



ANALYSING THE INTERNAL STRUCTURE OF HUMAN ACTIVITY ON THE STREET OF KARU, NASARAWA STATE, NIGERIA AS A STRATEGY FOR ECONOMIC GROWTH

Musa Adamu Eya^{1*}, Gobi Krishna Sinniah², Muhammad Zaly Shah³

^[1, 2] Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia

^[3] Centre for Innovative Planning and Development, Universiti Teknologi Malaysia

*Corresponding Author

Musa Adamu Eya

Faculty of Built Environment
and Surveying, Universiti
Teknologi Malaysia.

Article History

Received: 15.08.2023
Accepted: 19.08.2023
Published: 29.08.2023

Abstract: One of the many human activities that have an impact on urban highways is street vending, particularly for motorists in a country with a developing market economy like Nigeria. The impact of human activity on urban roadways was investigated in this study. The first part of the study evaluates the geographic distribution of street vending activities on urban roads. The second objective compares the relationship between land use interaction and activities related to street vending. The study evaluates the crucial element affecting roadways using roads designated as reservations for potential future road development and was the subject of surveys with a purposefully selected sample of one hundred sixty questionnaires. The study found that the current economic climate has forced many city dwellers into small-scale businesses like street selling, hawking, and begging. The desire to push for the use of more than 55% of the right of way (ROW) was influenced by human activity and the regulatory agencies' shortcomings or incapacity to maintain regulations on human activities taking place on urban roadways. The study asserts a significant connection between human activity, such as street vending, building encroachment, and government policy on urban roads. This study offers policymakers, stakeholders, and academics concrete and abstract benefits of street vending activities as a contributor to raising the living of standard of the country.

Keywords: Examining, street businesses, urban structure, right of ways, building extension.

1. INTRODUCTION

Many researchers now discuss street vending on a daily basis because it has consistently dominated most urban centres for the past decade, with a large proportion of the population in developing countries relying on it for daily survival as the only alternative to addressing household challenges. Poverty is the most severe and dramatic form of human destitution, and it is most likely linked to human capital development, which is viewed as a worldwide economic pandemic. Globally, transport infrastructure development and road congestion pricing cannot be fully and sufficiently accessible in the absence of social justice [1].

The many human actions for a livelihood include social, economic, and physical factors, as well as other motivated activities, which have facilitated the mobility of people inside and outside the state, as well as throughout Nigeria. Karu is traditionally an agrarian hamlet, although it has been more urbanised since the relocation of the nation's capital from Lagos to Abuja (Federal Capital Territory (FCT) in 1992.

Observing cities in the twenty-first century has a significant impact on pedestrian and vehicular traffic [2]. Agriculture's value chain enhances productivity, as does the expansion of mineral-

based mining activities for future economic growth [3]. These possibilities, however, call into question the diversification pledges made in the Economic Recovery and Growth Plan (ERGP), the National Economic Empowerment and Development Strategy (NEEDS), and other initiatives. Neglecting vending operations as a part of the informal sector worth interacting with and expanding into might be a missed opportunity.

Roadways of profitable locations include social and commercial sectors, and are primarily supported by land formation and transportation infrastructure [4], [5]. Such actions, on the other hand, can serve to offset the detrimental impacts on the environment and public safety. Street selling as a professional vocation is a realistic way for people with disabilities to make a living [6]. Street sellers in South Africa, on the other hand, confront a number of social, economic, and political obstacles. Ordinary items are sold by street vendors at the lowest feasible price to clients or consumers in convenient locations. However, as the population rises, property values rise and roadways become more competitive, leading to the privatisation of roadside vendors [7].

Street sellers play an important role in the economic growth of nations, particularly in the areas of self-employment and the



improvement of living standards. Nigeria is Africa's most populous country, with abundant natural and human resources for national growth. Nonetheless, access to formal employment is becoming increasingly difficult. Because of the economic opportunity, many persons living in poverty are able to make their livelihood through small-scale companies.

The purpose of this research is to evaluate the influence of human activity (street commerce) on highways. The research has two primary goals. The study begins by examining the geographical distribution of street-selling activities on metropolitan highways. Second, compare the links between street vending and land use transport interaction. The study found that street vending activities significantly increased people's sources of income while also enhancing public life and beauty.

1.1. Study Background

In urban areas across the country, streets and open spaces bustle with men and women selling in buying and selling many things from fresh fruits, grains, vegetables, and oils to mobile phones, covers colourful fabrics, and material wares [7]. The street vendors supply everyday goods to buyers or consumers at the cheapest prices in locations convenient to them. However, as the population grows, land values increase and roadways become more competitive; and privatised, by roadside traders [7].

Roadways of lucrative places include social and commercial areas, and are mostly supported by land formation and transportation infrastructure [4][5]. However, such measures can help to mitigate the detrimental effects on the environment and public safety. Street selling as a professional occupation is a viable method of sustainable living for individuals with disabilities [6]. However, street sellers in South Africa face a variety of social, economic, and political obstacles.

