Urbanisation and Green Space: Analysing Urban Green Space Accessibility in Uganda' Cities

Abel Nzabona
Centre for Basic Research, Kampala
abel.nzabona@gmail.com
+256772502405

Abstract
African countries are experiencing heightened pace of urbanization. However, this is happening alongside urban challenges such as limited accessibility to urban green spaces (UGS) in Uganda's cities. This undermines the principle of achieving SDG 11.7 that aims to have UGS for all. This paper analyses predictors of UGS accessibility using a sample of 936 residents of six cities who were interviewed in a 2022 survey. The outcome variable is 'accessibility to urban green space'; measured by asking heads of households whether UGS is freely accessible to the public. Descriptive statistics are computed and a probit regression model is fitted to determine the predictors of perceptions of accessibility to UGS. Findings indicate low perception of urban green space prevalence and accessibility. Physical, demographic and social factors significantly influence the perception levels. The findings have several implications including improving the physical conditions of the cities as well as raising the socio-economic status of the urban residents. Conserving existing and planning new urban green spaces are recommended.

Key words: **Urban** **Green Space** **Age-friendly city** **SDG11**

Background

African countries are experiencing heightened pace of urbanization. Uganda is one of the countries with high rates of urbanisation and data indicates that the proportion of people living in urban areas increased from 1.6 million in 1991 to about 12.4 million in 2022 (UBOS, 2016). However, the high urbanisation rate is hardly matched by corresponding growth of urban services and facilities.

The cities face multiple challenges including overstretched housing, transportation, health and sanitation infrastructure. One of the desired qualities of an Age-friendly City (AFC) is the prevalence of urban green space. Goal 11 of the Sustainable Development Goals (SDGs) is about making cities and human settlements inclusive, safe, resilient and sustainable (UN, 2015). SDG target 11.7 specifically aims to provide universal access to safe, inclusive and accessible green and public spaces.

Urban Green Spaces have diverse benefits including improving air and water quality, facilitating health and well-being (through alleviating stress, supporting relaxation and physical activity) and improving social interaction (Hartig et al., 2014). The benefits of UGS notwithstanding, green environment is limited, or even shrinking, in various urban environments (Güneralp et al., 2017). In Uganda, the threat to existing green and public space stems from competing land uses such as markets, transport and commercial construction activities. Apart from limited green space, free accessibility to what is supposed to be open/public space is questionable. Some of the green spaces are enclosed off by metallic railings while others are manned by private security personnel.

Although there is ample research on Uganda's urban systems and infrastructure such as roads, education and health, less work has been done on issues pertaining to urban green space. This paper aims to analyse perceptions of urbanites on accessibility to green spaces in Uganda's cities.

Theoretical/Conceptual framework

The conceptual framework adopted in this paper anchors on the work propounded by Wolff et al., (2022). The authors propose three dimensions of obstacles to realising benefits of urban spaces namely: physical, personal and institutional barriers. While adopting some of the variables in the aforementioned work, our paper specifically engages with factors associated with urban green space accessibility and focuses on demographic, socioeconomic and physical factors. It delves into correlates of accessibility rather than the direct barriers to accessibility. Background factors (demographic, socioeconomic and physical factors) are hypothesised to influence the perception of urban green space (Figure 1).

