas according to income and density (Jimmy *et al.*, 2020). The upper and middle income live in planned and fully serviced neighbourhoods while the low-income and the poor live in congested, dilapidated density neighbourhoods (Jimmy *et al.*, 2020). Hence, this study focused on the residential preferences of people living in varied neighbourhood densities of low, medium and high-density areas to show what the residents in these areas consider more important when choosing a residential area. The sampling criteria used were density and income to highlight the diverse preferences of residents who live in different contexts. The choice of Nairobi city was because the demand and supply of housing are at odds in this city and the government is trying to bridge this gap by construction of 250,000 units per year (Kieti *et al.*, 2020). The construction of more houses cannot be successful without assessing the desires of the residents since the homes will remain vacant. The Garden Estate is a high-income estate with low density and is located approximately 9 km from the Central Business District (CBD), while Zimmerman is a low-income estate with high density and is located approximately 8km from the CBD. Buruburu is a middle income estate and is located approximately 8km from the CBD as shown in Figure 1.

Figure 1: Location of the study areas in Nairobi city**Data collection and analysis**

Primary data was based on a sample size of 406 households determined using the Cochran formula

(Cochran, 1977), but 268 responded (Table 1), the number of households used was obtained from the 2019 Census (KNBS, 2019b).

Table 1: Distribution of household questionnaires in the three estates

Estate	Number of households	Sample size	Administered	Response rate
Buruburu	6,174	135	125	93%
Zimmerman	18,934	137	83	61%
Garden	5,481	134	60	44%

The household questionnaire was by use of systematic sampling in Buruburu, simple random sampling in Zimmerman and an online survey in Garden Estate. The garden estate association does not allow entry into resident's houses. Data collected was on socio-economic characteristics and the factors residents consider important in a residential area. The factors that were assessed in this study were safety and security, availability of open spaces, close proximity to workplace,

provision of facilities, housing of various prices, accessibility, land use diversity, availability of local employment and easy accessibility to services. The respondents were asked to rate the importance they attached to the above factors when they chose the residential area. The rating of the factors was based on a Likert scale of five with 5 representing very important and 1 not important. Statistical Package for Scientists Software (SPSS) Version 22 was used in the analysis of data from the field. Data was

analysed using descriptive statistics, with factor analysis used to identify the major factors that have a greater influence while ordinal regression was used to determine the relationship between socioeconomic characteristics and the major residential preferences that were identified through factor analysis.

Factor analysis was suitable for the study since the sample size was adequate, and variables were well correlated, which is in line with Pallant (2011) that noted that a smaller sample size of 150 cases is sufficient if solutions have several high-loading marker variables above 0.8 and correlation matrix has coefficients greater than 0.3. The nine preference variables and sample size of 268 was considered adequate for the factor analysis while ordinal regression was used since the dependent variables were in a ranked order while the independent variables were in form of nominal and interval scale. The mean of the factors was ranked in order and interpreted according to the average index in order to identify the most important and the least important factors residents usually consider in a residential environment. The ranking was made in order to identify which factors the residents in low, medium and high-density estates consider first when moving into an estate. The classification of age was based on the constitution of Kenya's age groups. The elderly people are those who are aged 60 years and above while the youth are between 18 to 34 years and the middle are those who are between 35 to 59 years (RoK, 2010).

RESULTS

Socioeconomic characteristics of the residential areas

Table 2 shows the socioeconomic characteristics of the study areas. In Garden Estate, 30% of the sampled respondents were male while in Buruburu and Zimmerman 70% and 54.2% were male respectively. In terms of house ownership, all the respondents in Garden Estate were house owners, 31.2% in Buruburu were owners, and 13.3 % in Zimmerman were owners. The level of education for all respondents in Garden estate was graduates, while in Buruburu and Zimmerman it is mixed, showing majority of the respondents in the study area were educated. Most of the residents in Zimmerman are young people, while Buruburu has a variety of residents ranging from young, middle and elderly people and the Garden estate majority are middle and older people (Table 2). The youth are not found in Garden estate this can be attributed to the fact that the area is a low-density area and the cost of acquiring land and building in the area is expensive hence most youth cannot afford to live in the area. The income levels of people in this estate range from KES 300,000 to 1,500,000, making Garden estate a high-income estate according to the economic survey of 2023 (KNBS, 2023). Buruburu comprises lower-income (who live in the extensions and work within the estate) and middle-income earners, with the majority and owners being middle-income earners since they earn between KES 46,356 to 184,394 per month according to the economic survey (KNBS, 2023) who represent 52.8% of households surveyed. Zimmerman comprises low-income earners earning below KES 30,000. The average household size in Garden Estate is 3.9, Buruburu 3.2 and Zimmerman 2.9. The majority of households have lived in Garden estate (78.3%) for at least 11-21 years, Buruburu (44.8%) at least 10 years and Zimmerman (65.1%) have lived for 1-5 years (Table 2).

