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*RESEARCH ARTICLE*

# SPATIAL INFLUENCE OF TERTIARY INSTITUTIONS ON LAND COVER DYNAMICS AND ADJOINING PROPERTY PRICES IN HOST COMMUNITIES

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**ABSTRACT**

The establishment of a tertiary institution in a community is often regarded as a catalyst for economic growth. This study aims to assess the influence of tertiary institutions on adjoining property prices, as well as land use and land cover changes in the host settlements. The Oyo State College of Agriculture and Technology in Igbo-Ora, Ibarapa Central, Oyo State, Nigeria, serves as the focal point for this investigation. 301 structured questionnaires were distributed to the heads of households in proximity to the college premises. The survey focused on obtaining information related to land prices and rent. Additionally, Landsat imageries from 2012 and 2023 were obtained and analyzed using ArcGIS 10.7 to observe the changes in land use and land cover around the college premises. Inferential and descriptive statistics were employed to analyze the information gathered from the heads of households. The findings indicate a significant relationship between the spatial location of tertiary institutions and property prices in host communities. The study revealed a noteworthy increase in built-up areas around the college, expanding from 28.84 hectares in 2012 to 50.12 hectares in 2023. Concurrently, vegetal cover decreased significantly from 260.54 hectares to 186.52 hectares in 2023. Furthermore, the research highlighted a substantial rise in land prices and tenement rates in 2023 compared to 2012. This study underscores the need for state or local governments, urban and regional planners, and other stakeholders in the housing sector to regulate the activities of estate developers around tertiary institutions. Such measures can prevent deforestation, protect ecosystems, and moderate tenement rates in these areas. To mitigate the environmental impact and socioeconomic consequences, it is recommended that appropriate regulations be implemented to guide development around tertiary institutions. This proactive approach will contribute to sustainable urban planning and the overall well – being of host communities.

**KEYWORDS**

Tertiary institutions, spatial location, GIS, land use and land cover changes and property price.

## 1. INTRODUCTION

Tertiary institutions contribute to the growth and development of host community and assist citizen to possess right to education (Ali, 2020). Establishment of an educational institution in a community has been identified to be a propellant of development of host community. Such institution creates job opportunity, positively impact on the host community through population increase as a result of influx of people through admission of students from different parts of the country (Fatoki, 2017). The increase in the population usually transforms the economic and social profiles of the host community. The divergent of cultural values in Nigeria usually reflect in the community where tertiary institutions are situated, play crucial roles in integrating the several ethnic groups across the country not only to promote cohesion among them but transcend the realm of education (Ehinmowo and Eludoyin, 2010 and Fatoki, 2017, Idris, et al, 2022). Similarly, the establishment of tertiary institution often encourage influx of people from various parts of the country, increase demand for land and housing and consequently lead to increase in land, student housing and rent price.

Oyo State College of Agriculture and Technology (OYSCATECH), situated in Igbo - Ora is one of the specialized higher institutions in Nigeria which did not make provision for student accommodation possibly due to financial shortage or the policy at the take-off point of the school which has in turn created untold hardship to both students, staffs and host communities. The increase in housing demand in Igbo - Ora where the institution is located has caused increase in land cost and house rent (Folorunso, et al., 2019). However, rent varies across the locations, building types, facilities provided, nearness to office and market places and neighbourhood composition. As revealed that dwellings in the same neighbourhood enjoys similar economic and social characteristics (Boardman, et al., 2005). Asserted that housing development is largely appreciated when access to the location is provided, the structure is supported by relevant facilities, location is adjoining to work place, shopping centers, near to school, recreational facilities, and accessible to public transport, open space, place of entertainment, worship centre, and at closes distance to CBD and other related community services (Thorncroft, et al., 2011). The acts of meeting the growing needs of housing especially among the students have left uncalculated changes to vegetal and land uses.