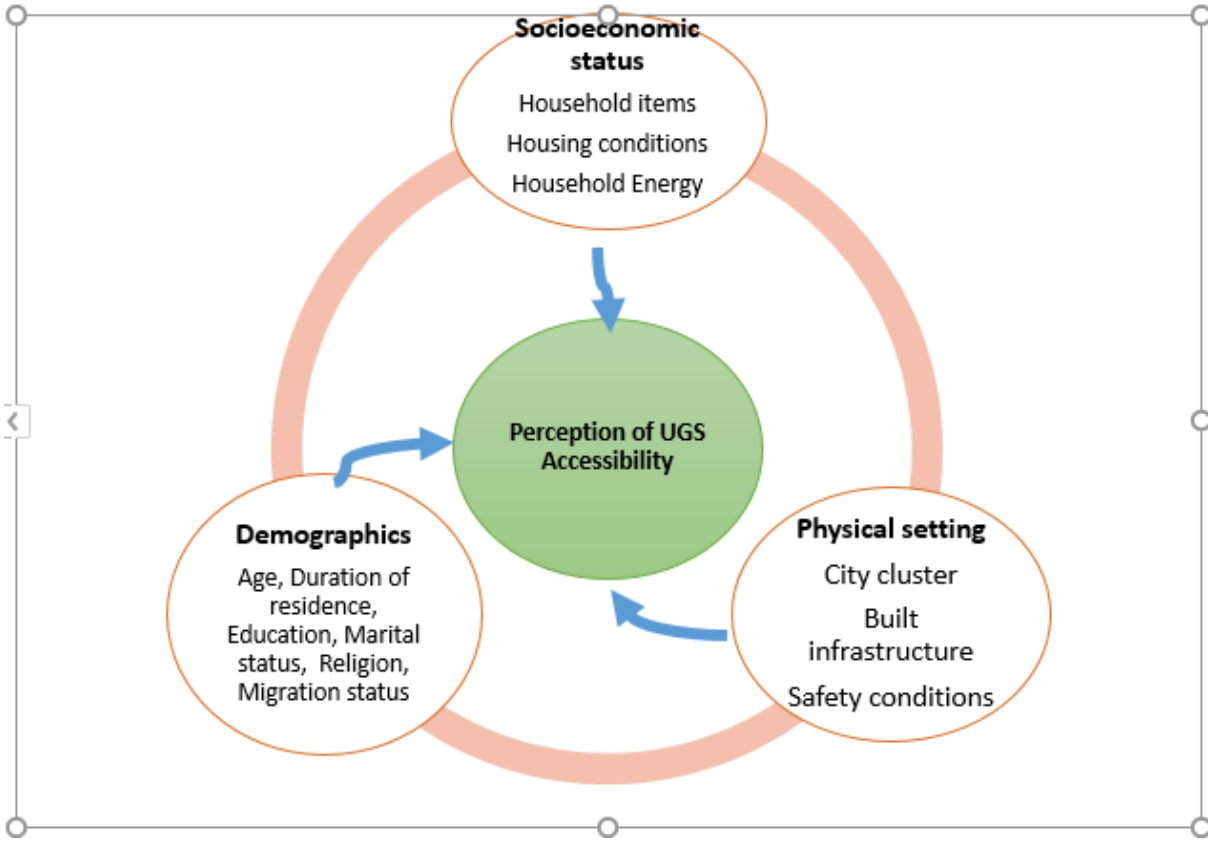

Figure 1. Conceptual framework for analysing urban green space accessibility

Source: Adapted & customised from Wolff, et al, (2022). Conceptualizing multidimensional barriers: a framework for assessing constraints in realizing recreational benefits of urban green spaces. Ecology and Society, 27(2).

Methodology

The paper uses secondary survey data collected in March 2022 by the Uganda National Population Council and Chrisbert Consult. A sample of 936 urban residents was drawn from six cities; namely Kampala, Masaka, Fortportal, Gulu, Arua and Jinja (Figure 2). Taro Yamane (1967) formula was used to calculate desired sample size *(taking, into account 4.8% margin of error & 1.6 design effect).* Proportion to size was adopted while selecting the 936 respondents from the six cities.