Table 2: Socio-economic characteristics of the respondents in the three estates

Category		Estate		
		Garden	Buruburu	Zimmerman
Gender	Male	30%	63.2%	54.2%
	Female	70%	36.8%	45.8%
Age groups	Young	-	20.8	57.8
	Middle-aged	66.7	52	26.5
	Elderly	33.3	27.2	15.7
Education	No formal education	0	4%	1.2%
	Primary	0	1.6%	7.25%
	Secondary	0	33.6%	41%
	College	0	31.2%	27.7%
	University	100	29.6%	22.9 %
House ownership	Owner	100 %	31.2%	13.3%
	Rental	0	68.8%	86.7 %
Years lived in the estate	1-5 years	21.7%	44.8 %	65.1%
	6-10 years	0	19.2 %	16.9%
	11-15 years	30%	4.8%	4.8%
	16-20 years	10%	11.2%	3.6%
	≥21 years	38.3%	20%	9.6%
Motivated to live in the estate	Yes	68.3%	76.4%	63.4%
	No	31.7%	23.6%	36.6%
Average Household size		3.98	3.24	2.98

Factors residents consider important when moving into an estate

Safety and Security

The results (Table 3) show consistency in the three estates, Garden estate had a mean of 4.42, Buruburu 4.95 and Zimmerman 4.58. This shows the factor is a very important factor to residents in low, medium and high-density areas. Safety is an important aspect to consider when moving into a new area. This supports the study done by Oluwole *et al.* (2022) in Kaduna South, the residents of the area also indicated security as an important factor that tenants make when in terms of residential preference. Safety and security make an area attractive for residents and can encourage the residents to stay in the area for a longer time. Safety relates to minimal crime level, a resident should feel safe during the day and night, have safe streets and have a police station (Shirazi & Keivani, 2019). Buruburu was planned to have a police station to enhance the security of the area. Buruburu is organised into

courts which were designed to enhance the security of the area since each court is guarded by a watchman and no one can enter the place without the permission of the one in charge. The Garden Estate is also organised into various courts; which has enhanced the security of the area. The estate street design is cul-de-sac which has further promoted safety in the area. Zimmerman estate has a police station that promotes safety in the area.

Availability of open spaces

The availability of open spaces was inconsistent among the three estates. This factor was ranked 2nd in Garden estate with a mean of 3.77 meaning the residents of this estate considered it as an important factor while in Buruburu this factor was ranked 6th with a mean of 4.55. Hence it was considered as a very important factor in Buruburu even though it has a lower rank. Garden estate residents rated this factor as very important due to the value they place on open spaces. The Garden estate has adequate open spaces. The spaces are used for social

gatherings, relaxing and as children's playgrounds. Open spaces can be used to sustain a neighbourhood. They can act as buffer zones and separate incompatible land uses, they can also be used to control indoor and outdoor temperature. Open spaces that have trees can be used to regulate greenhouse gases in the atmosphere (Chan, 2014). High vegetation cover makes the area to be pervious hence the area has minimal floods. The residents of Buruburu also rated this factor as very important because they understand the value of open spaces, given that the area was planned using cluster design. The aim of the design was to provide open spaces within each cluster of houses. The residents of Zimmerman estate do not value open spaces since the area lacks open spaces due to land grabbing, hence over time they have adopted to stay in an area without open spaces. If these spaces are left vacant or idle, they are used for disposing solid waste hence the residents of this area did not consider this factor as more important.