Land use and land cover change has been a uncompromising effects of massive production of housing to meeting the increasing demand which resulting to modification of the terrestrial surface (Ellis, 2011). Demand for land and housing has increased activities such as trees feeling, road and building constructions which have consequently reduced natural vegetation and loss of biodiversity (Giri, 2001). As higher institutions continue to expand in size through increase in admission of more students, establishment of more faculties and departments it would consequently result to more demand for land and housing. Studies affirmed that the establishment of higher institutions has been found to have significant impacts on the surrounding communities, including the properties values

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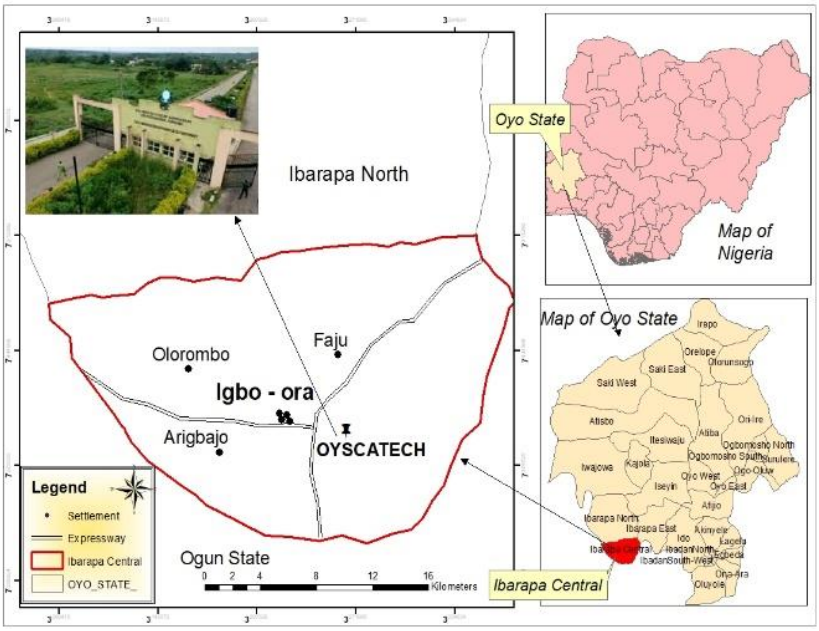
(Idris et al., 2022; Olayiwola and Dombo, 2019; Fatoki, 2017; Aiyejina, 2008). These studies have discovered the relationship between the establishment of such institutions, socio – economic characteristics and property values. However, they failed to examine the rate of land use, type and land cover changes brought occasioned by the establishment of tertiary institutions on the host communities. As examined the impact of universities on local housing prices in China and found that universities have a significant positive impact on housing prices (Li, et al., 2019). Similarly, investigated the impact of school finance reform on housing prices in California and found that improvements in school quality can lead to significant increases in housing development (Rothstein and Verdier, 2018).

As investigated the impact of university location on housing prices in Nigeria and found that universities have a positive impact on property values in the surrounding areas (Nubi, 2003). The study concluded that the establishment of universities can lead to significant increases in housing prices. Similarly, examined the impact of tertiary institutions on housing development in Nigeria and found that the establishment of such institutions has a positive impact on property prices (Afolabi, et al., 2016). The study concluded that the establishment of tertiary institutions can lead to significant increases in housing development, particularly in areas where there is a high demand for housing.

Despite several studies on the influence of tertiary institution on socio – economic status of the host community, property price, its effects on landuse and land cover changes have not received adequate attention. Therefore, this study examines the influence of (OYSCATECH) on sub – urban settlement particularly to measure landuse and land cover changes of the host settlement using Geographic Information System (GIS). Similarly, the study examined the impact of the institution on rent and property value of the host community.

