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RESEARCH ARTICLE

ASSESSING THE EFFECTS OF AGRICULTURAL LAND CONVERSION TO URBAN DEVELOPMENT PATTERN IN BIRNIN KEBBI, KEBBI STATE

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ABSTRACT

This paper seeks to assess the effect and consequences of agricultural land conversion to urban development in Birnin Kebbi, Nigeria. The study assessed the factors inducing agricultural land conversion to urban development. This study therefore used the focus group discussion. The qualitative data was analyzed using content analysis to assess the effect of agricultural land conversion to urban development in Birnin Kebbi, the Kebbi State capital. The creation of Kebbi State in 1991 and Birnin Kebbi as the state capital results to rapid loss of agricultural lands ranging from rainfed, irrigated, grasslands and forest areas as a result of development. Over 60% of the agricultural lands were loss as a result of development. However, for several decades, rural and urban planners have advocated policies to encourage consolidated forms of development as one strategy to protect agriculture and preserve open space. The true repercussions of Birnin Kebbi's transfer of agricultural land to urban growth have not received much empirical study up to this point. The goal of this study is to close that gap by concentrating on Birnin Kebbi, the capital of Kebbi state. In order to incentivize farmers to continue producing, the paper suggested that government supply agricultural inputs at a subsidized rate and that each time land is taken from a farmer, the farmer should be given another piece of land and receives cash compensation. There should be a body in place to plan the land use in Birnin Kebbi; zoning regulations should be followed to decide how specific land should be used.

Keywords: Land use/Land cover, Conversion, Urbanization, Agricultural Land.

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1.0. INTRODUCTION

Humans must continue to survive on Earth, and the environment has a significant impact on how well they live. The biophysical characteristics of land are altered, and the reasons for these changes are illustrated by land use (Etim, 2021). Building construction and unforeseen disasters like floods are examples of the interwoven complex of natural and human processes that drive land use change, which is a collection of biophysical changes to the land surface and water bodies that ultimately seize control of the lands of the inhabitants (Edewede, 2018). The time period under investigation, the geographic region, the type of land cover, and the ongoing human activity all affect how much land use is changing (Etim, 2021).

According to Raworth (2018), "to meet the needs of the people within the means of this extraordinary, unique living planet so that humanity and the rest of nature can thrive" is clearly the ultimate purpose of a man in the twenty-first century. The majority of the problems facing the world are caused by the growing global population. Currently, 54% of people live in cities worldwide, and by 2030 and 2050, that number is predicted to increase to 60% and 66%, respectively, as the globe continues its trend toward urbanization (UN 2022).

Urbanization is characterized as a revolutionary shift in the land cover and use of a specific area that results in the growth and territorial extension of undeveloped areas. Urbanization typically takes place in both temporal and spatial contexts, and it is primarily impacted by three factors: natural growth, migration from rural to urban areas, and reclassification of rural areas as urban. Khan and colleagues (2014) acknowledged Pham and Vamaguchi's 2011 work.

Following the industrial revolution, there was a notable change in the global population distribution towards urban centers. Global urbanization increased dramatically and unprecedentedly in the 20th century due to new economic opportunities and an improved standard of living in metropolitan areas. In general, Nigeria's urban population trend has grown in line with global urban population projections. There were 123,701,699 people living in urban areas of the nation in 2023, up to 3.57% from 2022 (MacroTrend, 2023).

2. CONCEPTUAL AND THEORETICAL FRAMEWORK

2.1. Conceptual Background

In order to clear any ambiguity in the usage of words in this paper, concept related to the research were defined.

2.1.1. Urban Development

Urban development is the use of land by humans for commercial, industrial, residential, agricultural, and transportation purposes that significantly changes the natural environment or has an impact on the ecosystem. It communicates advancement and success. It is an inevitable consequence of economic expansion. Another concern is how and where development occurs. For instance, clearing land and building structures can worsen runoff and erosion, disrupt wildlife habitat, and cause environmental issues both on and off-site. There is no guarantee that those issues will be mitigated (UNFPA, 2007).

