

Original Research Article

**DEMOGRAPHICAL FACTORS AND THEIR HINDRANCES TO METROPOLITAN
LAND ZONE USE POLICY ADHERANCES**

Abstract

Appropriate application of metropolitan land zone use policies and regulations may help in resolving metropolitan land zone use hitches such as undesirable zonal fragmentation, zonal use mix-up and zonal encroachment. This research aims at contributing to acquaintances required to enhance adherence to metropolitan land zone uses in metropolitan land zone use planning. This paper focused on the hindrances to metropolitan land zone use adherence in Nakuru City. Human population in Nakuru city has been on upward trajectory over the past thirty years. Just like any other modern metropolitan area in the world, Nakuru city's land use is mainly divided into residential, industrial, commercial and agricultural zone. The size of Nakuru city (municipality) has remained unchanged since 1974. However, there is a proposal to expand its size following its upgrading into a city. This has pressurized the already limited metropolitan land use zones. The study adopted Hoyt Theory which says that metropolitan land use zones are swayed by financial factors. Precisely, the study's main objective was to assess socio-economic aspects of metropolitan demography as hindrances to metropolitan land zone use adherence. This paper employed descriptive survey design. Field data from a sample size of 400 from eleven sample units showed that uncontrolled metropolitan population influx is the major hindrance to metropolitan land zone use adherence (30.7%) followed by inadequate capital (22.9%), corruption (15.6%), poor implementation of metropolitan land use policy (14.2%), ignorance (11.1%) and political influence (5.7%). Information from Key informants, field observation, and review of guidelines for land use planning were also incorporated. This research suggested that these hindrances should be minimized through incorporation of all stakeholders, integrity, checked urbanization and proper implementation and adherence to all metropolitan land zone use policies that are in place. This study may be useful to metropolitan land planners, developers and government.

Keywords: metropolitan, Nakuru city, zonal use hindrances, policies adherences, demographical factors, population influx, political influence, inadequate capital

1 Introduction

Study that was done by Kuang *et al.* (2020) in China found that China's urbanization (both metropolitan population and physical metropolitan expansion) stimulated Urban Land

Consumption Intensity (ULCI). They also found that ULCI is caused by population, economic, spatial and social urbanization. This high intensity of city land uses has a great influence on metropolitan ecosystem. There are a lot of metropolitan land use inefficiencies in many cities (Korosoet *al.*, 2021). In many cities, the level of land use surpasses the rate of population progression. On the other hand, they also found that metropolitan infill is low and slow. Their analysis indicated that some cities had had metropolitan land that was not in use within the metropolitan for long. According to them, Metropolitan Land Use Efficiency (ULUE) is what led to metropolitan sprawl, metropolitan land subdivision and casual settlements. The geospatial analysis that was done by Atasoy (2018) showed that upward trajectory of human settlement in Osmaniye city significantly decreased the metropolitan green space. The reduction was due to high levels of metropolitan land subdivision in the city center. This subsequently led to metropolitan land use arrangement change. In Bangladesh, the research revealed that the southern part of this city experienced an escalation zone uses because of metropolitan population influx (Rahaman & Shermin, 2021). This led to metropolitan land use interruptions that were characterized by residential buildings. Maconachie (2016) found that agricultural land was being changed into settlement areas in Benue state of Nigeria.

According to the constitution of Kenya 2010 Article 184, specific regulations and rules are supposed to be formulated to address challenges facing land use in metropolitan areas and cities. In connection to this, the Constitution assigns planning functions to all 47 county governments while the National Land Commission is charged with the responsibilities of monitoring and overseeing (Constitution of Kenya 2010). Adherence to metropolitan land zone use is a measure of the extent to which aftermaths follow the laid down policies (Chand BJK, 2019).

The primary reason for this study was to examine the socio-economic aspects of metropolitan demography as hindrances to metropolitan land zone use adherence in Nakuru City. Demographical factors that were looked at included; population influx, inadequate capital, ignorance, corruption and poor implementation of policy. Annually, the average rate of metropolitan human population of Nakuru city is 2.7% (UN, 2020). With a near static land use zones, this rapid influx of metropolitan population in Nakuru city is estimated to have a great effect on metropolitan land zones (Mbuyi, 2019). In connection to this, available studies that examine hindrances to adherence to metropolitan land zone use plans are scanty. The study's findings may be valuable to metropolitan land use developers for imminent changes and policy making in order to safeguard Nakuru city's land zone use sustainability.

