

# LAND USE CHANGE AND ITS EFFECTS ON SUBURBAN AGRICULTURE AND FOOD PRODUCTION IN LAGOS STATE

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## ABSTRACT

This review article synthesises existing data (remote sensing data, institutional policy documents, and peer-reviewed literature), the study documents the conversion of cultivable suburban farmland between 1984 and 2024, the structural inadequacy of existing extension frameworks, the agronomic vulnerabilities of surviving smallholder farms, and the emerging policy responses of the Lagos State Government. The rapid urbanisation in Lagos, one of Africa's largest megacities, is exerting severe pressure on the agricultural land base of its suburbs and suburban localities, with far-reaching implications for food production, agronomic practice, and the effectiveness of agricultural extension services. This article reviewed the various works and reports on land use patterns in the four suburbs of Lagos, namely, Badagry, Ikorodu, Epe, and Ibeju-Lekki, Local Government Areas (LGAs) of Lagos State, and examines how these alterations to cultivable arable lands affect food production prospects for the state. From the secondary data that was appraised, evidence indicated that the available lands in the three LGAs are inadequate for food production. Hence, the article suggests that without coordinated land use protection, reformation of extension service delivery, and adoption of climate-smart agronomic strategies, Lagos faces a deepening food security crisis that cannot be resolved by imports alone. Hence, it may be suggested that the policy recommendations should centre on land reservation legislation, intensification of the Lagos State Agricultural Development Authority's extension services, integration of digital agronomy, and intergovernmental food system partnerships.

**Keywords:** Food production, Lagos State, Land use change, Suburban agriculture

## Introduction

Lagos State, with a population exceeding 20 million and a growth rate of 3.2 per cent per year, represents one of the most complex urban food system challenges in sub-Saharan Africa. As a megacity of global significance, Lagos consumes vastly more food than it produces, currently meeting less than 20% of its food needs through local agricultural activity (Osayomi & Lawanson, 2022). According to Lagos State Ministry of Agriculture and Food Systems (2022), the deficit is filled predominantly by imports from other Nigerian states and, increasingly, from international markets. This dependency renders the state acutely vulnerable to supply chain disruptions, inflation, and geopolitical volatility.

The geographical landscape of Lagos State is characterised by sixteen Local Government Areas, metropolitan core bordered by four suburban local government areas, such as Ikorodu, Epe, Badagry, and Ibeju-Lekki, which historically constituted the agricultural locality of the metropolitan area (Abiodun & Shotuyo, 2020). These farming zones have served as production centres for vegetables, cassava, maize, poultry, fisheries, and livestock. However, they are increasingly being engrossed by the expanding urban frontier, driven by population pressure, driven by housing demand, improved transport infrastructure, and inadequate development control (Sumbo, Lasisi, & Oyinloye, 2025).

Agricultural extension services, delivered principally through the Lagos State Agricultural Development Authority (LSADA), remain the primary institutional mechanism for transferring agronomic knowledge to Lagos farmers. However, the effectiveness of this system is constrained by chronic underfunding, inadequate staffing, and structural tensions between urban planning priorities and food production mandates (Tajudeen Omotayo, Ogundele & Rathbun, 2022). The 2021 five-year Agricultural and Food Systems Roadmap, with a target 40% self-sufficiency in food production by 2025, articulates ambition but faces serious challenges to implement in a state where the physical land base for agriculture continues to be encroached by urbanisation projects (Olusanya, 2024).

There is evidence that backs up these land use activities of Lagos state, as produced from remote sensing analyses, institutional data, peer-reviewed studies, and policy documents to provide a comprehensive assessment of land use patterns in Lagos suburbs and their implications for agronomy, extension service delivery, and food production prospects.

This article reviewed the theoretical framework and examined land use change dynamics, analysed its agronomic implications, evaluated extension services, assessed food production prospects, and presented conclusions and policy recommendations based on available secondary data consulted as evidence.

### **A Review of the Dynamics of Land Use Change in Lagos Suburban Areas**

According to Adedayo and Fasona (2024), multi-temporal satellite-based investigations have consistently demonstrated that Lagos State is experiencing rapid agricultural land decline driven by urban expansion and Suburban conversion processes. Analysis of Landsat imagery for 1984, 2013, and 2024 revealed a progressive and accelerating loss of metropolitan farmland across Lagos State. It was reported that farmland area declined by 13.03% between 1984 and 2013, during which approximately 89.48% of cultivated land was converted to alternative land uses. Furthermore, in their findings, it was observed that the rate of decline intensified between 2013 and 2024, with an additional 21.79% reduction in farmland area and approximately 73.51% of the remaining agricultural land was converted to non-agricultural uses. The Normalised Difference Vegetation Index (NDVI) analysis further demonstrated a deterioration in the ecological condition of surviving urban farmland, indicating that agricultural land loss in Lagos is accompanied by declining vegetation health and environmental quality on remnant cultivated parcels (Adedayo and Fasona, 2024).