### 1.1 Study area

Igbo – Ora, the study area, is the headquarters of Ibarapa Central Local Government Area of Oyo State, Nigeria. It is located about 80km north – west of Lagos. It is a sub – urban settlement and virtually all the indigenes are peasant farmers. In 2017 the population is estimated to be around 278,514 people (Omonkhua et al, 2020). Oyo State College of Agriculture and Technology also known as OYSCATECH is a state-owned polytechnic located in Igbo-Ora. It was established in August 2006 during the tenure of late Governor Abiola Ajimobi. The total population of students of the institution was 5,400 while the population of the staff was 535 (Tom, 2019). The college has contributed significantly to the socio-economic and demographic development of the town. Subsistence agriculture and hunting are other economic activities of the residents. Construction of a mini stadium is under construction in the town. Igbo -Ora is a collection of autonomous towns each with its traditional heads but with a very porous land bound area.




Source: Extracted from ESRI Shapefile

**Figure 1:** Map of Nigeria showing the study area

## 2. METHODOLOGY

The study adopted cross sectional research design. A combination of purposive and simple random sampling methods was utilized. The community adjourning the institution was purposively selected while random sampling method was used to select the respondents from each residential building. Both primary and secondary information were collected for the study. A total of 301 questionnaires (10% of existing buildings) were randomly administered on a tenant per building. Secondary information such as map of the Igbo-Ora and Landsat images of the study areas were obtained from the United State Geological Survey (USGS) for the year 2012 and 2023 (11 years interval). This was used to examine the rate of land use and land cover changes over the years in the study area. Land classification was performed on the images through supervised (full Guassian) maximum likelihood classification and the final product provides the overview of the major landcover changes. Three categories of Land use/Land cover (LULC) were identified: these are- Vegetation, Built up area and Bare Surface. The primary data collected was analyzed with SPSS software using descriptive and inferential statistics parametric statistics (ANOVA) and non-parametric statistics (linear regression). Additionally, since the nature of land use and land cover monitoring requires imageries of different time, period, and changes detection analysis was carried out with at least two Landsat imageries of the study area.

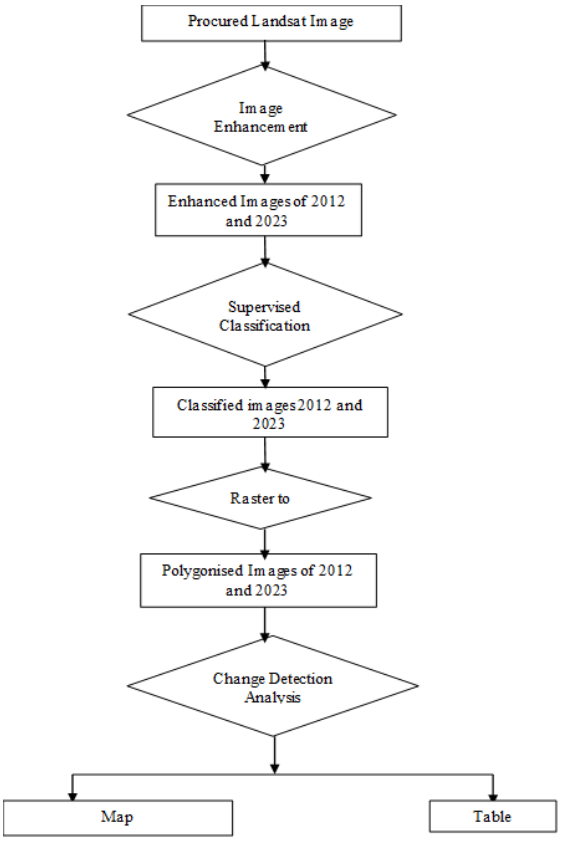
Table 1: Description of Landsat Images used for the study

| Satellite Imagery | Landsat Sensor(s) | Date of Acquisition | Path | Row | Spatial Resolution(m) |
|---|---|---|---|---|---|
| 2012 | LANDSAT_8 | 2012/12/03 | 190 | 55 | 30 |
| 2023 | LANDSAT_8 | 2023/02/16 | 190 | 55 | 30 |

Source: Authors' compilation

### 2.1 Image classification methodology flowchat

This shows in sequential order step – by – step processes and procedures to achieve the major aim (examine the rate of land use and land cover change in the host community of Oyo State College of Agriculture and Technology) of the study area (figure 2).