Provision of facilities

The provision of facilities rating was inconsistent in the three estates. This factor was ranked 5th in Garden estate with a mean of 3.2 meaning the residents of this estate considered it as an important factor while in Buruburu this factor was ranked 2nd with a mean of 4.89 while in Zimmerman the factor was ranked 7th with a mean of 4.16. Availability of facilities is one of the factors that affects the demand and choice of residential property because human beings are social beings hence they usually seek to dwell in places that have maximum facilities at affordable prices. Hence provision of facilities that would enrich the living conditions of people in a neighbourhood is very essential (Yakubu *et al.*, 2019). One of the main reasons people moved to new estates in urban areas was due to the proximity to a range of facilities and convenience made by the availability of these amenities and the ability to walk or use public transport (Allen, 2015). In terms of facility provision, Zimmerman has inadequate facilities while Buruburu and Garden Estate have an

adequate number of facilities. The neighbourhood concept that was used to plan Buruburu ensured the area had various facilities to promote the quality of the estate.

Housing of various prices

Garden estate residents rated this factor as not important with a mean of 1.87 while Buruburu and Zimmerman rated it as a very important factor with a mean of 4.54 and 4.20 respectively. This factor was ranked the 7th in Garden and Buruburu estate, while it was ranked the 5th in Zimmerman. This shows that high-income earners do not consider the factor important when choosing a residential environment while residents in low and middle-income places consider it important despite the ranking. The residents of Garden estate don't prefer housing of various prices because they think it will lead to a reduction of quality of the neighbourhood and their preference for segregation since they are high-income earners, but residents of Buruburu and Zimmerman prefer having houses with different price range and size since they can accommodate anyone regardless of their income. Garden estate has single dwelling units that come in the form of maisonettes and bungalows. Development control in the area is strict, hence, the land use permitted in the area is only for single-family dwelling units. The houses constructed in Buruburu when it was planned were 3 bedrooms, 4 bedrooms and 5 bedroom houses. After payment of the mortgage, the owners of the houses opted to construct extensions for either rent or for their children. This led to the construction of single rooms, bedsitter and one-bedroom houses. This gave rise to the development of diverse housing types with different prices. Zimmerman has various houses with different prices ranging from bedsitters to one-bedroom, two-bedroom and three-bedroom houses. The majority of the houses in this estate are bedsitters since a majority of the population in the area are youths. The aim of having different houses is for cohesion and, a healthy social network which

in turn can make the city develop (UN-Habitat, 2013).

Land use diversity

The residents of Garden Estate rated this factor as least important while Buruburu and Zimmerman rated it as very important and important with a mean of 2.8, 4.46 and 3.73 respectively. Garden estate residents do not prefer having diverse land use in the area due to fear of encroachment and informality in a neighbourhood. Residents of Buruburu and Zimmerman prefer having diversity of land use in an estate since it makes the estate lively, and promotes social sustainability and economy. Buruburu estate is quite diverse with land use ranging from commercial, residential, health, education and recreation while Zimmerman is mostly commercial cum residential. Diversity of land use is an appropriate mix of various land uses in an area, where it promotes various activities like living, working, shopping and leisure to be closer. Mixed-use areas tend to promote social inclusion and walkability, these areas are usually safe and accessible (Bahadure & Kotharkar, 2012). The purpose of having a diversity of land use in an area is to create jobs, promote local economy, reduce dependency on cars, encourage pedestrian and cyclist traffic, reduce fragmentation of the landscape and provide public services closer (UN-Habitat, 2013).

Accessibility

The 4th factor in Garden Estate is accessibility with a mean of 3.27 while this factor was the 3rd and the 5th factor in Buruburu and Zimmerman with a mean of 4.86 and 4.34 respectively. Accessibility was considered important in Garden Estate and very important in Buruburu and Zimmerman. The more accessible an area is to the various activities in a community, the greater its growth potential. Garden estate is accessible by driving cars while Buruburu is accessible by walking and driving and Zimmerman estate is easily accessible by walking rather than driving cars since the roads are narrow.

Availability of local employment

Availability of local employment was rated as the 8th factor in Garden estate with a mean of 1.67, the 5th with a mean of 4.58 in Buruburu and the 6th factor with a mean of 4.17 in Zimmerman estate (Table 3). Residents of Garden Estate consider the availability of local employment within the estate as not important since the area is strictly a single-dwelling residential area and setting up of commercial and business facilities will reduce the value of the area. The residents of Buruburu and Zimmerman consider the availability of local employment as a very important factor as the provision of jobs within the estate can boost the economy of the area. The biggest advantage accrued to residents in planned neighbourhoods is that the residents can work and invest in the place where they stay without travelling too far. This allows the residents to experience both economic and non-economic advantages (Murage *et al.*, 2016). Planning in neighbourhoods such as Buruburu has led to increased economic activities due to the creation of new residential units and commercial buildings which has increased the revenue of the area leading to economic growth of the country, increased house availability, income and employment opportunities. The availability of local jobs helps to support the viability of local shops, entertainment places and recreational places. The provision of facilities within the neighbourhood can help to provide diverse work opportunities for the local people. The provision of local jobs also helps to boost the local economy, allows residents to cycle or walk to their place of work leading to a reduction of carbon footprint and helps to improve air quality. It increases opportunities for mutual support, local ties and the need for travel to a client (Barton *et al.*, 2021).