Karu is the nearest community to Abuja, and it houses a large number of federal officials from around the country. To that purpose, both old and new districts turned a significant quantity of agricultural and open areas into residential, commercial, medium and small-scale industrial, institutional, recreational, and street space. Nigeria has been increasingly conscious of the complicated link that exists between urban expansion and the status of the environment during the previous decade [8].

2. LITERATURE REVIEW

There is a positive correlation between roadside greenness and mixed land use since it improves both the quality of life for locals and tourists [9]. How a city's greenness and land use factors affect the growth of a compact city and a smart city [9]. Urban planning's main objective has been to develop the ideal system that integrates human interactions, enhances social class order through better mobility, and enables people to share similar life goals and objectives for initiatives promoting sustainable city development [10], [11].

The dynamic nature of street vending operations may be used to evaluate the interaction of transportation networks and land use [12]. However, as a result of the global economic crisis, especially in underdeveloped nations. Streets, railways, inland waterways, and proxies of information and communication technology infrastructure, such as mobile and internet networks, benefit urban business [13]. Street selling has greatly contributed to the city's economy as a means of earning a living for the urban poor [14]. In

any case, street vending worsens urban traffic congestion in most major business areas. Street components are characterised as physical or non-physical based on their distribution and services [15].

The pace of urban development looks to be faster than the rate of population growth, and urban land area nearly surpasses what is required to support the population [16], [17], [18]. Changes in land use are the key to addressing the world's socioeconomic and environmental issues [19]. However, a lack of development plans and strategies in African nations leads to a large degradation of land use changes, which is connected to inefficient development control mechanisms.

The improvement of transport corridor and logistic strategies will include small-scale trade in the corridor region; moreover, the road network will be enhanced [20]. Roadway development, on the other hand, has a substantial influence on economic advancement, income generation, poverty reduction, small-scale business fairness, and incorporation. Travellers' performance varied significantly as a result of inconsistent trip time dependability, which impacted highway traffic [2]. Human activities abound, and changing patterns of street vending aid in the reduction of unemployment while also resolving economic, political, and social inequalities [21], [22].

Street business is significant in researching business potential since it engages individuals with productive activities, creates income, and sustains a family's standard of living [23]. While a roadside company might provide a steady source of income, many firms, especially those selling fruits and vegetables, confront poor earnings and considerable dangers [23].

In a rich and naturally endowed country like Nigeria, literature on human activities along roads is ineffectual. This research is significant because human activities have rendered petty capitalism compatible with the country's mixed economy governance structure [24]. Some state organisations, however, acknowledge street sellers as an integral aspect of global urban economies. Many adult Cameroonians made the decision to leave their country for a better life in Cape Town, South Africa due to the economic uncertainty brought on by the structural adjustment project [25].

The concept of commerce and commercial geography is attributed to the economy as trade in the transaction of goods and services at a specified distance, business operations, and trading of goods and services inside a particular market [26].



Figure 2.1. Refuse disposal along roadway

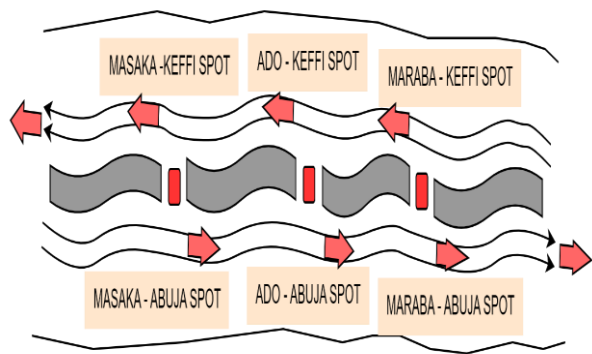


Figure 2.2 Sport segment and vending location

2.1. Location Theory

The purpose of location theory is to clarify the reason why traders choose places to operate depending on the worth and utility of the surrounding property. Firms must ultimately choose their location while selecting the best site from a range of possibilities and constraints in valuation methodologies that either include increasing cost-effectiveness or decreasing expenses. Economic geography has long attempted to comprehend the justification for such location.

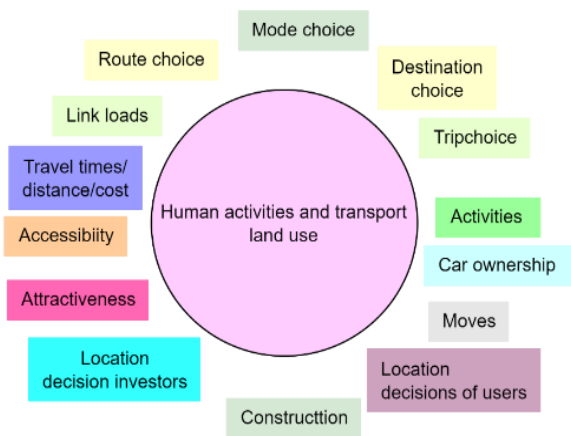


Figure 2.1. Human activities and transportation landuse

2.2. Land Use Model

Burgess' theory, commonly referred to as the concentric ring theory, was developed in 1925, in Chicago to depict the internal city structure as well as the urban social environment. The model depicted the distribution of social clusters within metropolitan regions [27], [28], [29]. Burgess discovered a link between distance from the central business district (CBD) and resident affluence on a regular basis; the wealthiest households tended to dwell much further away from the CBD. Previous research looked at the concept of informal street vendors, focusing on their locations/settings, usage of technology, nationality, and type of selling activities.