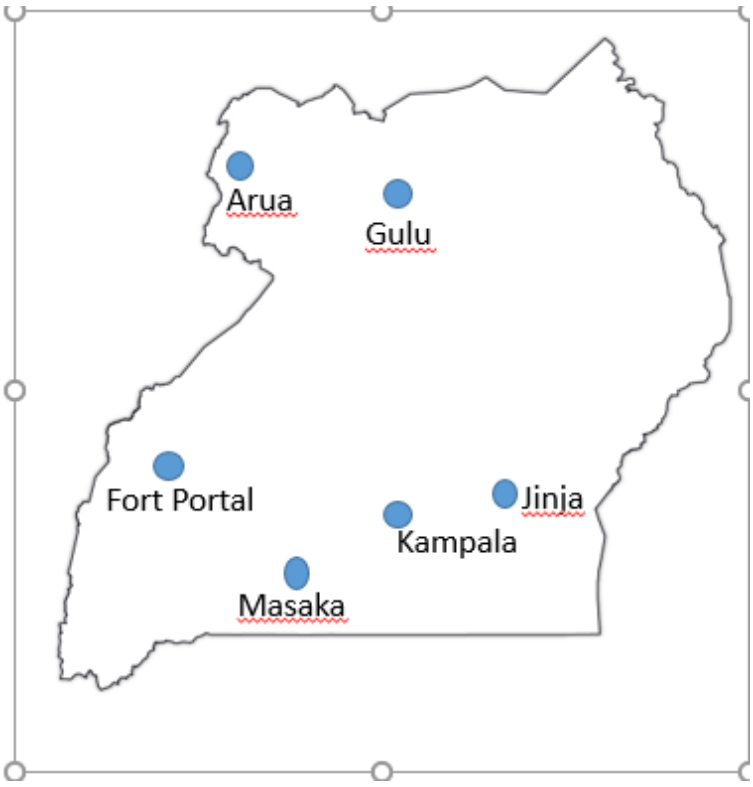

Figure 2. City Study Sites, Uganda

The independent variables comprised of physical, demographic & socioeconomic factors. The outcome variable was 'perception of urban green space accessibility'; measured by asking heads of households: *Are urban green spaces freely accessible to the public?* The variable was recoded "1" if urban green space was reported to be freely accessible and "0"; if otherwise. Descriptive statistics were computed to determine percentages of green space availability and accessibility. A probit regression model was fitted to determine the predictors of perceptions on accessibility to urban green spaces. The use of probit model was chosen considering that the outcome variable was dichotomous.

Results

(a) Prevalence of urban green space

Findings indicate that 37 percent of the respondents thought urban green spaces were available in the cities. The reported prevalence level varied by urban area (Figure 3). The highest reported levels were in Fort Portal and Jinja Cities (65% and 61% respectively) while the lowest were in Masaka and Arua Cities (7.3% & 13.0% respectively). Just under two-fifth (36%) of the respondents in Kampala, the capital city, reported that their green spaces were freely accessible to the public.

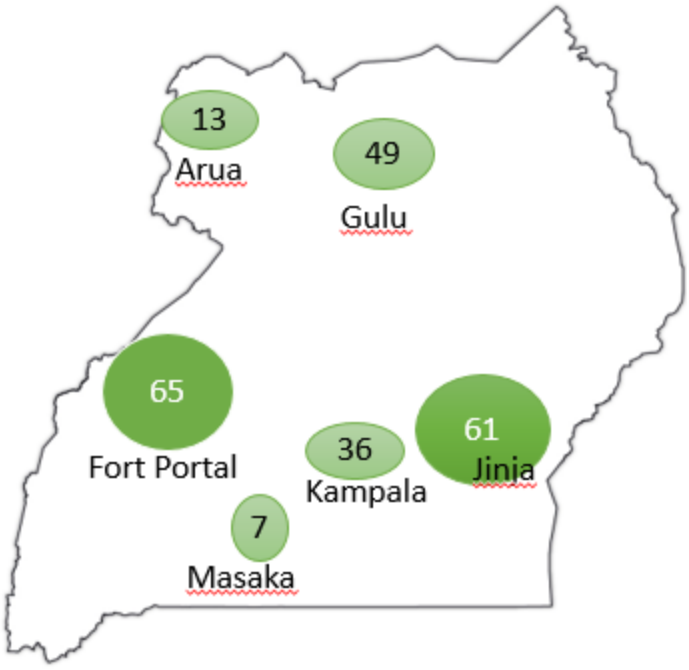

Figure 3 Prevalence of urban green space (%)

(b) Accessibility to urban green space

There is variance between availability and accessibility of urban green spaces. Overall, less than one-third of all respondents (29%) reported that green spaces in their cities were freely accessible to the public. The percentage of accessibility varied by urban area (Figure 4). The highest levels were in Fort Portal and Jinja Cities (63% and 55% respectively) while the lowest were in Arua and Masaka Cities (1.9% & 7.3% respectively). Just under one-third (27%) of the respondents in Kampala City reported urban green spaces being freely accessible.