Source: Author's compilation

**Figure 2:** Image classification methodology flowchart

## 3. Analysis and Findings

### 3.1 Spatial search and representation

Spatial query was used in this reserach to test the Geo - database created. This process was used to selet features based on location. It was achieved through a query syntex built to select features that match the selection criteria from a Geo - database using the Select by Attributes tool.

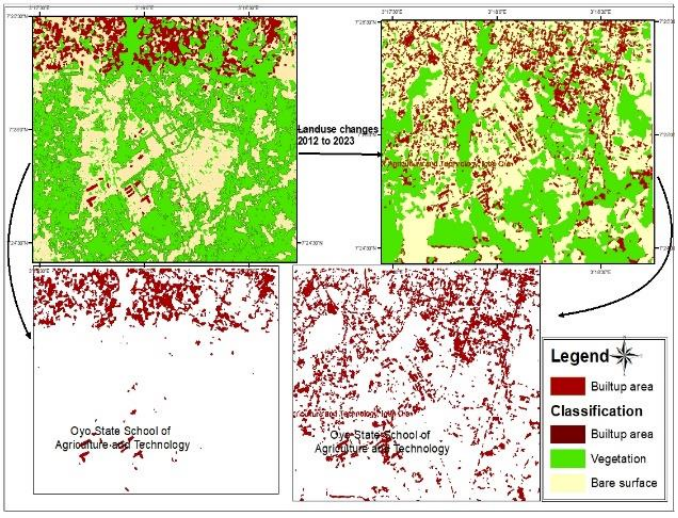



**Figure 3:** Landuse and Landcover of the study area (2012 - 2023)

Source: Authors' compilation, 2025

Figure 3 depicts landuse and land cover of the study area between the year 2012 to 2023 (11 years interval) with purpose to determine the rate of encroachment of built-up area to the Oyo State College of Agriculture and Technology. The 2012 imagery shows that the college is almost isolated from the main town, however, by 2023, eleven years interval, the town has totally surged into the college. This has contributed to the increase in the land value and rent around the school premises. As human activities and buildings continue to increase around the college premises land value and rent was increasing.

### 3.2 Landuse (built-up area) inventory and area calculation

The land use and land cover classification analysis from 2012 and 2023 for the study area is presented in the Table 2. Area calculation provides a comprehensive dataset in term of overall land cover and land use type and percentage of changes which occurred over the years. Furthermore, the Table shows the pattern of landuse (built - up) changes of the area within the interval of 11 years (2012 - 2023) using two remotely sensed imageries. This showed the area of coverage by built – up features which has increased from 28.84 hectares (5.90%) in 2012 to 50.12 hectares (10.26%) in 2023. The forest cover (vegetation) decreased from 260.54 hectares (53.33%) to 186.52 hectares (38.18%) in 2023. While bare (impervious) surface in the study area increased from 199.29 hectares (40.77) to 251 hectares (51.56%) in 2023. This shows human activities in the study area is persistently increasing. As population is increasing, demand for housing is increasing with other facilities which largely encouraged encroachment in Oyo State College of Agriculture and Technology campus.

| **Table 2:** Land use and Land cover classes/Inventory | | | | | |
|---|---|---|---|---|---|
| | **2012 Classification** | | **2023 Classification** | | |
| **LULC Type** | **Area (Hectares)** | **Area (%)** | **Area (Hectares)** | **Area (%)** | **% changes** |
| Built – area | 28.84 | 5.90 | 50.12 | 10.26 | 73.77 increase |
| Vegetation | 260.54 | 53.33 | 186.52 | 38.18 | 28.41 decrease |
| Bare surface | 199.29 | 40.77 | 251.88 | 51.56 | 74.13 increase |
| **Total** | **488.51** | **100** | **488.51** | **100** | |

Source: Author's compilation, 2025

### 3.3 Influence of OYSCATECH on residents' cost of living (rent, electricity, transport, feeding and water accessibility)

The study appraised the impact the Oyo State College of Agriculture and Technology on property prices around the college locality. The rent assessment provides insights into the affordability of housing in Igbo – Ora Town as shown in Table 3. The majority of respondents, 51.8% reported that rent is moderate, indicating that a significant proportion of the respondents can afford housing within their financial budget. However, a substantial number of respondents considered the rent to be high (21.7%) or very high (24.4%) suggesting that housing affordability may be a concern for a proportion of the community. Additionally, a small percentage (2.0%) reported low rent levels.