Burgess also observed that as the city expanded, the central business area (CBD) moved outwards, pushing the other rings to follow. It is useful to define the prospective revenues from land-based businesses [29]. Burgess' theory examines urban social dynamics by arranging socioeconomic groups in concentric circles around the city core. The point of entry for immigrants, who relocated out to nearby rings of working-class apartments, single-

family houses, and progressively wealthier suburbs as soon as they could afford it [30].

2.3. Types of Street Vending

Previous research looked at the concept of informal street vendors, focusing on their locations/settings, usage of technology, nationality, and kind of selling activities [31]. Additional extensive vending theories based on mobility, spatial appropriation, self-sufficiency, adherent behaviour, superimposition, and interference of essential components [32]. However, Women are more likely to work in the mobile business, while men are more likely to work at stations on sidewalks or from hawkers. [33] investigate many aspects of urban informal economic activity, including kiosks and corner stores, cobbler shops, and hairdressing salons.

The former is mobile and full-time, focusing on commercial and residential areas, whilst the latter is contained in roofed booths. The presence of an activity in a public location must not impair people's rights of access. [34], [35]. [36] explore the various sorts of street merchants and the motivations that drive their participation. (Onodugo et al., 2016) evaluate various policy strategies for dealing with the difficulties of street vendors in the public arena in their theoretical model that addresses the location, behaviour, and causes of street vendors in Enugu, (Nigeria).

Table 1 Social-Economic Classification of Street Vending Attractions

Elements of social attractiveness	Economic attributes of street vendors
Physical attraction: Appearance and aesthetic nature of the site	Personal income
Social attraction: The sociocultural activities and interaction with others	Employment opportunity
Proximity and the physical distance convenience to patronised goods	Improving the quality of life
Sellers and buyers establish a relationship with other people	Reducing poverty

The table above covers a number of important factors that affect people's choices to buy things from roadside vendors and buyers. Beautiful surroundings, the reason for visiting a recreation site (task attraction), special occasions and accolades, a historical visit with a particular interest, the site's proximity to other destinations, and developing connections with other people are all elements.

2.4. Reviewed Measures of Regulating Street Vending

Thailand: Subsidised low-income businesses to encourage self-employment in times of economic hardship. To maintain general cleanliness and street upkeep, fees have been enacted. Street commerce is restricted to one day every week for cleaning.

Greece: The Presidential Decree includes an array of qualifying items, and street trading requires a specific licence.

The Republic of Ireland: Authorisation from a district council is required and is only given to persons for a duration of up to three years. Specific legislation has been passed to address this issue. The local government decides whether streets are appropriate for peddling.

Canada: Special legislation and licencing are required. The permit is good for one year. If numerous applications are received for the same area, a lottery is undertaken to award a permit. Regulations are created for goods supply storage (including food) and waste collection

The literature demonstrates lines on how other countries overcome even not totally address the challenges of street vending enterprises through regulatory measures. The measurements are essential for the creation of regulations and laws that, if feasible and appropriate, would enhance street vending activity.

3. METHODOLOGY

The research included localities such as Masaka, Ado, and Maraba along the Keffi-Abuja Highway in Nasarawa State, Nigeria. These locations were chosen due to their commercial sectors and closeness to Nigeria's capital, Abuja. The research regions were chosen in part because the majority of economic activity occurs near roadways. The following factors impact street commerce, according to [37] location, economic, choice, and accommodation; and social component. Despite this, the researchers classed vendors as either food, products, or services.

The widespread availability of point of interest (POI) data enables a comparison of urban functions across towns, making it simpler to generate meaningful information on urban systems [38]. Urban forms are the spatial structures of towns that are actively emerging as a result of similar urban planning attitudes and practises [39].

The proportional sampling method was utilised. In each study area, twenty questionnaires were handed to roadside sellers. The information gathered from street sellers was statistically estimated. A multi-complex quantitative method was used, which included site visits and semi-structured interviews with key respondents.

4. Discussion and Results

This section provides the data analysis, conclusions, and interpretation of the results. The motivation of individuals to engage in social and economic engagement along streetways, the sorts of commodities offered at a certain area that are comparable or not available elsewhere, the daily ranges of items sold, and the advantages of street vendors were all explored. The vending trend or length, vending operator education background, and financing sources.