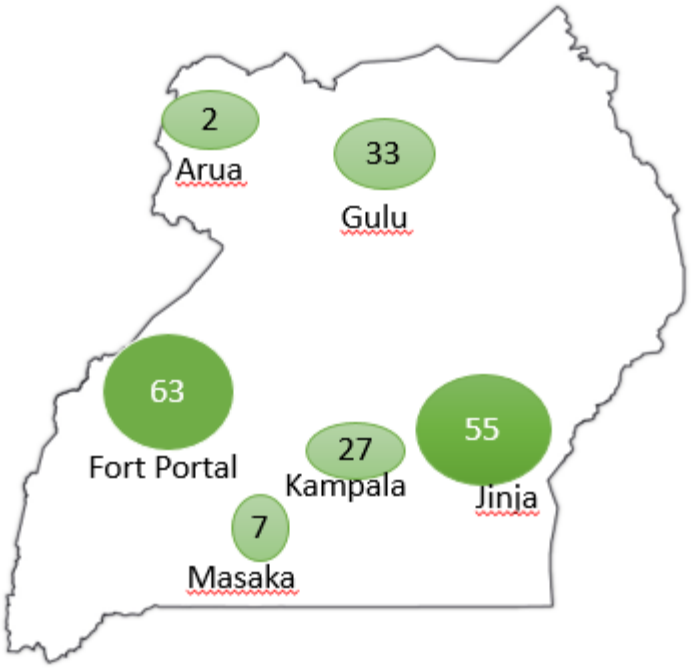

Figure 4. Reported accessibility to urban green space (%)

(c) Predictors of perception of urban green space accessibility

Table 1 indicates the physical, demographic and socioeconomic factors in the probit regression model. It is shown that physical setting (urban area, presence of walkways, & travel safety); demographic factors (duration of urban residence and marital status) and socioeconomic factors (television ownership and type of fuel used for cooking) significantly influenced the respondents' perception of green space accessibility. Overall, positive perception was influenced by residing in Jinja and Fort Portal cities, availability of walkways, safe night travels, being divorced/separated and using electrify for cooking. Negative perception was influenced by living in Arua city, being 50 and older and owning television.

In comparison with Kampala urban area, residing in Fort Portal and Jinja cities increased the probability of perceiving green space as being freely accessible (Coeff=1.38; p=0.000 and Coeff=1.04; p=0.000 respectively); while staying in Arua reduced the probability (Coeff=-1.18; p=0.018). Persons who reported that urban walkways existed had increased probability of urban green space accessibility in comparison with those who indicated absence of such facilities (Coeff=-0.85; p=0.000). Persons who indicated that urban night travel was safe had increased probability in comparison with those who reported unsafe travel (Coeff=-0.38; p=0.002).

Table 1 further shows that having stayed in the urban area for 50 years and longer reduced the probability in comparison with having been an urbanite for less than 10 years (Coeff=-0.73; p=0.029). Persons who were divorced/separated had increased perception probability compared to their counterparts who were never married (Coeff=0.59; p=0.009).

Those who owned television had reduced perception probability in comparison with those without such media set (Coeff=-0.36; p=005). In comparison with those who used charcoal for cooking, those who cooked using lectricity had increased perception probability (Coeff=0.56; p=0.024).

Table 1: Probit model: Predictors of urban green space accessibility

Background factor	Specific variable	Coefficient	*p*
Physical Setting	**Urban Area**		
	Kampala[RC]		
	Arua	**-1.18**	**0.018***
	Gulu	0.08	0.678
	Jinja	**1.38**	**0.000***
	Fort Portal	**1.04**	**0.000***
	Masaka	-0.30	0.251
	Gazzetted motor parking space		
	Absent[RC]		
	Available	-0.21	0.119
	Walkways		
	Absent[RC]		
	Available	**0.85**	**0.000***
	Travel safety		
	Unsafe[RC]		
	Safe	**0.38**	**0.002***
	Don't Know	0.37	0.081
Demographic status	**Age**		
	Under 30[RC]		
	30-39	0.05	0.735
	40-49	-0.14	0.455
	50-59	0.01	0.967
	60 & older	-0.02	0.957
	Duration of urban residence		
	0-9[RC]		
	10-19	-0.11	0.513
	20-29	0.13	0.427
	30-39	0.22	0.249
	40-49	-0.03	0.902
	50+	**-0.73**	**0.029***
	Marital status		
	Never married		
	Married	0.24	0.115
	Divorced/Separated	**0.59**	**0.009***
	Widower	0.41	0.148
	Migration status		
	Migrant	0.05	0.696
	Non-migrant[RC]		
Socioeconomic status	**Education**		
	Primary[RC]		
	Secondary	-0.09	0.498
	Post-secondary	-0.01	0.942