Easy accessibility to services

The factor was rated important in Garden estate with a mean of 3.3 and very important in Buruburu and Zimmerman with a mean of 4.74 and 4.34

respectively. This shows that residents value the provision of services such as shops, grocery stores, electricity, water and waste management. These services are important in a neighbourhood since the lack of them can inhibit the development of an area. These services are a key factor in achieving the economic and social goals of a community. These services enable an area to function effectively and are essential to the well-being and quality of life of residents (Oyedele & Oyesode, 2019).

Close proximity to the workplace

This factor was ranked the last with a mean of 1.58 in Garden Estate. The factor was also ranked the last in Buruburu with a mean of 3.98. This shows that even though this factor was ranked the last it was still an important aspect for residents in medium density. Residents in low-density estates own cars

hence they don't mind travelling long distances to their place of work hence this was not an important factor to them. This is in line with the statement by the World Bank (2016), that high-income earners are more likely to commute by personal car or public vehicle making close proximity to the workplace a less important factor when choosing a residential area. Buruburu rated it as important since they don't mind travelling, and most of them are car owners hence they would not mind travelling a long distance to the workplace. Residents of Zimmerman rated it as the most important factor since they would want to minimize the travel cost. This supports the statement that low-income earners prioritize close proximity to the workplace over more desirable places of living. This is important for low-income earners since they engage in multiple jobs (Nakamura & Avner, 2018).

Table 3: Factors residents consider when moving into an estate in percentage, mean score and rank

Variable	Garden estate		Buruburu estate		Zimmerman estate	
	Mean	Rank	Mean	Rank	Mean	Rank
Safety and Security	4.42	1	4.95	1	4.58	1
Open spaces	3.77	2	4.55	6	3.42	9
Provision of facilities	3.20	5	4.89	2	4.16	7
Housing of various prices	1.87	7	4.54	7	4.20	5
Diversity of land use	2.80	6	4.46	8	3.73	8
Accessibility	3.27	4	4.86	3	4.34	2
Availability of local employment	1.67	8	4.58	5	4.17	6
Easy accessibility to services	3.3	3	4.78	4	4.34	2
Close proximity to place of work	1.58	9	3.98	9	4.27	4

Motivation for wanting to leave or stay in the estate

The reasons residents live in Garden estate are that the area is secure, conducive for a family, has not changed over time, is close proximity to the CBD, good facilities, availability of open spaces, serene, quiet and not congested, good quality of life, and away from town and large land sizes. Residents prefer low-density areas since they offer more open spaces, large houses and ample parking spaces (Haque *et al.*, 2020). Reasons for wanting to move from the estate are the upcoming commercial

buildings, traffic along Kiambu Road and noise from the nearest entertainment places.

The reasons for living in Buruburu estate are that the area is secure, the availability of accessible facilities, ownership of houses, the area is quiet and serene, availability of job opportunities, accessibility, business opportunities, familiarity and nearness to the workplace. The reasons for wanting to move out are increasing congestion, expensive houses and a decrease in land size. When households change residences in response to changes in the urban environment and in the patterns of their daily lives, their migration produces

changes in neighbourhood characteristics, and in the spatial distribution and quality of the facilities available to serve them (Dokmeci *et al.*, 1996) which can cause problems such as congestion and inadequate facilities.

The reasons the residents stated for living in Zimmerman are that the area has affordable houses, accessible services, the area is accessible and has also accessible facilities, is a good place for business, has good security, availability of local jobs and the area is close to place of work for some residents. The reasons for wanting to move are that the area is congested, water shortage, poor roads and sanitation. These reasons above support the statement by Alago *et al.*, (2019) they stated that close proximity to the workplace place, and availability of facilities influence the choice of residents renting the place and that factors such as insecurity make residents dislike the place hence they would want to move. An area that is accessible and has land use diversity are attractions that residents consider (Fattah *et al.*, 2018). The above factors such as drainage systems, and cleanliness of the neighbourhood were also found to influence

one's decision to reside in a certain area (Kahura & Kamaria, 2017). The results illustrate that non-economic reasons are the major driving forces that cause residents to want to move from their residential areas. Changes in the neighbourhood characteristics are one of the factors driving forces for residents regardless of their income hence understanding these issues can be an effective planning strategy in urban areas where the population is projected to be high.