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The process of urbanization can be defined as the conversion of rural lifestyles into urban landscapes. It also specifies structural and lateral changes that lead to a new pattern of the landscape. Rimal (2011) asserts that urbanization is a process of greater system modernization that alters socioeconomic activity and transforms land use patterns in accordance with time. Also, Modica (2012) defined urbanization as a complex diffusion process, that result into dramatic spreading and variously affecting rural landscape at varying spatial scales.

The increase in the percentage of the population living in urban areas over time is known as the rate of urbanization, and it is determined by subtracting the growth rate of the urban population from that of the overall population. The population of urban areas may increase more quickly or more slowly than the overall population. In quest of employment opportunities and other types of prosperity, a growing number of individuals from rural areas moved to towns and cities as they grew in size. This trend is known as urbanization. Since towns and cities are primarily sites where human wants, ideas, ambition, and aspirations are realized, the majority of cities see population growth through migration rather than natural rise. This movement of people into urban centers is an objective anticipation and desire to have a better life (Scatterthwaite, 2005).

The process of moving from a rural to an urban setting is called urbanization. A nation's degree of urbanization typically dictates its degree of economic growth and development (UNFPA, 2007). Therefore, as urbanization is a natural byproduct of the recent history of human population growth, it can be simply concluded that it is inevitable. Urbanization has been linked to greater human development, higher wages, and higher living standards, according to the United Nations (2010) report on the state of African cities.

Although rapid urbanization can be both a blessing and a curse, a region may be burdened by the phenomenon unless strong, prompt, and clear policy action is taken. Through the case study of evolution, urban centers in the Savannah region of Nigeria may uncover several developed mechanisms that have a significant impact on modern urban life. It is clear from examining the successes of urbanization that the processes that have evolved produce a wide range of outcomes. These include dynamic town expansion based on high construction activity and its structural and functional development, which leads to a spatial divergence of centrality, as well as strong economic display and an increase in social living standards (Balzerek, 2003).

2.1.2. Urban Land Expansion

Urban land expansion refers to the spreading out of a city and its suburbs towards non-built-up areas at the periphery of an urban area; involving the conversion of other land uses into built-up land over time. Urban land expansion is the most easily identifiable characteristic of urbanization process as it affects land use/cover at both regional and global scales. (Liu, Zhan and Deng 2005)

2.1.3. Agricultural Land

Although it can also include animal husbandry, medicinal cultivation, and decorative production, agriculture is the term used to describe both commercial and non-commercial food production. The systematic rearing of plants and animals for the production of food, feed, fiber, fuel, and other products is known as agriculture. It includes ranching, grape and orchard care, and farming.

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Agriculture is typically defined as the cultivation and tillage of a field's soil to create a suitable seedbed, eradicate plant development, and enhance the soil's physical characteristics (FAO, 2003).

The portion of land that is arable and covered in permanent pastures and crops is referred to as agricultural land. The FAO defines arable land as land under market or kitchen gardens, land temporarily fallow, and land under temporary crops (double-cropped areas are counted once). Permanent crops are those that are grown on land that require no replanting after each harvest and take up residence for extended periods of time, like cocoa. Coffee and rubber. property under fruit trees, vines, flowering shrubs, and nut trees falls under this category; however, property under trees planted for lumber or wood is not included. Permanent pasture is defined as land used for crops, both natural and cultivated, for at least five years (FAO, 2003).

2.2.0. Theoretical Framework

2.2.1. Urban Ecological Theory

According to urban ecological theory, cities operate similarly to ecosystems, with individuals, organizations, and activities interacting and vying for resources and space. It sees the city as a natural system that, like ecological processes in the natural world, is affected by population dynamics, competition, and environmental pressures. It was among the first and most important ideas applied to the study of social behavior, land-use distribution, urban expansion, and spatial patterns. Early in the 1920s and 1930s, Roderick McKenzie, Ernest W. Burgess, and Robert E. Park developed the Chicago School of Sociology's Urban Ecological Theory. They used ideas from the ecology of plants and animals to human urban areas. It developed as a result of America's rapid urbanization in the early 20th century, an increase in immigration to cities, and new trends in crime, poverty, and segregation.