2. Location of the Study

The research was done in Nakuru city, Kenya. It entailed Nakuru East sub-county and West sub-county. The area of Nakuru city is 325km². She lies between 0.29'S to 1.03'S and 33.15'E to

36.10'E. Nakuru city consist of eleven administrative wards i.e. Biashara, Kivumbuni, Flamingo, Menengai, Nakuru East, Barut, London, Kapkures, Rhoda and Shabab.

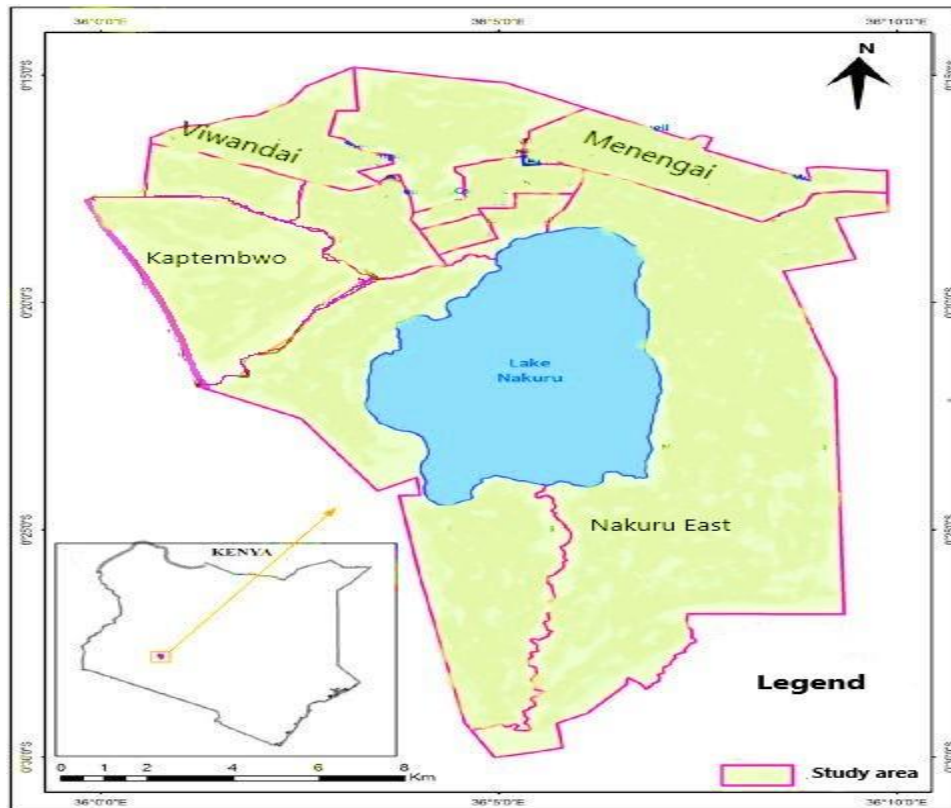


Figure 1 Geographical Location of the Study (Mogire et al, 2022)

4. Methodology

This study employed descriptive survey design. The information was collected between October and December in 2022. Nakuru city was purposively chosen due to tenacity of failure to adhere to metropolitan land zone use. Respondents who were both female and male farmers were drawn randomly selected from the eleven sample units that already existed as Administrative Wards based on their population.

4.1 Sample Size

The entire sample size for the survey was gotten using Yamane formula:

$$n = \frac{N}{(1 + N(e)^2)}$$

According to Yamane, for a 95% confidence level and $p=0.05$, the size of the sample should be: Where, N =target population=125879 households, n = sample size, e =level of precision of 0.05 precision. Assuming 95% confidence level and $p=0.05$, the sample size is $[125879/(1+125879 \times 0.05^2) = 125879/314.6975 = 400$ households].

4.2 Distribution of the sample size per sample unit

To achieve this, a formula $n = \frac{h}{H} (N)$ (Glenn, 1992) was used. Where n = sample size, h = households in the sample unit, H = total households in the target population and N = households sample size.