Assessment of electricity cost revealed that the majority of respondents (45.7%) rated electricity costs below ₦1,000 in a month. This indicates that a significant percentage of the community has relatively affordable electricity. Similarly, 24.3% of respondents reported electricity costs ranging between ₦1,000 and ₦2,000, while smaller proportions (11.6%) reported monthly electricity bill in the range of ₦3,000 to ₦4,000 and ₦5,000 to ₦6,000 was give to 18.5% per month.

The transportation cost provides insights into the expenses associated with commuting to classes or workplaces. The data gathered showed that the largest proportion of respondents (43.8%) spent below ₦1,000 on transportation suggesting that a significant proportion of the community particularly students spent less on transportation. Respondents in this category largely students trek to school while some follow non-motorable paths. Similarly, a proportion of 16.3% reported monthly transportation costs ranging between ₦1,000 to ₦2,000, larger proportions (33.3%) reported ₦3,000 to ₦4,000 while the sum of 5.9% spent between ₦5,000 to ₦6,000 per month. In all most of the commuters are students at youthful age who can trek to school while some of them are seldomly use transportation.

The cost of feeding revealed the monthly expenses on food consumption. The establishment of the college apparently increase population and demand for goods which include food stuffs. The majority (60.1%) spent between ₦10,000 to ₦20,000 on feeding. Similarly, smaller proportion (16.8%) of respondents spent less than ₦10,000. The majority (75.6%) of respondents relying on well water, suggesting that wells is the most common and reliable source of water for the residents. A smaller proportion of respondents (15.5%) were sourcing water from borehole, while relatively

smaller percentage (8.1%) had access to tap water. This finding is equivalence on the residents' living conditions in Ibadan metropolis to (Adejumo and Adelowokan, 2020).

| **Table 3:** Impact of OYSCATECH on Residents' cost of living (rent, electricity, transport, feeding and water accessibility) | | |
|---|---|---|
| **Rent Assessment** | **Frequency (F)** | **Percent (%)** |
| Very high | 73 | 24.4 |
| High | 65 | 21.7 |
| Moderate | 155 | 51.8 |
| Low | 6 | 2.0 |
| **Electricity Cost (₦)** | **Frequency (F)** | **Percent (%)** |
| **<**1,000 | 79 | 45.7 |
| 1,000-2,000 | 42 | 24.3 |
| 3,000-4,000 | 20 | 11.6 |
| 5,000-6,000 | 32 | 18.5 |
| **Transportation Cost (Class/Office) (₦)** | **Frequency (F)** | **Percent (%)** |
| <1,000 | 113 | 43.8 |
| 1,000-2,000 | 42 | 16.3 |
| 3,000-4,000 | 86 | 33.3 |
| 5,000-6,000 | 15 | 5.9 |
| 7,000-8,000 | 2 | 0.8 |
| **Feeding Cost (₦)** | **Frequency (F)** | **Percent (%)** |
| <10,000 | 40 | 16.8 |
| 10,000-20,000 | 143 | 60.1 |

| **Table 3 (cont):** Impact of OYSCATECH on Residents' cost of living (rent, electricity, transport, feeding and water accessibility) | | |
|---|---|---|
| 20,001-30,000 | 23 | 9.7 |
| 30,001-40,000 | 23 | 9.7 |
| 40,001-50,000 | 9 | 3.8 |
| **Water Source** | **Frequency (F)** | **Percent (%)** |
| Well water | 214 | 75.6 |
| Borehole | 44 | 15.5 |
| Tap | 23 | 8.1 |
| None | 2 | 0.7 |

Source: Authors' field survey, 2025

### 3.4 Relationship between College Location and Housing Price

This study provides information on the intercept (constant) and the independent variable, "Location of the Institution". The regression analysis revealed that the independent variable "Location of the Institution" has a significant effect on residential property prices (β = 5729.137, t = 2.376, p < 0.05). The coefficient (β) of 5729.137 indicates that, on average, for every unit increase in the location of the institution, the residential property prices in Igbo-Ora increase by 5729.137 units.