Although it was criticized for being overly deterministic and ignoring social inequality, Urban Ecological Theory made a significant contribution by introducing a scientific, methodical study of cities, explaining urban social patterns, and understanding segregation, slums, and industrial zones. This theory will be helpful to the study by applying its principles to understand how human, spatial, and environmental factors interact as Birnin Kebbi grows, as well as how land users (residential, commercial, and industrial) compete for land, especially near the city center.

2.2.2. Urban Land Rent Theory

Urban economic theory is based on the urban bid-rent model, which describes the cumulative effects of changing urban land usage. The distance to a city center is a single factor that determines land rentals and the spatial distribution of various land uses, according to the conventional bid-rent model. Commercial, industrial, and residential land users' willingness to pay varies according to the site's distance from the city center (CBD), as explained by the Urban Bid Rent Theory. The hypothesis demonstrates how land-use patterns are shaped by the decline in land values with distance from the CBD. The "Isolated State" model developed by von Thünen contains the earliest concepts of bid rent. He described how the cost of transportation causes farmers to bid higher for land near markets. He described how transportation expenses cause farmers to bid more for land near markets.

His model introduced the first spatial rent notion, despite being rural, and demonstrated how land value is influenced by distance and transportation costs. In his 1964 book "Location and Land Use,"

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William Alonso, the pioneer of the urban bid rent theory, developed the first formal Urban Bid Rent Curve and modified von Thünen's model for a contemporary metropolis. This project would construct and empirically execute a spatial land use model based on the bid-rent model to comprehend the conversion of agricultural land covers, industrialization, urban expansion, and the change in the geographical scale of cities.

3. MATERIALS AND METHODS

3.1. Study Area

The study area is located on the North West axis of Kebbi State, further downstream along the extensive valley of the Rima River. The city is located between latitude 12º 15'N to 12º 35'N and longitudes 4º 01'E to 4º 38'E and has a total landmass of 86.5 sqkm It is bounded by Argungu in the north-east, Kalgo, Jega and Aliero to the west, Gwandu to the east and Arewa/Dandi Local Government to the north-west. Birnin Kebbi has 15 political wards. (Figure 1)

