



## RESEARCH ARTICLE

### DETERMINANT FACTORS OF LAND USE CHANGE AND CONVERSION

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#### ABSTRACT

Land use alteration occurs when a particular land is changed from the use that was initially allocated due to invasion and succession, economic rents, highest and best use and other factors that incorporates urbanization in its entirety. Many studies have focused on identifying the driving forces shaping urban development patterns, such as urban scale, and rate and location of land use conversions. The study sought to identify the factors influencing land use changes and determine whether the Bid Rent Theory by Alonso is actually at play in explaining the factors responsible for land use changes in different climes. The driving forces of land use change are numerous, multifaceted and interwoven. The study adopted the use of secondary data from journals, research articles, books obtained through printed and online resources. Going by the vast literature on land use change factors, population growth, socio-economic, socio-cultural, technological, and natural factors as well as national policies and globalisation are the recognised motivating factors of land use changes. However, there are other drivers of land use change that are peculiar to developing countries like Nigeria. These include inter-urban migration as well as security and safety considerations. The Bid Rent Theory advocated the Willingness to Pay concept which explains the increase in demand for land and its changes. The identification of these drivers of land use change and conversion and their intricacies will help in terms of policy formulation to improve land use planning activities, sustainably manage land resources, reduce housing deficit and generally improve the lives of the citizens by boosting the national economy.

**Keywords:** Land use, land use change, land use change factors, bid rent, willingness to pay.

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## INTRODUCTION

The complete alteration of particular land use type to other land use types connotes land use change (Tilumanywa, 2022). Land use change has been defined by Trong et al. (2023) as any use or development that is dissimilar to the use last endorsed by the town planning authority. A particular land use can be changed into another one just as land can be changed from a forest to a farmland and then later converted for residential purposes; hence, experiencing a series of land uses (Trong et al., 2023). The outcome of complex interplay between man and his physical surroundings is land use change patterns. Specifically, land use alteration occurs when a particular land is changed from the use that was initially allocated due to invasion and succession, economic rents, highest and best use and other factors that incorporates urbanization in its entirety (Peng et al., 2021).

Many studies have focused on identifying the driving forces shaping urban development patterns, such as urban scale, and rate and location of land use conversions (Zhang et al., 2024). Researchers have used standard Monocentric city models (both closed city and open city models), and extended Monocentric city models to investigate the determinants of urban spatial scale of urbanized areas across the world (Allan et al., 2022). Theoretical models define that four basic factors – population, income, commuting cost, and price of rural land – explain variations in urban spatial scales. Empirical analyses of cities across the world confirm the theoretical derivations with the following results (Allan et al., 2022). For the US cities, the population and income variables have positive and significant effects on the spatial size of urbanized areas; the expenditure on transportation, a proxy for commuting costs, has positive effect on urban spatial scale and thus confirms the predicted negative relationship between urban size and commuting costs; and the higher agricultural land rents surrounding urban areas can result in smaller cities in the United States (Song, 2015).

Sarfo et al. (2022) provided a summary of influencing factors of land use. The factors include demography (population size, growth and density); location (distance to settlements, markets, employment, proximity to the urban structure); economic (returns on land use, commercialization of housing, job growth, cost of land use conversion); social (prestige and opulence, human behaviour and values); land use planning (zoning and tenure); land geographical and geological features; neighbourhood (availability of utilisable sites, developed areas agglomeration); and level of technology available.

This study undertook a review of previous empirical research work done in the aspect of influencing factors of Land Use Changes and Conversion. The study also sought to find out whether the Bid Rent Theory by Alonso (1960; 1964) is actually at play in explaining the factors responsible for land use changes in different climes. The study's methodology follows this section while section three presents the review of empirical literature. The findings are discussed in section four, and section five concludes the study.

## METHODOLOGY

A review of previous research works was conducted where a total of 20 empirical research studies were presented in a table and analysed descriptively. The bulk of the data used for this study was obtained from secondary sources. The secondary data sources used in the course of this study include journals, articles, books, of both printed and online resources.