Determinants of Residential Preferences

Factor analysis

Factor analysis was used in analysing the preference variables and reducing them to a more manageable number of variables. First, Cronbach alpha was conducted to test the reliability of the variables with a test indicating a value of 0.881 for the 9 variables (Table 4), which shows the variables are consistent and hence they are reliable and adequately measured the information that was obtained from the field. Cronbach's values of 0.7 are acceptable but values of 0.8 are preferable (Pallant, 2011).

Table 4: Reliability test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
.875	.881	9

The correlation matrix (Table 5) indicates that factor analysis can be used to analyse the variable since the variables are correlated, with (Table 6) showing Kaiser-Meyer Olkin (KMO) value is 0.881, which is above the acceptable limit of 0.5 and the Bartler test of Sphericity χ^2 (1267.181) $p=0.000$ that shows the test is significant. The results of Cronbach alpha, KMO and Bartler test show the test is appropriate for the variables. Results of the

Principal Component Analysis (PCA) using varimax rotation Eigenvalues of >1 retained two factors which are economic and environmental factors, with variables which had an Eigen value less than 1 excluded. Two components had an Eigenvalue of 4.765 and accounted for 52.949% of the variance while the second component had an Eigenvalue of 1.241 and accounted for 13.784% of the variance (Table 7).

Table 5: Correlation matrix

	SF	OP	FA	HD	DL	AS	AL	ES	CW
SF	1.000								
OP	.280	1.000							
FA	.607	.415	1.000						
HD	.267	.088	.468	1.000					
DL	.259	.287	.443	.508	1.000				
AS	.490	.295	.662	.604	.586	1.000			
AL	.309	.199	.535	.691	.515	.558	1.000		
ES	.466	.253	.637	.581	.577	.768	.589	1.000	
CW	.275	.062	.393	.605	.404	.430	.636	.524	1.000

a. Determinant = .008

SF = safety and security, OP = availability of open spaces, FA = provision of facilities, HD = housing diversity, DL = land use diversity, AS = accessibility, AL = availability of local employment, ES = easy accessibility of services, CW = Close proximity to work place

Table 6: KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.881
Bartlett's Test of Sphericity	Approx. Chi-Square	1267.181
	Df	36
	Sig.	.000

Table 7: Total Variance Explained

Component	Total	Initial Eigenvalues	
		% of Variance	Cumulative %
1	4.765	52.949	52.949
2	1.241	13.784	66.733
3	.780	8.664	75.397
4	.617	6.860	82.257
5	.428	4.758	87.015
6	.374	4.154	91.170
7	.316	3.506	94.676
8	.272	3.019	97.695
9	.207	2.305	100.000

Table 8, also shows only two components were extracted as factors influencing residential preference. The first component had a significant correlation with 7 variables which are houses of various prices, availability of local employment, close proximity to the place of work, easy accessibility to services, accessibility, diversity of land use and provision of facilities hence this factor can be considered as an economic factor. Houses of various prices, availability of local employment and close proximity to the place of work had a very high

loading > 0.8. The second component had a significant loading with 6 variables which are easy accessibility to services, accessibility, availability of open spaces, provision of facilities and safety and security. Availability of open spaces, provision of facilities and safety had a very high loading >0.7. Making this factor be environmental factor. This shows that economic and environmental factors are the predictors of residential preferences as they had the highest loading. Residents in low-density areas prefer environmental factors more than economic

factors since the environmental factors had a higher mean (Table 3) while residents in medium and high-density areas do not have a specific preference for

the factors since both economic and environmental factors had a high mean.