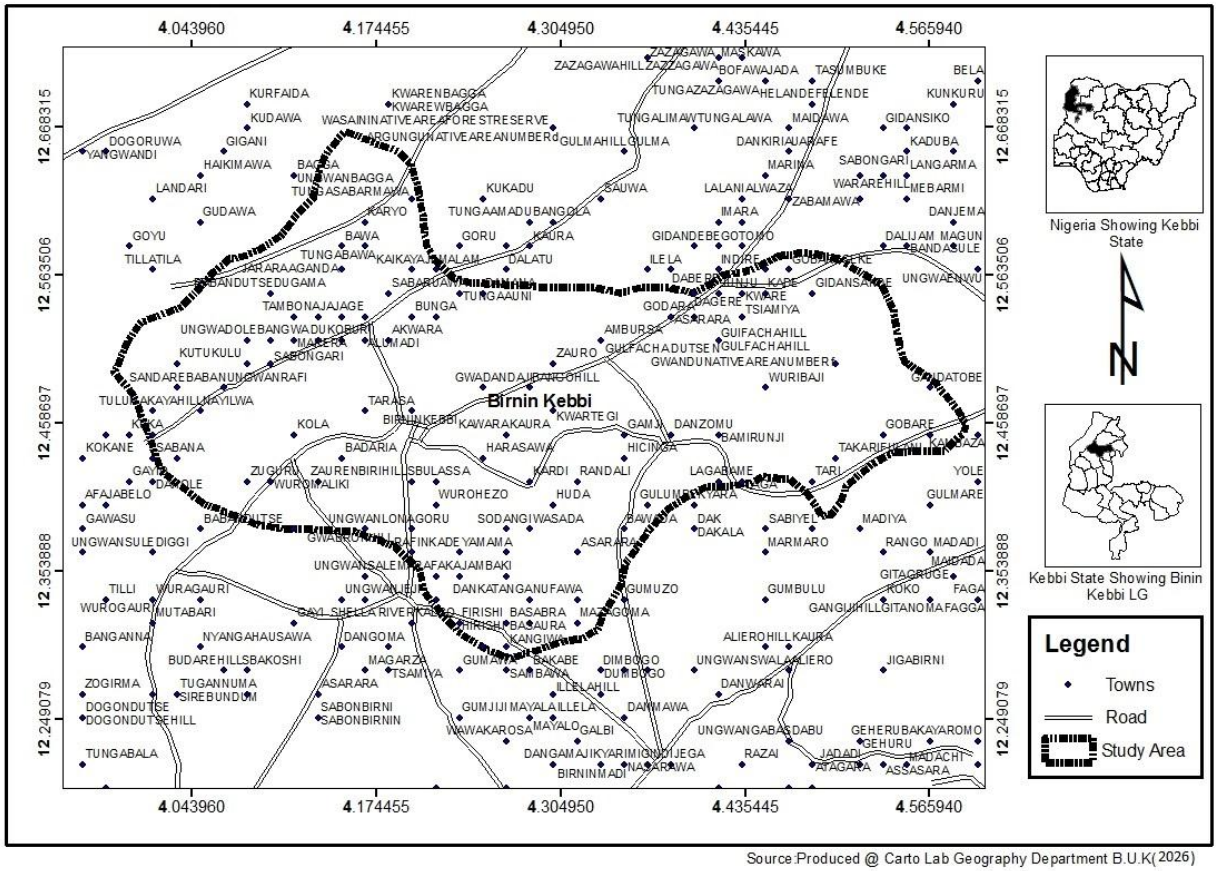

Figure 1: Birnin Kebbi LGA, Kebbi State.

3.2. Research Design

The research methodology used in the study was a qualitative survey. Participants' verbal input is the form of qualitative data that was gathered through focus group discussions with the following: Officials from the Kebbi Urban Development Authority (KUDA), the State Ministry of Land and

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Housing, the Ministry of Works and Transportation, and the Ministry of Agriculture and Natural Resources in Kebbi State, as well as farmers from the nearby community. This government organization is in charge of approving housing unit building, land development, and certification. The approach is suitable for determining the main effects of agricultural land conversion, the reasons that lead to its conversion to other uses, and the policy measures that should be taken to address the issue.

3.3. Data Analysis

The data gathered from the FGD was analyzed using content analysis, which is the proper and generally recognized technique for doing so. Eight people, including the researcher and a research assistant, participated in each of the two focus group discussion sessions. The first involved Kebbi State stakeholders, including representatives from the Ministry of Land and Housing, the Ministry of Agriculture and Natural Resources, the Ministry of Works and Transportation, and the Kebbi Urban Development Authority. Five farmers from the adjoined communities and a representative of the local traditional authority attended the second session. The FGD session was used as a tool to gather information about the main causes of land use change in the region, the main effects of the conversion, and the main policy measures that should be implemented to lessen the conversion's likely effects.

4.0. RESULT AND DISCUSSION

4.1. Drivers of Conversion of Agricultural Land to Urban Development

In line with economic growth and development, Birnin Kebbi town, the capital and headquarters of Kebbi state, has seen an increase in commercialization, industrialization, and city growth due to the rapid population growth and migration of people from the former Sokoto state and neighboring countries like Niger and the Benin Republic. A shift in the city's status, a quick increase in the population, and high agricultural output all contributed to the city's and the economy's growth. People in the area mostly engage in farming and cattle keeping as socioeconomic activities and sources of income.

As a result of civil personnel moving from the former Sokoto state to Kebbi State in 1991 and making Birnin Kebbi the state capital, the population of Kebbi State increased rapidly, necessitating the construction of new office space, residences, a big market, motor parks, schools, hospitals, and other facilities. The state house of assembly in 1993, the New Gwadangwaji administrative complex, and the Kebbi Agricultural and Rural Development Authority in 1991 are some of the significant projects that have been established since the state's founding in 1991. The 300 homes in Gesse Phase I in 1993, the Director General's and Gwadangwaji's quarters, the Central Market and Central Motor Park, Nagari College, and the township roads heading from Gwadangwaji to the Ahmadu Bello Way and Government House roughly to Birnin Kebbi's center market, Emir Usman Road, and Sani Abacha Bye Pass between 1993 and the present. 200 homes were built at Gesse Phase Two in 2001; 681 Aliero Housing Estate in 2003; Polo Ground in 2002; and Abdullahi Fodio Islamic Institute in 2006.