Table 1 Street vendors and categories of products in Karu, Nigeria

Products categories and types	Item	Daily profits in naira	Monthly Profits in naira (NGN)	(%)
Fruits and vegetables	Oranges, tomatoes, bananas, onions watermelons, pineapples, cabbage, carrots, apples, ice cream.	N600	N18000	13.79

Butchers	Meats, fish, chickens	N500	N15000	11.50
Food, grains & restaurants	Rice, beans, yams, sweet potatoes,	N450	N13500	10.34
Material wares	Male and female wares, shoes, hats, caps/head ties	N550	N16500	12.64
Household durables	Cooking utensils, buckets, bags, wall clocks, bed sheets, pillows	N600	N18000	13.79
Electronics & ICT	Radio sets, electricity, cookers, phones/chargers, irons/shavers, mobile phones/recharge cards.	N750	N22500	17.24
Fashion accessories	Wristwatch, handkerchief, wallet	N400	N12000	9.20
Books, magazines,	Books, magazines, journals, newspapers, pamphlets	N500	N15000	11.50



Figure 1.1 Street vending and traffic situation



Figure 4.2. Vending activities on pedestrian bridge

The table 2 included information on several sorts of street vendors, their items, daily earnings, weekly and monthly increases, and comparisons to the national minimum wage. The research claims that street vendors received less than the national minimum wage. The advantages of vending and regular business are contrasted in the table above. There is a desire for profit gains and sales disparities.

Table 2.4.2 Social and economic attributes of street vending Activities on roadways

S/N o.	socioeconomic attributes	Total	Range of acceptance		
			DA	NA/ND	A
1	The vendor's location point attracts street buyers and congest roadways	5	1	0	= 4. Agreed
2	Entertainment and advertisement influence street businesses and visitors.	5	0	1	= 4. Agreed
3	Street trading reduces walkable distance	5	0	1	= 4. Agreed
4	community park/garden creates an avenue for business, meeting friends/relatives	5	2	0	= 3. Agreed
Total		20	3	2	75% A

N.B: SD = Strongly Disagreed; D = Disagreed; NAND = Neither Agreed nor Disagreed; A = Agreed, SA = Strongly Agreed

$$SD+A = \text{Disagreed} = 2 + 1 = 3 = \frac{3}{4} = 0.75$$

$$ND/ND = \text{Neither Agreed; Nor Disagree} = \frac{3}{4} = 0.75$$

$$SA+A = \text{Agreed} = 10 + 5 = 15 = \frac{15}{4} = 3.75$$

$$\text{The mean number of respondents} = \frac{20}{4} = 5.00$$

Therefore: The mean range = 3.75 to 5.00

Table.3 Trends and types of street vendors

Duration of street vending (Years)			
Years	No	%	Category of vendors
0-5 Years.	6	30	Food/drinks
6-10 Years	8	40	Household goods
11-15 Years	4	20	Electronic/ICT
16-20 Years	2	10	Fashion/Accessories
21-25 ⁺ Above	0	0	Books, journals, magazines
		20	100% -

Table 2.4.4 Daily profit ranges

S/No.	Daily profit range in Nigeria Naira (N)	Number of Respondents	
		No	(%)
1	100 – 500	4	20
2	600 -1000	11	55
3	1100-1500	3	15
4	1600 – 2000	2	10
5	2100 – 2500	0	0
Total		20	100%

Table 2.4.5 Educational qualification of street vendors

S/No	Qualification	Number of respondents	(%)
1	Others (Informal education)	3	15
2	Primary school certificate	2	10
3	Junior secondary school	5	25
4	Senior secondary school	7	35
5	National Diploma/National certificate for education	2	10
6	B.Sc. degree	1	05
7	M.Sc. degree	-	00
8	Doctorate (Ph. D)	-	00
Total		20	100%

The benefits of vending and regular business are compared in the table above. Gains in sales and profits are being sought after. The table and figures included information on several sorts of street vendors, their items, daily earnings, weekly and monthly increases, and comparisons to the national minimum wage

Table 6 Sources of funds

S/No.	Source	Number	(%)
1	Personal savings	6	30
2	Family loans	3	15
3	Family and friends' donations	2	10
4	Peer group	0	00
5	Community loan	2	10
6	Cooperative	2	10
7	Skill/Empowerment	3	15
8	Bank loan	2	10
Total		20	100%



Figure 4.4 Advertisement and entertainment along roadway



Figure 4.3 Vending and beggary on pedestrian bridge

Table 7 Comparing Socio-economic Activities of street vending and road congestion

S/No	Socio-economic activities. X		Y	XY	X ²	Y ²
1	1		4	4	1	16
2	1		4	4	1	16
3	1		4	4	1	16
4	2		3	6	4	9
Total	$\sum x = 10$		$\sum y = 15$	$\sum xy = 18$	$\sum x^2 = 7$	$\sum y^2 = 57$

Table 2.4.8 Comparing educational background and source of income

S/No	Educational Qualification		Source of income	XY	X ²	Y ²
	X	Y				
1	3	6		18	9	36
2	2	3		6	2	9
3	5	2		10	25	4
4	7	0		0	49	0
5	2	2		4	4	4
6	1	2		2	1	4
7	0	3		0	0	9
8	0	2		0	0	4
Total	$\sum x = 20$	$\sum y = 20$		$\sum xy = 40$	$\sum x^2 = 90$	$\sum y^2 = 70$

The coefficient $r =$ calculated value $= 0.0131 < 1.895$, implying that H_0 is rejected and H_1 is accepted. There is a $r =$ calculated value $= 0.012 < 1.895$ coefficient link between social and economic activities of street selling and traffic congestion. H_0 was refused, while H_1 was accepted. There is a link between educational attainment and income levels.