Distribution of the Sample Size

SAMPLING UNIT	HOUSEHOLDS	No. of respondents
CENTRAL/BIASHARA & LION HILL	15382	48
KIVUMBINI/ BONDENI	6770	22
KIRATINA/MENENGAI WARD	5316	16
FREE AREA/EAST WARD	15391	49
LANGALANGA/FLAMINGO	10708	34
VIWANDANI	8908	28
SHABAB	5951	19
RHONDA & MWARIKI A (MANYANI)	25615	82
MWARIKI	8518	27
KAPTEMBWO	153611	50
BARUT	7859	25
TOTAL	125879	400

Source: Fieldwork, 2022

Questionnaires were given to the respondents from the selected households. They were to determine the level of the predetermined factors of metropolitan demography on adherence to metropolitan land zone use policies at the household category. Logistic regression was used to analyze aspects that hinder adherence to metropolitan land zone use at household category.

$$\text{Logic}(Y) = \ln \left[\frac{P}{1-P} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \dots + \beta_n X_n + \varepsilon$$

Where:

$\frac{P}{1-P}$ = odds ratio in favor of adherence to metropolitan land zone use plan. This is the ratio of the likelihood that the research participants will adhere to metropolitan land zone use plan against the possibility that research participant will not.

Y= hindrance to Adherence (1=yes, 0=No) in eachmetropolitan land zone

β_0 =constant

$\beta_1 - \beta_n$ = Coefficient parameter of logistic equation

$X_1 - X_7$ = set of independent variables,

ε =Error Term

Variables used in the logistic regression equation

Variables	Description
Y	Adherence(1=yes, 0=not)
X1	Population influx(1=increase, 0=no increase)
X2	Inadequate capital(1= Yes, 0=no)
X3	Ignorance(1=Yes, 0=not)
X4	Political influence(1=Yes, 0=no)
X5	Poor implementation of policies(1=Yes, 0=no)
X6	Corruption(1=Yes, 0=no)

5. RESULTS&DISCUSSION

5.1Demographical factors and Their Influence onMetropolitan Land ZonalUse Adherence

The resultsexposed that majority of the respondents point out that population influx was the maindeterrent to metropolitan land zone use adherence at 30.7%. Inadequate capital was the second factor at 22.9% followed by corruption (15.6%), poor implementation of metropolitan land use policy (14.2%), ignorance (11.1%). Political influence was the least hindrance to metropolitan land zone use adherence at 5.7%

Metropolitan population influx calls for more metropolitan land space. Due to inadequate metropolitan land, urban dwellers are unlikely to adhere to consigned metropolitan land zone uses. Rich dwellers have substantive capital which they employ developing their metropolitan land space in accordance to metropolitan land zone use plans/policies. On the ugly side, high Income also gives metropolitan dwellers power to sway decision in their favor through carrots and access to metropolitan land in zones not designated for certain activity which they want to execute.

Inadequate funding from the government resulted in poor implementation of metropolitan land zone use policy and regulations at all the stages of the metropolitan land zone use planning. In developing countries such as Kenya, metropolitan land use planning is majorly funded by donors. Bearing in mind that donors have their main concern depending on their own goals, therefore, the planning process is not sustainable and considerate to local metropolitan land use demands.

Ignorance due to inadequate knowledge on metropolitan land zone use policies significantly influenced the implementation of metropolitan land zone use plan. Significant number of metropolitan dwellers was using metropolitan land anyhow provided they make a living. Metropolitan land use was influenced by political class especially those who are in power at that moment. This entailed setting land aside for a public project. Political influence was also used in metropolitan land grabbing. For instance, metropolitan land that was set aside for public use was being diverted into personal use/property.

Poor adherence to metropolitan land zone use led to land fragmentation and zonal use mix-ups. Generally zonal use mix-ups were cited by 62% of the respondents while land fragmentation was cited by 38% of the respondents. This finding was similar to those of Menakanit et al. (2022) who found that urbanization (metropolitan dwellers increase) led to clearance of vegetation and finally fragmentation of metropolitan land in Bangkok city that was initially under vegetation. The responses also revealed that Rhoda and Free Area/East Ward witnessed high rate of land fragmentation and zonal use mix-ups at 39.9% and 31.6% respectively. Interestingly responses cited the least disruptions in metropolitan land zonal disruptions in Central/Biashara & Lion Hill and Kivumbini/ Bondeni area with a percentage of 5% and 4.6% respectively.