The National Fadama Project (i, ii, iii, and iv) began agricultural development initiatives with Fadama 1 from 1993 to 1999, Fadama 2 from 2004 to 2009, and Fadama 3 and 4 from 2009 to the present. The CBN Anchor Borrowers Initiative in 2015, the Community-based Agricultural and Rural

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Development Project, and the National Agricultural Technology Support Program from 1993 to 1999. In Kebbi State's capital city, urban expansion has resulted in the loss of more than 60% of agricultural land. For agricultural purposes, people have relocated to remote locations throughout the state, including Kalgo, Jega, Argungu, Gwandu, Gulumbe, Ambursa, etc. The new secretariat building, the Polythecnic new side,

Haruna Rasheed College, Gesse Phases 1 and 2, Gwadanwaji quarters, Aliero Housing Estate, Dr. Amina Abubakar College, the central motor park, and the central market were all once agricultural lands that have since been lost to development. New satellite areas such as Bayan Kara, Behind Presidential Lodge, Gangaren Ama, Badariyya Kola road, Gorun Chindo, and Gesse Bayero, among others, were made possible by the relocation of communities or individuals who were displaced due to road building and other developmental initiatives. After the state was established, the necessity for large-scale development projects took on a new dimension. This was due to the requirement to provide office space and housing estates for civil personnel who had been moved from Sokoto State in order to fully resume state operations.

The majority of agricultural lands were converted to uses related to the expansion of cities, populations, and economies as a result of the development process. This is the primary form of land use and land cover change in human history. In general, metropolitan environments absorb more solar radiation and have a larger thermal capacity and conductivity, which allows heat to be retained during the day and released at night. This has a significant impact on the climate because of the impermeable surface created by buildings, roads, and other structures. As a result, temperatures in metropolitan regions are typically greater than in nearby rural areas. Due to significant movement from rural to urban Birnin Kebbi, the population grew quickly, leading to urbanization. Green spaces are destroyed as a result of unplanned and, consequently, unregulated urbanization (city and rural area development). In contrast, the results of Azuma, Bianca, and Thompson (2014), who view residential development as the primary driver of land use change, show how rural residential development affects forest communities in Oregun and Washington.

There are several ways in which this kind of development might impact the products and services that the forest offered to the area. Because the study's focus was on rural residential growth, it did not examine other land uses in the region, such as commercial, industrial, or recreational activities, as drivers of land use change.

Table 1: Factor Inducing Conversion of Agricultural Land to Urban Development

a.	The necessity for additional housing when the state was established in 1991, such as Gesse Phase 1, DGs quarters, and Gwadangwaji quarters.
b.	b. The state's establishment of significant agricultural initiatives, including as the Community-based Agricultural and Rural Development Project, the Fadama Project, and the CBN Anchor Borrower Scheme.
c.	The requirement for additional buildings for office space following the state's establishment in 1991
d.	Economic growth and population expansion are combined because the region is now the state capital.
e.	A large number of people are moving from rural to urban Birnin Kebbi.
f.	The conservation of agricultural land in Birnin Kebbi is hampered by lax implementation of zoning laws and land use policies.

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4.2. Consequences of the Conversion of Agricultural Land to Urban Uses.

The loss of agricultural land as a result of urbanization was one of the main effects. The establishment of Kebbi state with Birnin Kebbi as the state capital has drawn a large number of residents, which has aided in the city's physical growth.

Due to the ensuing repercussions, farmers are forced to relocate for farming, usually to nearby villages or local governments, which results in high transportation costs and other expenses which ultimately cause them to lose money. Another significant issue is that it causes increased farm produce due to labor and transportation costs, and it also lowers farmers' crop output levels because most large-scale farmers are now unable to produce much because most of their farms have been converted to other land uses. The findings of Enisan and Adeyemi (2013), "Effect of agricultural practices on residential land use," are consistent with this. They examined the negative consequences of residential development on the immediate environment, and to other land use especially agricultural land use.