The studies on the spatial dynamics of land conversion in Lagos by Abiodun and Shotuyo (2020) further indicated that agricultural land fragmentation is concentrated within

Suburban Local Government Areas. In the studies, GlobeLand30 datasets and FRAGSTATS landscape metrics identified Ikorodu, Epe, Badagry, and Ibeju-Lekki as major hotspots of cultivated land fragmentation resulting from metropolitan expansion pressures. It was further reported that farmland fragmentation in these Suburban zones is largely associated with the outward spillover of economic and demographic pressures from the Lagos metropolitan core. According to the report from the studies, agricultural land in the urban core has almost disappeared entirely, and diversity metrics increased because remnant vegetation patches became increasingly interspersed with built-up surfaces. Furthermore, it was observed that in rural and Suburban LGAs, fragmentation of cultivated land intensified due to the conversion of farmland into residential and light-industrial developments stimulated by urban demand (Abiodun and Shotuyo, 2020).

Rapid urbanisation has also been identified as a major driver of agricultural land depletion in Lagos State. According to Faisal, Wu Yue, Ghali, Roknisadeh, and Akram (2021), the urbanised area of Lagos increased from 495.91 km<sup>2</sup> in 1990 to approximately 1,255.91 km<sup>2</sup> in 2020, representing an increase from 13.52% to 34.24% of total land cover within thirty years. Faisal et al. (2021) concluded in their report that this substantial expansion of residential land occurred largely at the expense of vegetated and agricultural surfaces.

In similar studies, according to Muchelo, Thomas, Sabastine, and Stephen (2024), Ibeju-Lekki has undergone rapid spatial transformation driven by residential expansion linked to Lagos housing deficits. They further documented that accelerated residential encroachment occurred between 1980 and 2016 using multi-temporal spatial imagery analysis. Furthermore, their results showed that although Badagry and Epe still retain considerable agricultural potential, both areas remain vulnerable to similar urban conversion pressures in the absence of effective land-use planning interventions (Muchelo, Thomas, Sabastine, & Stephen, 2024).

#### **Agronomic Implications of Suburban Land Use Change in Lagos State**

According to Afripoli (2025), the agronomic implications of suburban land use change in Lagos operate at multiple scales, encompassing soil quality, crop choice, farm viability, and climate vulnerability. It was further noted that surviving farms in the suburbs of Lagos are characterised by smallholder operation, with average holdings typically under 2 hectares, consistent with the Nigerian and sub-Saharan African smallholder norm.

Tajudeen et al. (2022) observed in a landmark study that the farms in Lagos State are predominantly rain-fed, making them structurally vulnerable to the climatic variability that is increasingly documented across southern Nigeria. The study examining weather data from 1998 to 2018 for Lagos State, found that climate change exerts a measurable negative impact on maize yield, while cassava demonstrates greater resilience. Hence, Tajudeen et al. (2022) reported that agriculture in Lagos is largely rain-fed, and climate change negatively impacts crop productivity through decreased crop yield and soil fertility, limited soil water availability, increased soil erosion, and enhanced conditions for pest proliferation. And this rain-fed dependency, in the context of escalating climate variability, represents a central agronomic challenge that extension services must address.

Adedayo and Fasona (2024) documented that soil degradation in the suburbs of Lagos is compounded by the proximity of agricultural plots to urban pollution sources. They specify that untreated irrigation water, proximity to industrial effluents, and the use of municipal solid waste as a soil amendment introduce contaminants that undermine both productivity and produce safety. It was further stated that these conditions, documented in earlier urban agricultural surveys, persist in suburban areas and are likely worsening as urbanisation advances (Adedayo & Fasona, 2024).

According to Osayomi and Lawanson (2022), crop diversification patterns in Lagos suburban farms reflect pragmatic responses to market proximity and land constraints rather than agronomically optimal choices. It was further explained that leafy vegetables and tomato

production were predominant in suburban zones, given high urban demand and rapid turnover. According to the study, it was also noted that root crops such as cassava remain important subsistence and commercial crops given their climate resilience, and that maize, increasingly threatened by climate variability, continues to be grown but requires intensified agronomic support to maintain yields. In addition, poultry, aquaculture, and small ruminant keeping are practised across farm settlement areas in all the suburbs.