Urban Growth Monitoring Using Remote Sensing and GIS Techniques

Table 10 Supervised Classification for LULC (2003)

S/No	LULC	Count	Area (SQ M)	Percentage (%)
1	Built-up Land	1476	119.124	12.10
2	Agricultural Land	3644	328.116	34.30
3	Forest Land	2763	292.06	31
4	Water Body	1322.55	119.025	12.40
5	Barren Land	1086	97.785	10.2
Total		10291.55	956.11	100

Source: Authors' Analysis, 2023

Table 10 reveals a diverse distribution of land use categories, with the highest count observed in Agricultural Land (3644 counts), followed by Forest Land (2763 counts), Built-up Land (1476 counts), Water Body (1322.55 counts), and Barren Land (1086 counts), Agricultural Land appears to be the most dominant land use category, accounting for a significant portion of the total

area at 34.30%. This suggests a substantial extent of land being utilized for agricultural purposes, Forest Land constitutes a substantial portion of the landscape, representing 31% of the total area.

This indicates a noteworthy presence of forested areas within the study region, highlighting the importance of environmental preservation and biodiversity, and Water bodies, including lakes, rivers, and other aquatic features, account for approximately 12.40% of the total area. This balanced coverage signifies a notable proportion of the landscape being covered by water, indicating potential importance for ecological balance and human usage (figure 10).

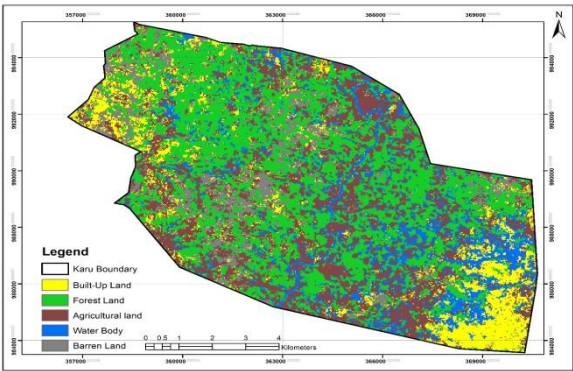


Figure 4.4 Landcover/landuse change of Karu 2003

Table 11 Supervised Classification for LULC (2013)

S/No	LULC	Count	Area (SQ M)	Percentage (%)
1	Built-up Land	3810	378.3435	39.57
2	Agricultural Land	1609	145.81	15.26
3	Forest Land	1015.55	91.3965	9.55
4	Water Body	1367	123.03	12.87
5	Barren Land	2417	217.53	22.75
Total		10291.55	956.11	100

Source: Authors' Analysis, 2023

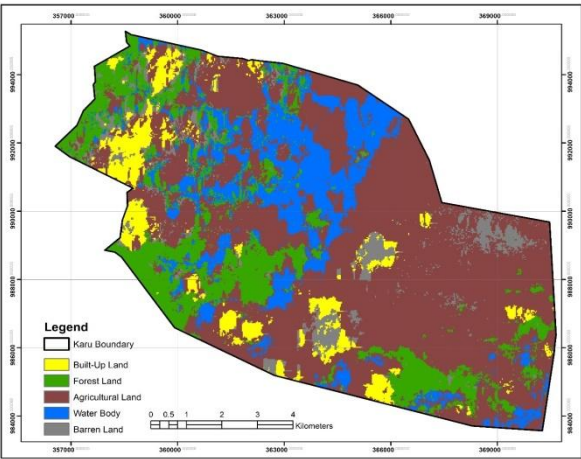


Figure 4.5 Landcover/landuse change 2013

Table 11 shows a count of 3810 pixels, equivalent to an area of approximately 378.34 square meters, built-up land constitutes a significant portion, accounting for 39.57% of the total area. This high percentage indicates substantial urban or developed areas within the region, Agricultural Land, with 1609 pixels and an area of 145.81 square meters, covers about 15.26% of the total area.

This signifies a notable portion of land dedicated to agricultural activities, showcasing the importance of agriculture in the region, Forest Land, represented by 1015.55 pixels and covering an area of approximately 91.40 square meters, constitutes 9.55% of the total area.

This indicates a significant presence of forested regions, which are crucial for ecological balance and biodiversity, Water bodies, encompassing 1367 pixels and an area of 123.03 square meters, account for 12.87% of the total area. This highlights the presence of significant water resources such as lakes, rivers, or ponds within the area, and Barren Land, with a count of 2417 pixels and covering an area of 217.53 square meters, forms a substantial portion, making up 22.75% of the total area. This suggests areas with minimal or no vegetation, contributing to a diverse landscape composition (figure 4.5).