## THE REVIEW OF EMPIRICAL LITERATURE

The Urban Land Market Theory (Bid rent function) by Alonso (1960; 1964) modelled after von Thünen's theory was widely renowned and is considered as setting the foundation upon which a series of modern econometric tools have been advanced to analyse diverse land use and land value issues. In order to isolate factors attributable to the household's willingness to pay (WTP) for access to the Central Business District (CBD) of an urban centre, Alonso (1960; 1964) employed the concept of bid rent. Bid rents have been defined as the maximum rent that could be paid for an acre of land at a given distance from the market centre, if the activity in contention is to achieve normal profit (Angel et al., 2021).

Alonso (1960; 1964) posited that households make preferences among substitute locations based on the utility or satisfaction that they expect to realize from such choice. The concept of willingness to pay (WTP) to achieve or maintain utility is very relevant to land use and property value studies, since in actuality, what really determines land use is the interest in such land. The said interest consequently creates demand which sustains property values and brings about changes in land uses (Gwamna, Wan Zahari & Ismail, 2015).

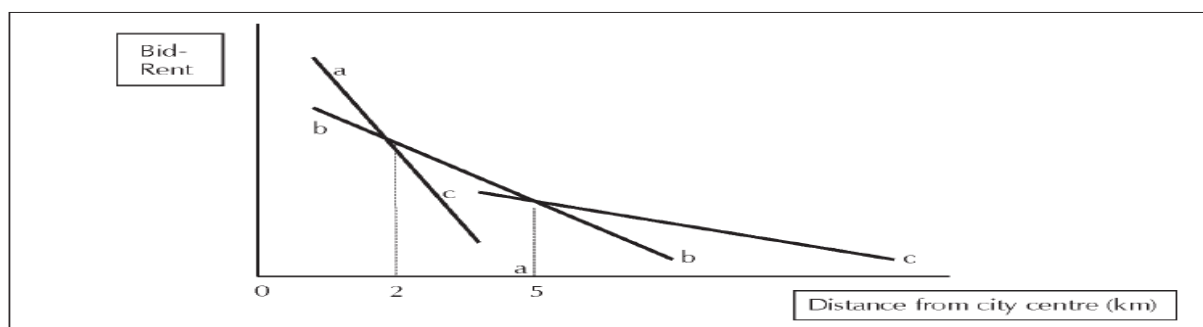


Figure 1: Alonso's bid rent distance relationship (Balchin, Bull & Kieve, 1995).

Land rent manifests itself through the bid rent, or, the maximum amount that any land user would be willing to pay for using that land (Alonso, 1964; Meyfroidt, 2025). Land use extent and intensity change along with bid rent changes, affected by a myriad of factors such as road construction, new technologies, climate change, or property market situations. Such changes move the land use frontier, usually involving the expansion of the more profitable land use (Wu, Mo & Dai, 2022). The driving forces of land use change are numerous, multifaceted and interwoven (Cheng, 2020). Furthermore, they diverge and function within a series of



dimension from local resource administration and utilisation to national scheme to global directions such as international markets and global climate change (Anabestani & Jafari, 2021).

Going by the vast literature on land use change factors, population growth, socio-economic, socio-cultural, technological, and natural factors as well as national policies and globalisation are the usually recognised motivating factors of land use changes (Sipahi & Yilmaz, 2022; Pandya et al., 2023). However, there are other drivers of land use change that are peculiar to places in Nigeria. These include inter-urban migration as well as security and safety considerations (Ajibuah, 2010; Gandu, 2011; Aliyu et al., 2013; Isola-Muyideen, 2025; Alli, Olusola, & Ayobami, 2025).

Empirical works focusing on the driving forces and dynamics of land use change were reviewed in order to highlight the major areas of such works. The review dwelt on issues, research methods, findings as well as this study's authors' comments on them. This is presented in Table 1.