Table 8: Rotated Component Matrix

	Component	
	1	2
Houses of various prices	.862	
Availability of local employment	.823	
Close proximity to place of work	.814	
Easy accessibility to services	.701	.486
Accessibility	.648	.558
Diversity of land use	.618	
Availability of open spaces		.772
Facilities provided	.466	.727
Safety and Security		.712

Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization

Ordinal Regression

Ordinal regression was conducted for 6 factors extracted from PCA to test which socio-economic variables affect them. The p-value for all the models is < 0.005 indicating that all models were significant. The Pseudo R^2 indicate the proportion of variance in the dependent variable explained by the model for instance local employment model is 0.547, which shows that the regression can explain 54.7 % of the variation in this factor (Table 9). The Likelihood Ratio Chi-Square is a measure of how well the model fits compared to a null model with no predictors. Higher values show a better model. Density was consistently a significant predictor across most factors. Residents in Garden estate ($E=2.884$, $p=0.000$) were significantly likely to rate safety and security higher than residents in Zimmerman estate. Residents in the Buruburu estate ($E=1.947$, $p=0.002$) had a similar but slightly smaller effect on safety and security. Residents in Garden estate were significantly likely to rate open spaces ($E=1.771$, $p=0.001$) higher than residents in Zimmerman estate, which was similar also for residents in Buruburu estate but had a slightly higher effect than residents in Garden estate. A significant positive coefficient for low and medium-density estates suggests residents in Garden and

Buruburu estates are likely to rate open spaces, safety and facilities higher compared to residents in Zimmerman estate.

Residents in Garden estate had a significantly strong negative effect on housing diversity ($E=-5.794$, $p=0.000$), local employment ($E=-5.912$, $p=0.000$) and close proximity to the workplace ($E=-2.658$, $p=0.000$). A significant negative coefficient for low-density estates suggests residents in Garden estate are likely to strongly rate housing diversity, local employment and close proximity to workplaces lower compared to residents in Zimmerman estate. Gender was a significant variable for housing diversity and close proximity to the workplace. Male residents had a significant negative coefficient ($E=-0.860$, $p=0.005$) and hence were less likely to rate housing diversity highly compared to females. Males on the other hand had a significant positive coefficient and hence were likely to rate close proximity to work place highly compared to female residents ($E=0.848$, $p=0.002$).

Age group was a significant variable for open spaces and close proximity to the place of work. The younger ($E=-1.144$, $p=0.004$) and middle-aged ($E=-1.343$, $p=0.000$) residents were significantly less likely to rate open spaces highly compared to older residents. Household size was a significant

variable for the perception of open spaces ($E=0.234$, $p=0.005$) and provision of facilities ($E=0.317$, $p=0.004$). Families with larger household sizes are significantly more likely to rate preference for open spaces and facilities provision highly. Education was a significant variable for perception of open spaces ($E=-1.390$, $p=0.001$) indicating individuals with no formal education are significantly less likely to rate preference for open spaces highly than individuals with higher education.

Years lived were significant in facilities provision and housing diversity. Residents who have lived in an estate for a shorter time of between 1 to 10 years ($E= 1.513$, $p = 0.004$) were likely to rate preference for facilities highly than those residents who have lived for 21 years and above. Residents who have lived longer in an estate for a period between 11-15 years ($E=-1.688$, $p=0.002$) were less likely to rate preference for housing diversity highly than those residents who have lived for 21 years and above. Homeowners were less likely to rate preference for facilities ($E=-3.448$, $p= 0.002$) and local employment ($E=-1.411$, $p=0.005$) highly than residents who rented.

Residential preferences varied by density, age, gender, education and years lived in an estate. In general, preferences for safer neighbourhoods with open spaces and facilities were high for residents in low-density areas while preference for neighbourhoods with housing diversity, local employment and close proximity to workplaces was high among the residents in high-density estates. Medium-density residents had varied preferences for both economic and environmental factors. Hence this paper concludes that environmental factors are more important to low-density residents or high-income earners while economic factors are more important for high-density residents or low-income earners. Females had a preference for neighbourhoods with diverse housing than their male counterparts. Older residents had a higher preference for neighbourhoods with open spaces.

Table 9: Ordinal regression model for socio-economic determinants for neighbourhood preference

