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Review Article

Urban Expansion and Its Effects on Land Resources and Environmental Sustainability

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Abstract: Urban expansion has become one of the most significant drivers of land-use change and environmental transformation worldwide, particularly in developing countries where rapid population growth and economic development have intensified pressure on limited land resources. While urbanization contributes to economic growth, infrastructure development, and improved access to social services, uncontrolled urban expansion often results in the conversion of agricultural land, deforestation, habitat fragmentation, biodiversity loss, soil degradation, and increased environmental pollution. This study examined the effects of urban expansion on land resources and environmental sustainability with a focus on identifying the major drivers of urban growth, assessing its impacts on land resources, evaluating its implications for environmental sustainability, and proposing sustainable urban planning strategies. The study adopted a qualitative desktop review research design based on the systematic analysis of peer-reviewed journal articles, books, government publications, and reports from international organizations, including the United Nations, the Food and Agriculture Organization (FAO), the United Nations Environment Programme (UNEP), the World Bank, and the Intergovernmental Panel on Climate Change (IPCC). Data were analyzed using thematic content analysis to identify recurring patterns and emerging issues across the reviewed literature. The findings revealed that rapid population growth, rural–urban migration, industrialization, infrastructure development, weak land-use planning, and ineffective environmental governance are the principal drivers of urban expansion. The review further showed that uncontrolled urban growth accelerates land degradation, loss of agricultural land, deforestation, biodiversity decline, increased flood risk, environmental pollution, and greenhouse gas emissions, thereby undermining environmental sustainability. The study concludes that sustainable urban development requires integrated land-use planning, stronger environmental governance, investment in

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green infrastructure, ecosystem restoration, and active stakeholder participation. It recommends the adoption of smart growth principles, enforcement of land-use regulations, and nature-based solutions to promote resilient cities and long-term environmental sustainability.

Keywords: Urban expansion, land resources, land-use change, environmental sustainability, sustainable urban development, land management

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1.0 Introduction

1.1 Background to the Study

Urban expansion has become one of the defining environmental and developmental issues of the twenty-first century. Increasing urban populations, economic transformation, industrialization, and infrastructure development have accelerated the physical growth of cities across the world. Although urban expansion contributes to economic opportunities, innovation, and improved access to education, healthcare, and public services, it also exerts enormous pressure on land resources and natural ecosystems. The rapid conversion of agricultural land, forests, wetlands, and open spaces into residential, commercial, and industrial areas has become a major concern for environmental sustainability. According to recent global reports, urban areas continue to expand at a faster rate than population growth, resulting in inefficient land consumption and increasing environmental degradation (United Nations, 2023; FAO, 2023). Land resources constitute one of the most valuable natural assets supporting food production, biodiversity conservation, water regulation, climate resilience, and socioeconomic development. Sustainable management of land resources is therefore essential for maintaining ecosystem services and achieving long-term environmental sustainability. However, uncontrolled urban expansion often leads to soil sealing, habitat fragmentation, declining agricultural productivity, increased surface runoff, and deterioration of ecosystem functions. The growing demand for housing, transportation networks, industries, and public infrastructure continues to transform landscapes in ways that threaten ecological integrity and reduce the capacity of ecosystems to provide essential services (IPCC, 2022; UNEP, 2024). The challenges associated with urban expansion are particularly pronounced in developing countries, where rapid urbanization frequently outpaces effective land-use planning and environmental management. Weak institutional capacity, inadequate enforcement of planning regulations, informal settlements, and poor environmental governance have contributed to unplanned urban growth and unsustainable land-use practices. Consequently, many cities experience increasing environmental problems such as flooding, erosion, waste accumulation, air pollution, water contamination, and biodiversity loss. These challenges undermine efforts to achieve sustainable urban development and reduce the resilience of urban ecosystems to climate change and other environmental stresses (World Bank, 2023; UN-Habitat, 2022). Nigeria has witnessed rapid urban growth over the past few decades due to population increase, rural–urban migration, economic diversification, and expanding infrastructure. Major urban centres, including