Table 12 Supervised Classification for LULC (2013)

S/No	LULC	Count	Area (SQ M)	Percentage (%)
1	Built-up Land	3810	378.3435	39.57
2	Agricultural Land	1609	145.81	15.26
3	Forest Land	1015.55	91.3965	9.55
4	Water Body	1367	123.03	12.87
5	Barren Land	2417	217.53	22.75
Total		10291.55	956.11	100

Source: Authors' Analysis, 2023

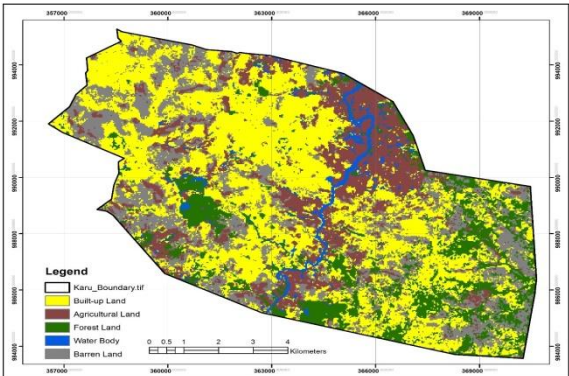


Figure 4.6 Landcover/landuse change 2023

Table 12 shows a count of 4327.53 and an area of 402.04 square meters, Built-up Land constitutes a significant portion, accounting for 42.05% of the total land area. This high percentage indicates substantial urban or developed areas within the region, Agricultural Land, comprising 1741.1 count and an area of 161.75 square meters, makes up 16.92% of the total land area. This suggests a notable presence of land dedicated to agricultural activities, a fundamental component of the region's landscape, Forest Land, represented by a count of 317.36 and covering an area of 29.48 square meters, constitutes a smaller proportion, accounting for 3.08% of the total land area.

The relatively low percentage underscores the need for conservation efforts to preserve and possibly enhance the forested areas, Water Body, with a count of 2411.77 and an area of 224.06 square meters, comprises a substantial part, representing 23.43% of the total land area. This highlights the significance of water bodies within the region, likely influencing various ecological and environmental aspects, and Barren Land, totaling 1493.79 in count and 138.78 square meters in area, accounts for 14.52% of the total land area. This category denotes land areas with limited or no

vegetation and could be a focus for potential reclamation or land use improvements (figure 4.6).

Table 13 Summary of roadways and socioeconomic activities.

Goal	Spatial scale	Accessibility requires	Possible means of transport
Economic competitiveness	Urban corridor	Enterprises need access to the labour force and cities mobility	Cars and mini taxis
Variety in a living environment	Urban density	A variety between the community with respect to the level of access to cultural facilities, and non-shopping facilities	Single family car, and bicycles.
Sustainable growth	Urbanisation	Access to self-employment by cars and cyclist	Luxury buses
Social cohesion	Neighbourhood	Pedestrians and cyclists need access to daily shopping, social services, and sporting facilities	Tricycle and shuttle buses

The research claims that street vendors received less than the national minimum wage. The advantages of vending and regular business are contrasted in the table above. There is a desire for profit gains and sales disparities.

5. Conclusion

Karu, Nigeria's geographic setting, people resources, and economic viability are all important factors since population and economic production indicate the possibility of future economic stability. Abolishing street hawking in Nigeria would be impossible given the number of schools that would have to be involved. However, the lack of chances for street vending would leave them more open to social crime and neighbourhood violence.

The research areas might be used as a tool for progress in the relevant nations and regions. Federal, state, and municipal governments should empower young, developing individuals who are prone to failure and increase production power. Street sellers are actively tracking various livelihoods and seeking to better their level of life. To include street vending activities into road design plans, government norms, commercial assurance, and inward-looking urban planning should focus on the sense of stability. These findings might be utilised to include the informal sector into Nigerian regulatory Acts. Based on this, the study emphasises that more empirical research is needed to gain a more objective understanding of how the shape of street vending activities relates to other types of abnormalities in most African countries, such as informal or unregulated building extension, encroachment, and unofficial allocation of public space to commercial vending sites.