**TABLE 1: Empirical Studies on Factors Influencing Land Use Changes and Conversion**

Author/ country	Issues/ Factors/ Themes	Methods	Findings	Remarks/ Comments
Raharjo 2005 Indonesi a	Factors influencing change of land use from residential to commercial use	Area mapping and descriptive statistics.	Factors influencing land use change were accessibility advantage, high level of profit returns by the proliferation of commercial activities, demographic characteristics, and ambiguous government policy on planning.	The study only analysed tangible factors influencing changes in land use. It did not give regard to the important aspect of property values.
Han et al. 2009 China	Physical and socio- economic factors affecting urban land's spatial distribution	Remote sensing and multivariable stepwise regression	There is increase in urban lands while farmlands are decreasing owing to conversion. Population, economic factors and transportation bringing about growth in urban land use.	The rise in demand for land and increase in transportation activities which influence land uses are all induced by increasing population.
Clark 2010 U.S.A	The political and institutional determinant s of land use change	Conceptual land use model is proposed from previous theories, models & empirical studies	Government affects the demand and supply side by amenities or disamenities, taxation, public transit, subsidies, government land utilization, land conversion costs, rezoning and the release of public land for private use.	The study articulates the role and power of the government in influencing land use patterns.
Swangja ng & Iamaram 2011 Thailand	Land use patterns near Suvarnabhu mi Internationa	GIS themes and layers to map land use patterns, paired T-test to analyse the	Urban expansion and land use change in the form of new property projects occur in areas close to the airport. Also, agricultural lands have been converted mostly for residential purposes.	The study outlines the role of government intervention and projects in influencing land use.



	l airport before and during the airport devt.	changes.		
Li et. al. 2013 China	Land use conversion and identification of drivers of land use change in China.	GIS database on land use to estimate an econometric land use model.	Results portrayed that generally, economic forces such as demand, increasing urban land value, rising wage rates and rising GDP were the major drivers of land use changes in China.	Economic forces exerting influence on the dynamics of land use.
He et. al. 2013 China	Economic growth as driver of land use change	Correlation analysis and Structural equation analysis	Agricultural land has been converted for urban, transportation and industrial use. Found strong association between land use change and GDP expansion. Analysis indicated that economic growth drive land use change.	Economic forces exerting influence on the dynamics of land use.
Alam 2014 Bangladesh	Land use pattern determinants and their corresponding changes over time	Cross-sectional data using questionnaire and focus group, logistic regression and cost-benefit analysis	Agricultural land has been converted for settlement purposes and the building of roads, communication and business infrastructure. Economic benefits, neighbourhood land use, family demand and land use cost (rent) affecting land use decisions on individual basis.	Residential land use and infrastructure provision crowding out agricultural land use.
Kamh et al. 2012 Egypt	Urban land cover change in the Hurghada area.	GIS and remote sensing coupled with socio-economic data.	Coastal tourist activities, population growth/pressure and city location were the foremost factors behind the development and extension of the urban area.	Human and environmental factors at play in influencing land use change.
Tiluman ywa 2013 Tanzania	The major changes in land use and the factors accountable for such changes.	Employed both qualitative and quantitative approaches. Interviews, questionnaire, observation and satellite imageries.	Demographic, socio-economic, socio-cultural, natural and political factors responsible for the changes in land use. Government policies have also played a part in this regard.	The study revealed the complex and intricate interplay of the factors influencing land use change.
Appiah et. al. 2014 Ghana	Effects of Peri-urbanization on land use change patterns	Pearson's Chi-square and step-wise logistic regression modeling	Increasing rate of peri-urbanization caused by rising demand for residential, recreational and commercial land uses to the detriment of agricultural land uses.	Urbanisation with increasing population that creates demand for land.
Adebayo 2009 Nigeria	Impact of urban land use changes on property rental values.	Simple descriptive statistics.	Major land use change determinants were demand and supply factors. Others were complementarity, accessibility, and infrastructural facilities. The land use conversions had prompted parallel changes in property values in the study area.	Only descriptive statistics were used for data analyses which were inadequate for a study of such magnitude.
Sunday 2011 Nigeria	Assessment of land use changes in Abuja.	GIS to map the changes and then Chi-square and T-test to validate the findings	The major factors causing land use changes were land commercialization and capitalization, and increase in rural-urban drift.	Land speculation and rural-urban migration influencing land use in a developing country.