The t-value of 2.376 implies that the relationship is statistically significant, as it exceeds the critical value at the 0.05 significance level. The p-value of 0.018 further supports the significance of the relationship, indicating that the likelihood of observing such an effect by chance is less than 0.05. Therefore, this study reveals that the location of the institution has a significant and positive spatiotemporal impact on residential property prices in Igbo-Ora, suggesting that properties closer to the institution tend to have higher prices.

**Table 2:** Relationship between the location of the institution and residential property prices.

| **Coefficients** | | | | | |
|---|---|---|---|---|---|
| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| | B | Std. Error | Beta | | |
| (Constant) | 35384.322 | 3685.2 | | 9.602 | .001 |
| Location of the Institution | 5729.137 | 2411.4 | .136 | 2.376 | .018 |
| a. Dependent Variable: Residential Property Prices in Igbo-Ora | | | | | |

Source: Authors' computation, 2025

### 3.5 Relationship between college and tenement rate

This study shows regression analysis which was conducted to examine the relationship between the distance of residential buildings to the college and rent charges in Igbo – Ora. The model summary indicates that the predictor (the distance to the college) explains that there is statistically significant proportion of the variance in house rent. The regression coefficient for the distance to the college (β = 7307.601, t = 2.064, p = .004) suggests that there is a positive relationship between the distance to college and house rent. This means that as the distance to college decreases, there is a corresponding increase in house rent. Controlling for other factors in the model, the standardized coefficient (beta) of 0.118 indicates that a one-unit increase in the distance to the college is associated with a 0.118 standard deviation increase in house rent. These findings support the hypothesis that there is a significant relationship between the distance of residential building to school and house rent in Igbo – Ora. The revelation suggests that proximity of the residential building to college determines the rental prices of the area. However, it is important to note that the effect of building size (R square = 0.14) and other factors which was not included in the model may also influence house rent in the area. In conclusion, the results provide evidence for a significant positive relationship between the distance to college and house rent in Igbo – Ora. This information can be valuable for individuals and other stakeholders involved in the real estate market, urban planning, and educational policy-makers in the region.

**Table 3:** Relationship between the distance to college and house rent in Igbo – Ora.

| **Coefficients** | | | | | |
|---|---|---|---|---|---|
| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
| | B | Std. Error | Beta | | |
| (Constant) | 55895.992 | 5411.99 | | 10.328 | .001 |
| Distance to School | 7307.601 | 3541.30 | .118 | 2.064 | .004 |
| a. Dependent Variable: House Rent in Igbo-Ora | | | | | |

Source: Authors' compilation, 2025

## 4. Conclusion and Recommendation

The study investigates the influence of spatial location of Oyo State College of Agriculture and Technology (OYSCATECH) on land use and land cover changes and property prices on the host community (Igbo - Ora). The finding revealed that the institution (OYSCATECH) was located in 2012 at fringe of the city of Igbo – Ora. As at 2023, the city has sprawl to the college site with some economic impacts particularly on housing price. Similarly, the study revealed a significant relationship between the location of the college and rent charges. Having established the facts that the presence of the institution has influenced land use and land cover of the host community, this study therefore recommend that State Government should regulate human activities around the college site. Additionally, the study also suggests land price regulatory mechanism to reduce the cost of

land, most especially lands around the institution. Similarly, the study also suggests construction of student and staff housing for the comfort of both students and staffs to enhance their security and creation of enabling environment. This will save both students and staff from real estate accommodation extortion and enhance the performance of both students and staff. related cost.

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