An average of 45.1% of the respondents said that Nakuru City metropolitan land zones were not used according to Metropolitan Land Zone Use Policy. Different sample units recorded different degree of non-adherence to metropolitan land zone use policy. The observation made from 290 points within the study area revealed different degree of non-adherence as shown in the following table

Table 1 Observed Sampled Points for Nakuru City

Planned ZONE	FOREST	BUILD UP AREA	WATER/WETLAND	OTHERS	AGRICULTURE	TOTAL
FOREST	35	0	15	0	4	54
BUILD UP AREA	0	48	0	0	5	53
WATER/WETLAND	21	0	10	0	0	31
OTHERS	12	3	0	40	1	56
AGRICULTURE	0	13	0	1	82	96
TOTAL	68	64	25	41	92	290
Percentage Not Adhering	51.5	75	40	97.6	89.1	

Source: Fieldwork, 2022

These results are in harmony with study findings of Güneralp et al., (2017) who carried a study to determine challenges caused by the growing cities in Africa. They found that metropolitan land use zoning policies are facing societal, institutional and environmental challenges among others.

Conclusions

The outcomes of this research disclose that Nakuru city is experiencing metropolitan population upsurge and this may be experienced for a long time if the existing trend is something to go by. This is causing a serious metropolitan land use challenge in Nakuru city. In fact, metropolitan land use areas/zones of Nakuru city continue to be depleted given that the city is sandwiched between Lake Nakuru and Menengai Crater which hinder its radial growth. Socio-economic data also revealed that Nakuru city land use arrangement is facing intra-zonal use mix-ups as well as intra-zonal land fragmentations. In fact, metropolitan land use areas/zones of Nakuru city continue to be depleted given that the town is sandwiched between Lake Nakuru and Menengai Crater which hinder its radial growth.

Spatiotemporal dynamics of metropolitan population was associated with metropolitan land use area/zone arrangement disruptions. Therefore, there is need to embrace measures that will

control the influx of metropolitan population. This will assist in reducing pressure on limited metropolitan land use areas in Nakuru city.

Recommendations

The study revealed that inadequate capital was the main challenge facing the implementation of metropolitan land use arrangement policies. The findings also cited political instability, Ignorance and Lack of awareness as challenges. Relevant bodies like governments and financial institutions should step in to provide technical and financial resources either through giving loans or grants to facilitate favorable land use. These may include provision of financial assistance to any metropolitan developers. The national and county governments should increase public education and awareness with regard to environmental use and conservation.

At the time of this research, Nakuru city had no zoning policies or any regulation concerning metropolitan land use zoning. Relevant bodies like Physical and Metropolitan Planning, Kenya National Land Commission, Ministry of Lands should exercise their authorities and avail the necessary frameworks needed in the realization of a sustainable metropolitan land use arrangements.

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**List 1 :Showing Frequencies and Percentage of Non-Adherence to Metropolitan Land Zone
use Plans in Nakuru City, 2022**

Sample Area	A.U		CU		RU		IU		Others		Total % Not Adherin g
	F	%	F	%	F	%	F	%	F	%	
Lanngalanga	11	19.6	20	10.6	40	11.8	0	0	10	8.8	50.8
Kivumbini/ Bondeni	1	1.8	15	7.6	34	10	0	0	13	11.5	30.9
Manyani	8	14.3	4	2.1	19	5.6	0	0	9	7.9	29.9
Mwariki	4	7.1	8	4.2	15	4.4	0	0	9	7.9	23.6
Barut	11	19.6	10	5.3	17	5.0	2	8.0	7	6.2	44.1
Lion hill	5	8.9	12	6.3	23	6.8	1	4.0	5	4.4	30.4
Shabab	2	3.6	13	6.9	32	9.4	3	12.0	10	8.8	40.7
Free Area/East Ward	3	5.4	13	6.9	38	11.2	4	16.0	6	5.3	44.8
Kaptembwo	2	3.6	12	6.3	24	7.1	1	4.0	3	2.7	23.7
Viwandani	2	3.6	13	6.9	25	7.4	10	40.0	14	12.4	70.3
Central/Biash- ara&Lion Hill	6	10.7	48	25.4	23	6.8	2	8.0	12	10.6	61.5
Rhoda	1	1.8	21	11.1	50	14.7	1	4.0	15	13.3	44.9
TOTAL	56	100	189	100	340	100	25	100	113	113	AV=45. 1