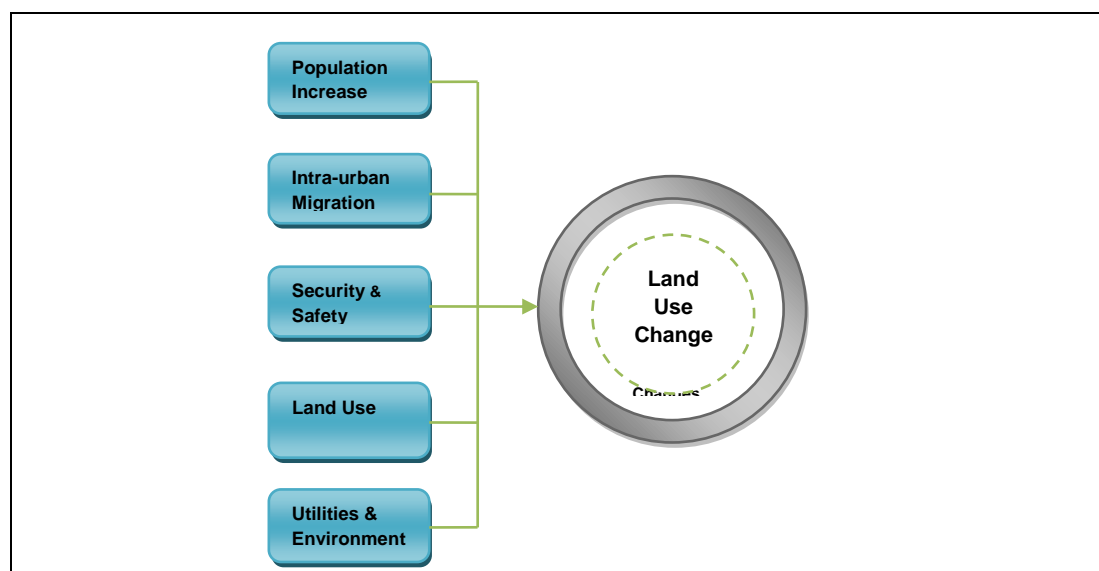
Ndabula et al., 2013 Nigeria	The dynamics of land use and land cover change in Kaduna.	GIS and remote sensing applications were used to map the changes.	The main influencing force of the land use changes was the socio-economic factor of urbanization processes such as emergent population, economic, technological and institutional growth.	Urbanisation processes with its attendant urban sprawl and changes in land use.
Oduwaye 2013 Nigeria	Implications of changing land use structure on land use develop.	Factor analysis and principal components Analysis (PCA)	Infrastructural and economic factors were the important factors influencing how land is used. Major determinants of residential development are accessibility, infrastructure (road) and land value.	Availability of infrastructure aided and complemented property development bringing about land use changes.
Saleh et al. 2014 Nigeria	Agricultural land use change and the driving forces of land use change.	GIS and remote sensing to determine the degree of agric land-use change from 1980 to 2012.	Agricultural land had decreased significantly. Major driving forces of land use changes were increase in population, urban growth, socio-economic and political factors, environmental factors; inadequate land use planning and non-enforcement of planning laws/ development control.	Built-up areas had largely taken over farmlands due to demand occasioned by population increase and other factors.
Wizor 2014 Nigeria	Dynamics of residential development in Port Harcourt.	GIS approach	Croplands had been converted to residential use. Residential land use one of the prominent land uses in the northern and eastern parts of the metropolis.	Demand for land for residential purposes causing land use conversions.
Oruonye, 2014 Nigeria	Impact of road construction on land use pattern	ANOVA and simple descriptive statistics	Rise in values of property near newly constructed roads. Complementarity of the new roads attracts people to the area and creates new demand for property.	Road construction opening up an area and bringing about land use intensity around that area.
Adzandeh et al., 2014 Nigeria	Factors causing urban growth and expansion.	Remote sensing and Markov chain model.	Built-up areas have encroached into vegetation areas. Factors responsible for this are population increase, rural-urban drift, proliferation of commercial and trading activities, and the emergence of educational institutions.	The distinct feature of a dynamic city is inevitable changes in land use. All human activities require land but land is physically limited in supply resulting in some uses dislodging others.
Saleh 2021 Nigeria	Impact of Land Use Conversion on Socio-Economic Development	Data on the factors of land use conversion, socio-economic benefits of land use conversion and land use conversion challenges were collected	Economic gain, increase in land value, and rental increase were found to be largely responsible for bringing about land use conversions.	Residential land use conversion to commercial land use type is the highest type of conversion in the study.
Ankeli 2024 Nigeria	Influence of land use conversion on property rental values	Structural Equation Model and ANOVA	Economic factors were the major factors influencing land use conversions	Ineffective institutional framework gives rise to unabated illegal land use conversions.