REFERENCES

1. A. M. Eya, G. K. Sinniah, and M. Z. Shah, "Equity And Fairness , An Attribute for Effective Urban Road Congestion Pricing on Low-Income Users of Lekki Toll Gate Lagos , Nigeria : A Review," vol. 12, no. 7, pp. 6268–6284, 2023.
2. M. A. Eya, G. K. Sinniah, M. Z. Shah, and A. Hashim, "ASSESSING MEASURES OF HIGHWAY TRAFFIC FLOW WITH TRAVEL TIME RELIABILITY BASED ON TRAVEL TIME INDEX . An in-depth literature review .," pp. 1–9, 2019.
3. O. A. Oyedele, "A study of control measures of building collapse in Lagos State , Nigeria A Study of Control Measures of Building Collapse in Lagos State , Nigeria (9284) Olufemi Oyedele (Nigeria) FIG Congress 2018 Embracing our smart world where the continents connec," no. 9284, 2018.
4. M. Hasan *et al.*, "Analyzing the Impact of Land Use and Roadside Informal Activity on Transportation System: A Case Study in Rajshahi City Corporation, Bangladesh," *Int. J. Transp. Eng. Traffic Syst.*, vol. 4, no. 2, pp. 18–31, 2018.
5. A. Raza, M. Safdar, M. Zhong, and J. D. Hunt, "Analyzing Spatial Location Preference of Urban Activities with Mode-Dependent Accessibility Using Integrated Land Use–Transport Models," *Land*, vol. 11, no. 8, 2022, doi: 10.3390/land11081139.
6. F. Gamielien and L. van Niekerk, "Street vending in South Africa: An entrepreneurial occupation," *South African J. Occup. Ther.*, vol. 47, no. 1, pp. 24–29, 2017, doi: 10.17159/2310-3833/2017/vol47n1a5.
7. S. Roeveer, "Street Vendors and Public Space," 2019.
8. A. M. Eya, G. K. Sinniah, A. M. Junaidu, and M. Zubairu, "Comparing Environmental Management and Cities Sustainability As a Basis for Sustainable Development in Nigeria," *Plan. Malaysia*, vol. 20, no. 2, pp. 359–372, 2022, doi: 10.21837/pm.v20i21.1119.
9. W. Wu, W. Y. Chen, Y. Yun, F. Wang, and Z. Gong, "Urban greenness, mixed land-use, and life satisfaction: Evidence from residential locations and workplace settings in Beijing," *Landsc. Urban Plan.*, vol. 224, no. April, p. 104428, 2022, doi: 10.1016/j.landurbplan.2022.104428.
10. X. Zhang, S. Du, and Q. Wang, "Hierarchical semantic cognition for urban functional zones with VHR satellite images and POI data," *ISPRS J. Photogramm. Remote Sens.*, vol. 132, pp. 170–184, 2017, doi: 10.1016/j.isprsjprs.2017.09.007.
11. X. Zhang, S. Du, and Q. Wang, "Integrating bottom-up classification and top-down feedback for improving urban