Table 2: Major Consequences of the Conversion of Agricultural Land to Urban Uses

a.	The loss of about 60% of agricultural lands as a result of development
b.	It results in an increase in farm produce due to labor and transportation costs.
c.	To conduct farming operations, farmers must relocate to neighboring LGAs.
d.	It results in a decrease in the amount of crops that farmers produce because most farmers who once farmed big hectares are now unable to produce much because the majority of their farms have been converted to other land uses.
e.	Both farmers and the consumers depend on food brought from other places, which is expensive to buy.
f.	As a result of increased erosion, flooding, and decreased soil fertility brought on by building construction, farmlands are lost.

4.3. Developmental Strategies to be adopted

Among other developmental measures, the government should intervene by establishing agricultural areas for farming, fishing, animal husbandry, and grazing reserves in order to lessen the loss of agricultural land to urban land uses. These places ought to be included in the states' master plans for development. Second, it should be standard procedure to give a farmer another plot of land and cash compensation for any land taken from them in order to motivate them to continue producing. High-tech farming, such as backyard and rooftop nursery/farming, should be promoted by the government and other pertinent agricultural sector partners, and agriculture should be mechanized as it is in the majority of developed countries. Additionally, the government ought to establish a high-level technical committee to address the aforementioned situation.

This result is consistent with Enisan and Adeyemi's (2013) study, "Agricultural practices' impact on residential land use." They looked at the economic, social, and positive effects of residential development as well as the drawbacks for other land uses and the surrounding environment. They stressed that the primary focus of future planning should be sustainable development, which

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necessitates, among other things, having sufficient understanding of and sensitivity to the management of natural resources. Sustainability broadens the definition of development by acknowledging the ecological constraints placed on accomplishing a particular set of development goals.

Table 3: Developmental Strategies to be adopted

a. The establishment of agricultural preservation zones for farming, fishing, animal husbandry, and grazing reserves is an example of government action. Legal protection against non-agricultural development is necessary for this farmland.
b. High technical farming, such as backyard, rooftop nursery/farming, and mechanized agriculture, should be promoted by the government and other pertinent agricultural sector partners.
c. Create urban growth boundaries to direct city expansion into land that is already less productive or deteriorated.
d. It should be a rule that if a farmer's land is taken, they should be provided another piece of land and paid to keep them producing.
e. The government should also form a high-level technical committee which should work on the implementation of the planning regulations.

5.0. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

In conclusion, the results of this study show that while agricultural land conversion in Birnin Kebbi has produced short-term economic benefits, it also poses serious long-term dangers to food security, environmental sustainability, and planned urban expansion. The establishment of significant agricultural projects in the state, such as the Fadama project, the CBN Anchor borrowers scheme, the Community based Agricultural and Rural Development Project, among others, and the need for additional office space following the state's creation in 1991 are the main factors driving the conversion of agricultural lands. The main effects of agricultural land conversion are the loss of almost 60% of farmland due to development, increased price of farm produce due to labor and transportation costs, and the necessity for farmers to relocate to neighboring LGAs in order to continue farming. Participants underlined the pressing need for legislative actions to support sustainable land use planning and safeguard agricultural land.

5.2. Recommendations

Creating agricultural areas for farming, fishing, animal husbandry, and grazing reserves is one example of a planning policy that the government can implement. This suggests that there should be a government agency tasked with deciding how land should be used for purposes that could harm the environment.

Second, it should be standard procedure to give a farmer another plot of land and cash compensation for any land taken from them in order to motivate them to continue producing. High-level technical

farming, such as backyard, rooftop nursery/farming, and mechanized agriculture, should be promoted by the government and other pertinent agricultural partners.

In Birnin Kebbi, there should be a body that enforces defined land use policies. Zoning laws and urban growth boundaries are examples of legal frameworks that should be used to decide what uses certain land should be put to in order to boost development demands while maintaining food security.

Conflict of Interest

The authors declare that no conflict of interest exist in this manuscript.

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