## DISCUSSION

From the review of literature, a number of factors are responsible for land use change. Population increase is one of the main factors influencing changes in land use (Han et al., 2009; Kamh et al., 2012; Tilumanywa, 2022; Appiah et al., 2014; Sunday, 2011; Ndabula et al., 2013; Adzandeh et al., 2014, Ishaya et al., 2015).

In their separate studies, Kwan (2011), Akbari and Aydede (2012), Accetturo et al. (2014) and Qiang (2014) discovered that land use changes occur when people of homogenous groups migrate within the same city to live near themselves. While Plantinga et al. (2013), Frenkel et al. (2013) and Yi and Lee (2014) have proven that people intra-migrate in an urban area due to their desire for more space and accessibility promoting urban expansion and land use changes in the process.

Another prominent factor influencing land use changes is security and safety considerations. Households generally prefer to reside in more secured and safe places. The willingness by such households to pay for utility in the form of security and safety creates demands and land uses are changed to supply those demands (Vetter et al, 2013; Lee et al., 2014).



*Figure 2: Factors influencing Land Use Changes and Conversion*

Studies by Clark (2010) and Ndabula et al. (2013) have shown that land use planning influences land use change by urban planning policies of development control and zoning. Inversely, the mass movement of people into a particular area in a city results in indiscriminate land use changes as there will be distortions of laid-down land use plans (Aliyu et al., 2013; Enisan and Aluko, 2015).



The preference for areas with public utilities and good environment makes people to demand for residence in such places leading to land use change (Adebayo, 2009; Oduwaye, 2013; Ndabula, 2013; Oruonye, 2014). Huang et al. (2015), Ajibola et al. (2013), Udoka (2014), Saleh (2021) and Ankeli (2024) further buttressed that fact by finding out that such desires keeps creating demand leading to increases in rental prices and subsequent land use changes.

## **CONCLUSION**

Population increase, intra-urban migration, security and safety considerations, land use planning, and public utilities and good environment have been shown to be the major drivers of changes in land use.

The Urban Land Market Theory (Bid rent function) by Alonso (1960; 1964) is applicable in explaining the factors responsible for land use changes in different climes. It is clear that the Willingness To Pay (WTP) for utility by land users creates more demand for land use and this results to higher demand land uses crowding out lower demand ones due to inelasticity in supply of land over a short period of time. This particular situation brings about changes in land uses both legally and illegally.

Land users derive utility in different and diverse ways. Some prefer to live alongside their kith and kin, some prioritize security and safety of neighbourhoods, some have an affinity for aesthetics and well-planned locations; while others are particular about the availability and condition of public utilities and the general environment before they decide to take residence in certain places.

The identification of these drivers of land use change and conversion and their intricacies will help in terms of policy formulation to improve land use planning activities, sustainably manage land resources, reduce housing deficit and generally improve the lives of the citizens by boosting the national economy.

## **Competing Interest**

The author declares that no conflicting interest exist in this manuscript.



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