Lagos, Abuja, Kano, Port Harcourt, and Jos, have experienced substantial land-use changes characterized by the conversion of agricultural land and natural vegetation into built-up environments. In many instances, urban development has occurred without adequate planning, leading to encroachment on environmentally sensitive areas such as wetlands, river corridors, forests, and floodplains. These trends have intensified environmental degradation and heightened the vulnerability of urban communities to climate-related hazards and resource scarcity. Despite increasing attention to urban sustainability, there remains a need for a comprehensive understanding of how urban expansion influences land resources and environmental sustainability, particularly in rapidly developing regions. Many existing studies focus on specific aspects such as land-use change, housing development, or environmental pollution without integrating their broader implications for sustainable land management and ecosystem resilience. This study, therefore, examines the effects of urban expansion on land resources and environmental sustainability by synthesizing current knowledge on its drivers, environmental consequences, and sustainable management strategies. The findings are expected to provide evidence that supports sustainable urban planning, informed land-use policies, and effective environmental management.

1.2 Statement of the Problem

Rapid urban expansion has become one of the leading causes of land-use change and environmental degradation across the world. The continuous conversion of agricultural land, forests, wetlands, and other natural ecosystems into built-up areas has reduced the availability of productive land, weakened ecosystem services, and increased environmental vulnerability. In many developing countries, including Nigeria, urban growth has often occurred in the absence of effective land-use planning and environmental regulation, resulting in uncontrolled development, habitat destruction, biodiversity loss, soil degradation, flooding, and pollution. The increasing pressure on land resources has significant implications for environmental sustainability because it compromises food security, ecosystem resilience, climate regulation, and water resource management. Although governments have introduced various urban planning and environmental policies, weak implementation, inadequate institutional coordination, and limited public awareness continue to undermine sustainable land management. Consequently, many urban centres experience persistent environmental challenges that threaten both ecological integrity and human well-being. Despite numerous studies on urbanization and land-use change, there remains limited integrated evidence on how urban expansion affects land resources and environmental sustainability in a holistic manner. Many studies have examined individual environmental issues without adequately linking urban growth to broader sustainability outcomes. This knowledge gap limits the development of effective planning strategies capable of balancing urban development with environmental conservation. Therefore, there is a need for a comprehensive assessment of the effects of urban expansion on land resources and environmental sustainability to inform evidence-based policy and sustainable urban development.

1.3 Aim of the Study

The aim of this study is to examine the effects of urban expansion on land resources and environmental sustainability. The study seeks to:

i. Identify the major drivers of urban expansion.
ii. Examine the effects of urban expansion on land resources.
iii. Assess the implications of urban expansion for environmental sustainability.
iv. Evaluate existing strategies for managing urban growth and protecting land resources.

Research Questions

The study will address the following questions:

i. What are the major drivers of urban expansion?
ii. How does urban expansion affect land resources?
iii. What are the implications of urban expansion for environmental sustainability?
iv. How effective are existing urban planning and land management strategies in addressing the environmental effects of urban expansion?

Research Hypotheses

The following hypotheses will guide the study:

H_{01}: Urban expansion has no significant effect on land resources.

H_{02}: Urban expansion has no significant effect on environmental sustainability.

H_{03}: Sustainable urban planning has no significant influence on mitigating the adverse environmental effects of urban expansion.

2.0 LITERATURE REVIEW

2.1 Concept of Urban Expansion

Urban expansion refers to the outward growth of urban areas through the conversion of rural and peri-urban land into residential, commercial, industrial, and infrastructural developments. It is a dynamic process driven by population growth, economic development, industrialization, technological advancement, and rural–urban migration. Urban expansion is not merely an increase in the physical size of cities but also involves significant changes in land-use patterns, socioeconomic activities, and environmental conditions. According to the United Nations Human Settlements Programme (2022), urban expansion has accelerated globally over the past few decades, with cities growing at unprecedented rates, particularly in developing countries. While this growth supports economic transformation and improved access to infrastructure and services, it often exerts considerable pressure on land resources and environmental systems when not effectively managed. Urban expansion can occur in planned or unplanned forms. Planned urban expansion is guided by comprehensive land-use policies, zoning regulations, infrastructure planning, and environmental impact assessments, thereby promoting sustainable urban development. In contrast, unplanned or uncontrolled urban expansion, commonly referred to as urban sprawl, is characterized by low-density, scattered, and