	Religion		
	Catholic[RC]		
	Protestant	0.10	0.478
	Muslim	-0.11	0.530
	Other	0.13	0.381
	TV ownership		
	Does not own TV[RC]		
	Owns TV	**-0.36**	**0.005***
	Wall material of dwelling unit		
	Ordinary bricks[RC]		
	Burnt bricks	0.32	0.053
	Cement blocks	-0.05	0.808
	Others	-0.12	0.612
	Fuel for cooking		
	Charcoal[RC]		
	Electricity	**0.56**	**0.024***
	Gas	0.43	0.094
	Firewood	-0.23	0.274
	Others	0.52	0.075

[RC] = Reference category ***= Significant (p<0.05)**

Discussion

The six surveyed cities have varying degrees of reported green space prevalence. The relatively low prevalence level for Kampala, the largest and most densely populated city, is worrisome in terms of enjoyment of the advantages of green spaces. The low prevalence level in the city is associated with competition from other landuse types such as burgeoning shopping malls, residential units and fuel stations. These have, over the years, taken over part of the space that was originally open public space. It is probable that Kampala City residents see the remaining urban green spaces as having substantial physical barriers that hinder accessibility by restraining potential users. Other studies have similarly revealed that landuse practices pose threats to existing green spaces (Güneralp et al., 2017) and links between physical barriers and accessibility to urban green spaces have been established (Morris et al., 2011).

The higher probabilities of perception of green space accessibility for residents of Jinja and Fort Portal urban areas are explicable, in part, from a historical and town planning perspective. During colonial Uganda, Jinja was a well-planned city, with elaborate landuse zones. These included specific industrial, recreational and settlement zones. Much of the colonial recreational area has remained free of colossal encroachment unlike the western neighbour, Kampala City. Although the city (Jinja) has gradually expanded, the pace of urban growth is relatively low and her population density is much lower compared to Kampala City.

Studies have shown that barriers to green space accessibility can be persistent and enduring. These are binally categorised as: limited rights to use land and limited ability to influence decisions on land use (Wolff et al., 2022). Institutional factors are also cited as barriers and may take the

form of management policies such as access restrictions (opening hours, entrance fees or user rules). Barriers may be occasioned by introducing a protection status of an area in reaction to the increasing crowding and vegetation stress (Matthews et al., 2015). Privatization of unbuilt land is a barrier that increasingly narrows accessibility options for urban green space benefits in cities (Colding et al., 2013).

Urban walkways and pavements in Uganda's cities facilitate easy movement of persons particularly those with disabilities. They are also a means by which persons navigate the city landscape with minimum threats from reckless motor-cyclists and other motorists. It may thus have been the case that respondents who reported presence of walkways also felt that availability of such structures made city dwellers access green spaces.

It is probable that a positive image of availability of urban walkways also had a positive opinion of green space accessibility. Biernacka et al. (2020) argue that on-site barriers often take the shape of "absent" physical features in city public spaces. Some features do not promote accessibility directly but enable different activities or make the stay within urban open spaces more attractive. Their absence may present a barrier to potential use of urban green spaces. Holt et al. (2019) posit that features supporting the use of a urban green spaces such as paths, lights, public toilets, benches, or waste bins relate to the basic needs of users and are particularly relevant for people with limited mobility such as wheelchair users and older persons.

Safety of life and property can be one of the enablers of enjoyment of what urban areas offer. Urbanites and visitors alike will want to visit city spots only when they feel their lives are safe and secure. Thus respondents who felt that traveling in the city was safe may have felt that city green spaces were similarly safe and thus attractive. Boone et al (2009) recognise that issues such as overcrowding of a park during the weekend, or the lack of illumination at night and the associated safety implications, could be significant barriers to accessing public spaces.

Studies have indicated that perceived barriers vary depending on one's self-awareness of interpersonal interactions. Women or older persons, for example, might consider safety as a constraint to accessing open spaces in contrast to male or younger individuals (Berney, 2010). Having felt unsafe in one physical green space setting before may impact the way people perceive and re-evaluate another urban green space (Rutt and Gulsrud 2016) and this can be reinforced by the lack of socio-cultural or institutional controls such as rules or norms.