According to Adedayo and Fasona (2024), the Tajudeen et al. (2022) project report on climate modelling for Nigeria states that agricultural production could decline by 10 to 25% by 2080, with rain-fed agriculture potentially falling by 50% under pessimistic scenarios. It was further discussed that Lagos produced a fraction of its food requirements even under more favourable conditions; these projections underscore the urgency of transitioning suburban farmers to more resilient, precision, and climate-smart agronomic systems.

The loss of 21.79% of farmland between 2013 and 2024, combined with the absence of irrigation infrastructure documented by Tajudeen et al. (2022), suggests that remaining farms face increased production pressure without the technical support needed to intensify (Adedayo & Fasona, 2024).

### **The Aptitude, Scope, and Breaches of Agricultural Extension Services**

According to Ricker-Gilbert & Jones (2024), the Lagos State Agricultural Development Authority (LSADA) is the state's primary agricultural extension service, focused on improving farmer productivity and welfare. While access to extension services is generally linked to better farm outcomes and household welfare in Nigeria, the reality is that many farmers, particularly smaller and more remote ones, still lack such support. Applying this national framework to LSADA shows a favourable alignment with programs like drip irrigation and Integrated Pest and Production Management, which are strongly associated with welfare gains.

The study of Oyeboode et al. (2025) of smallholder vegetable farmers in Lagos found that the lack or limitation of extension services remains a major constraint, and the extensive approach to agronomic advice overlooks the diverse conditions of Lagos's suburban farms. The study highlighted significant training gaps in key areas like seed viability and pest control, indicating that LSADA's current coverage is insufficient for the area's diverse farming systems.

Akinboye et al. (2024) stated that to address this, digitalisation offers a path to more targeted, large-scale delivery. Yet, research on cyber-extension use among LSADA's own extension agents found a scarcity of available digital tools, limiting their effective use. Furthermore, a study on digital service adoption among rural farmers in Lagos found a low adoption rate, hindered by barriers like erratic power supply and high data costs, showing that digital potential is hampered by a lack of both tools and infrastructure. It was then reported that LSADA must contend with deeper structural issues (Adeyemi & Bello, 2025).

A fundamental limitation of the existing extension model is its reliance on "blanket" agronomic recommendations that do not account for the considerable variability in soil conditions, farm size, water access, and market connectivity across Lagos suburban localities. This concern is directly supported by Oyeboode et al. (2025), who investigated the training needs of smallholder vegetable farmers in urban-farm clusters in Lagos State. The study found that "lack of extension services" was among the most critical constraints, alongside non-recognition by government institutions and inadequate capital. The researchers identified significant training gaps in seed viability testing, seed treatment, and pest and disease control, and recommended that these farmers be profiled and mainstreamed into relevant government agencies to facilitate access to support services. The findings from Oyeboode et al. (2025) suggested that even where LSADA extension agents are present, their coverage and the specificity of their advice remain inadequate for the heterogeneous needs of peri-urban vegetable producers.

## Urban Farming and Food Production Prospects in Lagos State

Undoubtedly, Lagos State, one of Africa's largest and fastest-growing megacities, faces mounting pressure on food availability and security as a consequence of rapid urbanisation, shrinking agricultural land, and persistent rural-to-urban migration.

According to Osayomi & Lawanson (2022), Lagos State produces less than 20% of the food consumed within its territory, while an annual population growth rate exceeding 3% continues to outpace realistic increases in local agricultural production capacity under current land-use trends. In response, the Lagos State Government, through the Lagos State Ministry of Agriculture and Food Systems, articulated a strategic objective in the Lagos State Agricultural and Food Systems Roadmap (2021–2025) to increase food self-sufficiency and strengthen resilience through investments in value chains, logistics, processing infrastructure, and urban agriculture systems.

Urban farming has consequently emerged as an important adaptive strategy for improving household food access and enhancing metropolitan food resilience. Urban agriculture involves crop cultivation and livestock production within and around urban centres using spaces such as rooftops, wetlands, vacant plots, school premises, and household backyards. In Lagos, practices including aquaculture, poultry production, sack gardening, and vegetable cultivation are increasingly promoted through institutional programmes coordinated by the Lagos State Government. The launch of the Urban Agriculture Programme in 2022 reflected a policy commitment to integrating food production into residential estates, schools, religious institutions, and community spaces as part of a broader urban food systems strategy (Lagos State Agricultural and Food Systems Roadmap, 2021).

Although Lagos demonstrates stronger institutional commitment than many African cities, implementation gaps remain substantial, particularly regarding land-use protection and long-term agricultural zoning (Osayomi & Lawanson, 2022). But according to Inegbedion et al (2019), the financing of agricultural extension through Agricultural Development Programmes (ADPs) in Nigeria has been found to positively impact crop development but to have a limited effect on employment creation and infrastructural provision, with scholars recommending a complete redesign of programme architecture to ensure achievement of stated goals.