fragmented development that frequently encroaches upon agricultural land, forests, wetlands, and other ecologically sensitive areas. Such expansion often results in inefficient land utilization, habitat fragmentation, increased transportation costs, environmental pollution, and the degradation of ecosystem services. Recent studies indicate that uncontrolled urban growth remains a major environmental challenge in many African cities due to weak planning institutions, inadequate policy enforcement, and rapid population increase (UNEP, 2024; World Bank, 2023). Globally, urban expansion has become one of the principal drivers of land-use and land-cover change. Advances in remote sensing and Geographic Information Systems (GIS) have demonstrated that urban areas continue to expand at rates that frequently exceed population growth, leading to the conversion of productive agricultural lands and natural ecosystems into built-up environments. This transformation has profound implications for biodiversity conservation, food security, climate regulation, hydrological processes, and environmental sustainability. The Food and Agriculture Organization (2023) emphasizes that sustainable urban growth should balance economic development with the protection of natural resources through integrated land-use planning, green infrastructure development, and ecosystem conservation. In developing countries, urban expansion is closely linked to demographic growth, industrial development, and rural–urban migration. Nigeria exemplifies this trend, with major cities such as Lagos, Abuja, Kano, Port Harcourt, and Jos experiencing rapid physical expansion over recent decades. Although this growth has stimulated investment, employment opportunities, and improved access to urban services, it has also contributed to the loss of agricultural land, deforestation, increased flooding, soil degradation, waste generation, and biodiversity decline. The expansion of informal settlements into environmentally sensitive areas further compounds these environmental challenges and undermines sustainable urban development.

2.2 Concept of Land Resources

Land resources constitute one of the most valuable components of the natural environment and serve as the foundation for human survival, economic development, and ecological sustainability. They encompass the physical land surface and its associated natural attributes, including soil, vegetation, forests, wetlands, water bodies, minerals, wildlife habitats, and the ecological processes that support life. Land resources provide the space and materials required for agriculture, forestry, mining, industrial development, housing, transportation, and recreation. Beyond their economic significance, land resources perform essential ecological functions such as nutrient cycling, carbon sequestration, water infiltration, biodiversity conservation, and climate regulation. According to the Food and Agriculture Organization (2023), sustainable management of land resources is fundamental to achieving food security, environmental protection, and sustainable development because healthy land ecosystems underpin the delivery of vital ecosystem services. Land resources are finite and increasingly threatened by both natural and anthropogenic pressures. Rapid population growth, urban expansion, deforestation, unsustainable agricultural practices, mining, industrialization, and climate change have accelerated land degradation across many regions of the world. These pressures reduce soil fertility, alter natural landscapes,

fragment habitats, and diminish the capacity of ecosystems to support biodiversity and human livelihoods. The United Nations Convention to Combat Desertification (2022) emphasizes that nearly half of the world's productive land is experiencing some degree of degradation, with serious implications for food production, water security, biodiversity conservation, and climate resilience. Consequently, protecting land resources has become a global priority for achieving sustainable development. The concept of land resources extends beyond the physical characteristics of land to include its productive, ecological, social, and economic values. Productive functions involve supporting agricultural production, forestry, livestock grazing, and infrastructure development, while ecological functions include maintaining biodiversity, regulating hydrological cycles, storing carbon, preventing soil erosion, and sustaining ecosystem resilience. Socially and economically, land provides livelihoods, cultural identity, settlement opportunities, and economic wealth for millions of people. The United Nations Environment Programme (2024) notes that effective land resource management should balance development needs with environmental conservation to ensure that land continues to provide these multiple benefits for present and future generations. In rapidly urbanizing countries such as Nigeria, land resources are under increasing pressure due to the expansion of cities and associated infrastructure. The conversion of agricultural land, forests, wetlands, and open spaces into residential, commercial, and industrial developments has significantly altered natural landscapes and reduced the availability of productive land. Urban encroachment into environmentally sensitive areas often results in soil sealing, increased surface runoff, habitat fragmentation, flooding, and declining ecosystem services. These changes not only threaten environmental sustainability but also compromise agricultural productivity, biodiversity conservation, and climate resilience. Effective land-use planning and sustainable land management are therefore essential for minimizing the adverse impacts of urban growth on land resources. Sustainable land resource management involves the planned use, conservation, restoration, and monitoring of land to maintain its productivity, ecological integrity, and socioeconomic value over the long term. It incorporates practices such as conservation agriculture, afforestation, agroforestry, integrated watershed management, erosion control, ecological restoration, and environmentally sound urban planning. These approaches help to improve soil health, protect biodiversity, reduce land degradation, enhance carbon sequestration, and strengthen resilience to climate change.