Although age as a demographic variable did not have a statistically significant association with perception of accessibility, the duration of a respondent's city residence did, and the relationship was inverse. Long urban residence decreased the chances of perceiving green spaces as freely accessible. Living in an urban environment for a considerably long period of time can enable a resident to internalise city dynamics. It could have been the case that 'older residents' had a more comprehensive and longer term view of green space dynamics such as accessibility. They could have had a more holistic view of the spaces in comparison with 'recent residents' who may have based their opinion largely on shorter, lived experiences.

Perceptions of urban life may vary by different sociodemographic factors including marital status. It may be the case that while the never married persons probably opted for indoor recreation/entertainment spaces (such as restaurants, pubs, takeaways), those who were divorced/separated preferred outdoor spaces; a phenomenon that may have made them more conversant with the wider spectrum of accessibility to green spaces.

Wolff et al., (2022) posit that interpersonal relations with families, friends, community and neighbourhood can have a bearing on green space accessibility. Absence or low level of interpersonal relations are believed to cause a feeling of being unfit or not welcome in a given space. This can in turn translate into a form of self-retreat in which people are not confident enough to go out or do not dare encounter others at all (Biernacka & Kronenberg, 2018).

Several other studies have underlined the role of socio-demographic factors in green space accessibility (Valentine 2008, Fincher and Iveson 2012). For example it is argued that the dominance of males, unsupervised children, or migrants could produce ambivalent feelings predisposing some groups to feel discriminated against. It could be due to certain cultural expressions (such as dress code) which, consequently, would translate into hesitancy to go to public open spaces. Finney (2014) argues that negative past experiences and different conflicts determine individuals' ability and willingness to access green spaces. Undesirable characteristics such as noise, social stigma or criminal activities can lead to exclusion (Leslie et al. 2005, Fischer et al. 2018).

The media plays vital role in information, communication and overall awareness. Ownership and use of household assets such as media can translate into enhanced understanding of urban infrastructure and urban dynamics. For example, television media houses may cover certain aspects of urban lifestyle; including unpleasant scenes such as congested city environments, disfigured open space and green space-turned construction sites. Media may also display scenes where private developers directly restrict access to green space by deploying private guards, constructing wire fencing and erecting perimeter walls. Awareness of such and other realities can arise from possession of media assets which, in turn, may influence people's perception of green space accessibility.

Socioeconomic status and outdoor visits tend to be associated. Residents of Ugandan cities and rural areas, alike, use a range of types of fuel for cooking. The cost of clean energy such as electricity is higher than that of charcoal and firewood which are part of the greenhouse gas-emitting fuels. Exclusive use of electricity in Uganda's cities is predominantly done by persons of higher social economic status in comparison with the use of charcoal and firewood (Nzabona et al., 2021). Thus it may be the case that the persons of higher socioeconomic status were also those who were more outgoing. Their level of visiting outdoor spaces and understanding of green space dynamics could have been higher in comparison with their counterparts at the lower end of the socio-economic ladder. The nexus between socioeconomic status and outdoor visiting may have had a bearing on the perception of urban green space accessibility.

Conclusion and Implications

There is low perception of prevalence and accessibility of green space in Uganda's cities. Physical, demographic and social factors significantly influence the perception levels. The findings have several implications including improving the physical conditions of the cities as well as raising the socio-economic status of the urban residents. This would in the long term hopefully translate into higher levels of urban green space accessibility. Conserving existing and planning new urban green spaces are options for stakeholder consideration.

Limitations

This study has used secondary data which, unfortunately, comprises of questions that generated a limited range of variables that are specific and relevant to urban green space discourse. The dataset lacks a wide range of questions for direct measurement of urban green space accessibility. This study has therefore had to rely on the question that sought to find out residents' opinion of whether city green spaces were freely available to the public. The analysis would have been richer if there were questions that asked respondents whether they, as individuals, freely accessed the spaces and if there were any barriers that restricted entry. The narrow range of pertinent variables has therefore translated into inability to engage with wider and deeper analysis of green space issues.

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