- land-cover and functional-zone mapping,” *Remote Sens. Environ.*, vol. 212, no. March, pp. 231–248, 2018, doi: 10.1016/j.rse.2018.05.006.
12. B. L. Gaol and I. S. Sutanto, “Development of Transportation System and Land Use Interaction Scenario on the Development of Utilization in West Java International Airport Using System Dynamics Approach,” *Int. J. Eng. Adv. Res.*, vol. 4, no. 2, pp. 34–47, 2022, [Online]. Available: <http://myjms.mohe.gov.my/index.php/ijearhttp://myjms.mohe.gov.my/index.php/ijearhttp://myjms.mohe.gov.my/index.php/ijear>
13. I. U. Rahman, M. Shafi, L. Junrong, E. T. M. K. Fetuu, S. Fahad, and B. P. Sharma, “Infrastructure and Trade: An Empirical Study Based on China and Selected Asian Economies,” *SAGE Open*, vol. 11, no. 3, 2021, doi: 10.1177/21582440211036082.
14. B. V. Bhatt, “a Study of a Study of Street Vending Activities in the South East,” *Int. J. Civ. Eng.*, vol. 7, no. 3, pp. 1–10, 2018.
15. M. Senthil and J. L. Kitchley, “Reviewing the Physical and Non-Physical Attributes of Collector and Local Streets: a Case Study of Mylapore, Chennai,” *J. Eng. Sci. Technol.*, vol. 17, pp. 90–103, 2022.
16. D. Zhang, X. Liu, Z. Lin, X. Zhang, and H. Zhang, “The delineation of urban growth boundaries in complex ecological environment areas by using cellular automata and a dual-environmental evaluation,” *J. Clean. Prod.*, vol. 256, p. 120361, 2020, doi: 10.1016/j.jclepro.2020.120361.
17. D. Zhang, “A Systematic Review of Factors Influencing the Vitality of Public Open Spaces : A Novel Perspective Using Social – Ecological Model (SEM),” 2023.
18. X. Xu, D. Zhang, X. Liu, J. Ou, and X. Wu, “Simulating multiple urban land use changes by integrating transportation accessibility and a vector-based cellular automata: a case study on city of Toronto,” *Geo-Spatial Inf. Sci.*, vol. 25, no. 3, pp. 439–456, 2022, doi: 10.1080/10095020.2022.2043730.
19. K. County, D. Abuya, M. Oyugi, and E. Oyaro, “Management of the Effects of Land Use Changes on Urban Infrastructure Capacity: A Case Study of Ruaka Town, Kiambu County, Kenya,” *Civ. Environ. Res.*, vol. 8, no. 4, pp. 158–190, 2019, doi: 10.7176/ce/11-7-03.
20. A. S. M. A. Quium, “Transport Corridors for Wider Socio – Economic Development,” 2019.
21. H. Kamalipour and N. Peimani, “Negotiating space and visibility: Forms of informality in public space,” *Sustain.*, vol. 11, no. 17, 2019, doi: 10.3390/su11174807.
22. N. Peimani and H. Kamalipour, “Informal Street Vending: A Systematic Review,” *Land*, vol. 11, no. 6, pp. 1–21, 2022, doi: 10.3390/land11060829.
23. I. I. Aun, “Effect of Street Entrepreneurship Transformation on Small and Medium Enterprises Performance,” *J. Manag. Econ. Ind. Organ.*, pp. 81–97, 2022, doi: 10.31039/jomeino.2022.6.1.5.
24. P. Deore and S. Lathia, “Streets as public spaces: Lessons from street vending in ahmedabad, india,” *Urban Plan.*, vol. 4, no. 2PublicSpaceintheNewUrbanAgendaResearchintoImplementation, pp. 138–153, 2019, doi: 10.17645/up.v4i2.2058.
25. H. M. Nyamnjoh, “Entrepreneurialism and innovation among Cameroonian street vendors in Cape Town,” *African Identities*, vol. 00, no. 00, pp. 295–312, 2020, doi: 10.1080/14725843.2020.1777085.
26. J.-P. Rodrigue, *The Geography of Transport Systems. 3rd Edition*. 2019.
27. Y. Xu *et al.*, “Another tale of two cities: Understanding human activity space using actively tracked cellphone location data,” *Ann. Am. Assoc. Geogr.*, vol. 106, no. 2, pp. 489–502, 2016, doi: 10.1080/00045608.2015.1120147.
28. J. Chen *et al.*, “Evaluating residents’ satisfaction before and after regeneration. The case of a high-density resettlement neighbourhood in Suzhou, China,” *Cogent Soc. Sci.*, vol. 8, no. 1, 2022, doi: 10.1080/23311886.2022.2144137.
29. Z. A. Cheng, M. Pang, P. A. Pavlou, Z. A. Cheng, M. Pang, and A. Pavlou, “Mitigating Traffic Congestion : The Role of Intelligent Transportation Systems Mitigating Traf fi c Congestion : The Role of Intelligent Transportation Systems,” no. May, 2020.
30. T. Reiffenstein, “Concentric Zone Theory,” *Wiley-Blackwell Encycl. Soc. Theory*, pp. 1–2, 2017, doi: 10.1002/9781118430873.est0440.
31. A. Trupp and S. Sunanta, “Gendered practices in urban ethnic tourism in Thailand,” *Ann. Tour. Res.*, vol. 64, pp. 76–86, 2017, doi: 10.1016/j.annals.2017.02.004.
32. L. Ojeda and A. Pino, “Spatiality of street vendors and sociospatial disputes over public space: The case of Valparaíso, Chile,” *Cities*, vol. 95, no. January, p. 102275, 2019, doi: 10.1016/j.cities.2019.02.005.
33. A. Farinmade, O. Soyinka, and K. W. M. Siu, “Assessing the effect of urban informal economic activity on the quality of the built environment for sustainable urban development in Lagos, Nigeria,” *Sustain. Cities Soc.*, vol. 41, no. May, pp. 13–21, 2018, doi: 10.1016/j.scs.2018.05.020.

34. M. J. Rahayu, R. A. Putri, and E. F. Rini, "Sustainable Street Vendors Spatial Zoning Models in Surakarta," *IOP Conf. Ser. Earth Environ. Sci.*, vol. 123, no. 1, 2018, doi: 10.1088/1755-1315/123/1/012044.
35. M. J. Rahayu, I. Buchori, and R. Widjajanti, "The need for the improvement of street vendors management in public spaces at surakarta city," *Plan. Malaysia*, vol. 17, no. 2, pp. 146–157, 2019, doi: 10.21837/pmjournal.v17.i10.636.
36. W. Huang, S. Xu, Y. Yan, and A. Zipf, "An exploration of the interaction between urban human activities and daily traffic conditions: A case study of Toronto, Canada," *Cities*, vol. 84, no. July 2018, pp. 8–22, 2019, doi: 10.1016/j.cities.2018.07.001.
37. R. Planning and E. Campus, "DETERMINANTS OF URBAN ROADSIDE TRADING IN ENUGU METROPOLIS Juliet Ibekwe 1 and Christopher M. Anierobi 2," no. 6, pp. 1–13.
38. B. Huang, B. Zhao, and Y. Song, "Urban land-use mapping using a deep convolutional neural network with high spatial resolution multispectral remote sensing imagery," *Remote Sens. Environ.*, vol. 214, no. April, pp. 73–86, 2018, doi: 10.1016/j.rse.2018.04.050.
39. Y. Song, Y. Long, P. Wu, and X. Wang, "Are all cities with similar urban form or not? Redefining cities with ubiquitous points of interest and evaluating them with indicators at city and block levels in China," *Int. J. Geogr. Inf. Sci.*, vol. 32, no. 12, pp. 2447–2476, 2018, doi: 10.1080/13658816.2018.1511793.

Corresponding Author: Musa Adamu Eya
Email: musaeya@graduate.utm.my