2.3 Concept of Environmental

Environmental sustainability refers to the responsible use, management, and conservation of natural resources in a manner that maintains ecological integrity, supports biodiversity, and ensures that the needs of present generations are met without compromising the ability of future generations to meet their own needs. It is founded on the principle that economic development, social well-being, and environmental protection are interdependent and must be pursued in a balanced manner. Environmental sustainability, therefore, emphasizes the efficient utilization of land, water, forests, minerals, and other natural resources while minimizing environmental degradation, pollution, and the depletion of ecosystem services. According to the United Nations Environment Programme (2024),

environmental sustainability is fundamental to achieving resilient ecosystems, climate stability, and sustainable development, particularly in the face of rapid urbanization, biodiversity loss, and climate change. The concept has evolved considerably since the publication of Our Common Future in 1987, which introduced sustainable development as development that meets present needs without compromising the ability of future generations to meet their own needs. Since then, environmental sustainability has become a central objective of global environmental governance and is reflected in international frameworks such as the 2030 Agenda for Sustainable Development, the Paris Agreement, the Convention on Biological Diversity, and the United Nations Convention to Combat Desertification. These international agreements emphasize the need to protect ecosystems, conserve biodiversity, restore degraded lands, reduce greenhouse gas emissions, and promote sustainable patterns of production and consumption. Environmental sustainability is therefore recognized as an essential pillar for achieving global development goals and enhancing resilience to environmental change. Land resources play a critical role in environmental sustainability because they provide the foundation for agriculture, forestry, biodiversity conservation, water regulation, carbon sequestration, and human settlements. Sustainable management of land resources ensures the continued provision of ecosystem services that support food security, public health, climate regulation, and economic development. However, rapid urban expansion, deforestation, unsustainable agricultural practices, mining, and industrial activities have intensified pressure on land resources, resulting in soil degradation, habitat destruction, declining biodiversity, increased flood risk, and environmental pollution.

2.4 Drivers of Urban Expansion

Urban expansion is influenced by a combination of demographic, economic, political, technological, and environmental factors that collectively shape the growth and spatial development of cities. Among these, rapid population growth remains the most significant driver of urban expansion worldwide. As urban populations increase through natural population growth and rural–urban migration, the demand for housing, transportation networks, public utilities, educational institutions, healthcare facilities, and commercial infrastructure also rises. This growing demand compels cities to expand beyond their traditional boundaries, often resulting in the conversion of agricultural land, forests, wetlands, and other natural landscapes into built-up areas. According to the United Nations Human Settlements Programme (2022), more than half of the world's population now lives in urban areas, and this proportion is projected to increase significantly by 2050, particularly in Africa and Asia. Without effective urban planning, such population-driven expansion can accelerate environmental degradation and unsustainable land-use change. Economic development and industrialization also play critical roles in driving urban expansion. The concentration of industries, commercial enterprises, financial institutions, and employment opportunities in urban centres attracts large numbers of people seeking improved livelihoods. As businesses expand and new investments emerge, the demand for industrial estates, commercial centres, residential neighbourhoods, and supporting infrastructure increases substantially. Infrastructure development, including roads, railways,