The establishment of the Imota Rice Mill represents one of the largest agricultural infrastructure investments in Lagos State, illustrating the government's value-chain-oriented approach to food security. Conceived under the state's agricultural transformation agenda, the mill was designed to stimulate rice processing, reduce dependence on imported rice, and strengthen local food systems. However, peer-reviewed assessments and policy analyses indicate that the facility remains heavily dependent on paddy sourced from other Nigerian states because Lagos lacks sufficient arable land to sustain large-scale rice cultivation internally. This demonstrates a structural contradiction within Lagos' food security framework: processing and distribution capacity may expand faster than the state's ability to secure local primary production (Lagos State Agricultural and Food Systems Roadmap, 2021).

To address land scarcity, Lagos adopted the "Lagos Farm" intergovernmental partnership model, whereby states such as Niger State provide agricultural land and production capacity while Lagos supplies finance, logistics, processing infrastructure, and market access. Although pragmatic in the short term, this model has attracted criticism for externalising Lagos' agricultural dependence rather than resolving it structurally. The model increases vulnerability to interstate political tensions, transportation disruptions, insecurity along supply corridors, and fluctuating intergovernmental cooperation. Furthermore, it risks weakening incentives for preserving remaining Suburban agricultural lands within Lagos itself. Critics, therefore, argue that while the Lagos Farm model may enhance temporary food supply stability, it does not constitute a sustainable pathway toward genuine metropolitan food sovereignty.

Overall, the evidence suggests that despite ambitious policies such as the Lagos State Agricultural and Food Systems Roadmap and related climate resilience initiatives, agricultural land conversion in Lagos is proceeding more rapidly than policy interventions can effectively mitigate. Sustainable food security in Lagos will therefore require not only urban agriculture promotion and external partnerships, but also stronger farmland protection policies, integrated metropolitan land-use planning, and long-term investment in local agricultural productivity (Lagos State Agricultural and Food Systems Roadmap, 2021; Razak et al., 2024).

### **Conclusions**

This review demonstrates that suburban farmland loss in Lagos (13.03% from 1984 to 2013, 21.79% from 2013 to 2024) is outpacing institutional responses, and that extension services remain underfunded despite documented farmer demand. Firstly, this article provides empirical quantification of agricultural land decline in Lagos suburbs, showing an acceleration from 13.03% loss (1984 to 2013) to a further 1.79% loss (2013 to 2024), and uniquely reports that 89.48% and 73.51% of converted farmland went to non-agricultural uses, establishing clear benchmarks for land use change as recorded by previous findings. Secondly, it highlights a paradox of Lagos State's investment in large-scale agricultural infrastructure (e.g., Imota Rice Mill) while losing its local production base, exposing a mismatch between processing capacity and local arable land availability. And, it critiques the externalisation of agricultural production to other states, arguing this increases vulnerability to transport disruptions and reduces incentives to protect peri-urban farmland, reframing the model as a temporary supply fix rather than a pathway to food sovereignty.

From this review, areas of further research emerge, as the article focuses on land loss, it does not explore affected farmers' livelihoods; hence, research is needed on compensation mechanisms, rural-urban migration, and occupational change among smallholders displaced between 1984 and 2024. Secondly, although the article notes barriers to digital extension (power supply, data costs, lack of tools), it does not empirically test specific interventions; further research should evaluate pilot projects of cyber-extension or mobile-based advisory services in Ikorodu, Epe, Badagry, or Ibeju-Lekki to determine which models improve yields under land-constrained conditions. Besides, the article mentions soil degradation from urban pollution but lacks primary data; a comparative study measuring heavy metals, pathogens, or pesticide residues on suburban versus rural farms would quantify food safety risks of peri-urban agriculture.

### **Recommendations**

To address the gaps identified in this article, it can be recommended as follows:

- a. Researchers and state agencies should collaborate to develop a publicly accessible satellite-based monitoring system providing quarterly updates on farmland conversion, enabling early warning and evidence-based enforcement of zoning laws.
- b. Given that most farms are rain-fed and climate vulnerable, extension services (LSADA) should operationalise a tailored low-cost protocol integrating drought-tolerant arable crops, soil moisture conservation, and agroforestry, researched through participatory on-farm trials.
- c. Finally, instead of top-down extension alone, the Lagos State Government should fund a peer-to-peer learning network where smallholder farmers in Epe and Badagry share locally adapted practices (sack gardening, rooftop farming, integrated poultry-aquaculture) via audio-visual case studies accessible on basic mobile phones.

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