Factors	Safety and Security		Open spaces		Facilities		Housing Diversity		Local employment		Close proximity to the workplace	
Socio-economic variables	Estimate	Sig	Estimate	Sig	Estimate	Sig	Estimate	Sig	Estimate	Sig	Estimate	Sig
<i>Density</i>	2.884	0.000	1.771	0.001	6.642	0.000	-5.794	0.000	-5.912	0.000	-2.658	0.000
Low												
Medium	1.947	0.002	2.424	0.000	2.614	0.000	-0.711	0.056	0.947	0.110	0.372	0.286
High	0 ^a											
<i>Gender</i>	-0.340	0.427	-0.025	0.928	0.134	0.698	-0.860	0.005	-0.347	0.239	0.848	0.002
Male												
Female	0 ^a											
<i>Age group</i>	-0.297	0.606	-1.144	0.004	0.426	0.396	0.078	0.847	-0.130	0.738	1.246	0.001
Young												
Middle-aged	1.576	0.008	-1.343	0.000	-0.502	0.241	0.565	0.130	0.385	0.306	1.453	0.000
Older	0 ^a											
Household size	0.340	0.027	0.234	0.005	0.317	0.004	-0.085	0.333	-0.129	0.142	0.007	0.940
<i>Education</i>	16.674		-4.954	0.000	-1.009	0.390	-0.535	0.599	1.035	0.394	1.033	0.404
No formal education												
Primary	0.286	0.823	-1.276	0.100	-0.290	0.727	1.476	0.150	1.149	0.189	-0.084	0.915
Secondary	-0.641	0.310	-1.390	0.001	0.206	0.691	-0.395	0.329	0.830	0.050	0.415	0.280
College	0.119	0.858	-0.565	0.187	0.615	0.291	0.632	0.156	0.188	0.645	0.392	0.315
University	0 ^a											
<i>Years lived</i>	1.067	0.119	0.620	0.152	1.513	0.004	-0.938	0.058	0.545	0.236	-0.231	0.590
1-5 years												
6-10years	0.239	0.759	0.776	0.135	2.210	0.004	-0.085	0.889	1.373	0.023	0.653	0.241
11-15 years	-0.837	0.225	0.116	0.822	0.574	0.317	-1.688	0.002	-0.483	0.362	-0.993	0.092
16-20years	-0.064	0.929	-0.532	0.299	-1.492	0.023	-1.174	0.032	-1.013	0.064	-0.734	0.147
21 years and above	0 ^a											
<i>House ownership</i>	0.436	0.534	0.097	0.831	-3.448	0.002	-0.209	0.677	-1.411	0.005	0.933	0.024
Own												
Rent	0 ^a											
Pseudo R ²	0.206		0.307		0.427		0.528		0.547		0.486	
Chi ²	0.000		0.000		0.000		0.000		0.000		0.000	
LR Chi ²	60.988		97.092		147.795		199.103		209.780		176.226	

This parameter is the reference value.

CONCLUSION

Nairobi city faces a daunting challenge of housing provision, with demand and supply of housing at odds but building more residential houses without defining the preference of the target group cannot solve the problem. This paper first examined residential preferences in high, medium and low-density areas. Residential preferences among high, medium and low-density areas vary. The most preferred factors for low-density residents were safety and security, open spaces availability and adequate facilities; while the residents in high-density areas preferred areas with housing diversity, local employment and close proximity to the workplace. Medium-density residents preferred both preferences for economic and environmental factors. The least preferred factor for low-density residents was close proximity to work place since they own cars hence they are more willing to commute while high-density residents prioritize proximity to work to minimize transportation costs. Safety emerged as a very important factor across all estates.

These insights underscore the importance of addressing the varied needs and preferences of different demographic groups in urban planning and housing policy to create more equitable and livable communities in Nairobi in order to limit housing mismatch. There are no studies related to residential preferences in high, medium and low-density areas, especially in developing countries, such as Kenya. This study contributes to the planning studies literature by firming up empirical evidence from developing countries that have high populations in urban areas. Secondly, this paper determined socio-economic variables that influence residential preference. Density, age, gender, education, household size, house ownership and years lived in an estate were significant determinants of residential preference. Residents in high-density areas prefer safer neighborhoods with open spaces and facilities while residents in high-density areas prefer areas with housing diversity, local employment and close proximity to workplace. Female residents preferred an area with diverse housing over male counterparts. Older residents preferred an area

with open spaces. Tenants prefer an area with facilities and local employment. This interpretation provides insights into how different socio-economic factors influence neighbourhood preference and can help to inform planning and policy decisions in the development of residential areas that not only meet the needs of current inhabitants but also anticipate their future demands. Understanding the residential preferences of people of different demographic characteristics can help in the provision of important factors that residents value hence improving the quality of life and satisfaction of residents in urban areas.

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ACRONYMS

JCWG Just City Working Group

SJPTWG Socially Just Public Transport Working Group

KNBS Kenya National Bureau of Statistics

RoK Republic of Kenya