airports, housing estates, educational institutions, and healthcare facilities, further stimulates the outward growth of cities by opening previously undeveloped areas for urban development. The World Bank (2023) notes that while economic growth promotes urban prosperity and national development, inadequate planning often leads to inefficient land consumption, urban sprawl, and increasing pressure on natural resources. Rural–urban migration has become another major driver of urban expansion, particularly in developing countries such as Nigeria. People migrate from rural communities to urban centres in search of employment, higher incomes, better educational opportunities, improved healthcare, and enhanced living standards. This continuous influx of migrants increases the demand for residential accommodation and public services, leading to the rapid physical expansion of cities. In many instances, however, urban growth occurs faster than the capacity of planning authorities to provide adequate infrastructure and enforce land-use regulations. Consequently, informal settlements frequently develop on environmentally sensitive lands such as wetlands, floodplains, forest reserves, and steep slopes, increasing environmental risks and reducing the sustainability of urban development (UNEP, 2024; FAO, 2023). Weak land-use planning, ineffective environmental governance, and inadequate enforcement of development regulations also contribute significantly to uncontrolled urban expansion. In many developing countries, outdated master plans, poor institutional coordination, illegal land acquisition, and limited financial and technical capacity have weakened urban planning systems. As a result, residential, commercial, and industrial developments often occur without proper environmental impact assessments or compliance with zoning regulations. This situation encourages urban sprawl, inefficient land utilization, habitat fragmentation, and the loss of productive agricultural land. The Intergovernmental Panel on Climate Change (2022) emphasizes that strengthening environmental governance and integrating climate-sensitive land-use planning are essential for promoting sustainable urban growth and reducing environmental degradation. Technological advancement, globalization, government policies, and changing socioeconomic conditions have further accelerated urban expansion in recent decades. Improved transportation systems, digital connectivity, and increased investment in real estate have facilitated the development of peri-urban areas and expanded metropolitan regions. In Nigeria, cities such as Lagos, Abuja, Port Harcourt, and Jos have experienced rapid outward expansion due to population increase, infrastructure development, and economic activities

2.5 Effects of Urban Expansion on Land Resources

Urban expansion has profound effects on land resources because it alters land-use patterns, transforms natural landscapes, and increases pressure on finite land available for agriculture, forestry, and ecosystem conservation. One of the most significant consequences of urban growth is the conversion of productive agricultural land into residential, commercial, industrial, and transportation infrastructure. As cities continue to expand, fertile farmlands located on the urban fringe are increasingly acquired for housing estates, roads, shopping centres, and industrial facilities. This conversion reduces the amount of arable land available for agricultural production, threatens food security, and undermines the livelihoods of farming communities. According to the Food and Agriculture

Organization (2023), the loss of agricultural land to urban development has become a major global concern because it compromises sustainable food systems and weakens long-term land productivity. Another important effect of urban expansion is land degradation through soil sealing, compaction, erosion, and declining soil quality. The construction of buildings, roads, parking areas, and other impervious surfaces covers fertile soils with concrete and asphalt, thereby reducing their capacity to absorb water, recycle nutrients, and support vegetation. Soil sealing disrupts natural hydrological processes by increasing surface runoff while reducing groundwater recharge, which contributes to flooding and declining water availability. In addition, extensive excavation, sand mining, quarrying, and infrastructure development associated with urban growth often accelerate soil erosion and landscape instability. The Intergovernmental Panel on Climate Change (2022) notes that land degradation resulting from unsustainable urban development diminishes ecosystem resilience and increases vulnerability to climate-related hazards. Urban expansion also contributes significantly to habitat fragmentation and the destruction of natural ecosystems. As forests, wetlands, grasslands, and other natural habitats are converted into built-up environments, wildlife populations become isolated, ecological corridors are disrupted, and biodiversity declines. Fragmented landscapes often reduce species richness by limiting breeding opportunities, restricting animal movement, and increasing human–wildlife conflicts. Wetland reclamation for urban development further diminishes ecosystem services such as flood regulation, water purification, and carbon storage. The United Nations Environment Programme (2024) emphasizes that continued habitat destruction associated with urban expansion threatens ecological stability and reduces the capacity of ecosystems to provide essential environmental services. In many developing countries, including Nigeria, uncontrolled urban expansion has intensified land-use conflicts and increased pressure on limited land resources. The rapid growth of cities frequently results in competition among residential, commercial, industrial, and agricultural land uses. Inadequate land-use planning, weak enforcement of development regulations, and insecure land tenure systems often encourage informal settlements and encroachment into environmentally sensitive areas such as floodplains, wetlands, and forest reserves. These developments not only degrade valuable land resources but also expose urban residents to environmental risks, including flooding, erosion, and pollution. Recent studies indicate that unplanned urban growth has significantly altered land-use patterns in many Nigerian cities, reducing the availability of productive land while increasing environmental vulnerability (World Bank, 2023; UN-Habitat, 2022

2.7 Theoretical Framework

This study is anchored on the Sustainable Development Theory and the Urban Ecology Theory. These theories provide a comprehensive framework for understanding the interaction between urban expansion, land resources, and environmental sustainability. They explain how urban growth influences natural ecosystems and emphasize the need to balance economic development with environmental conservation and the sustainable use of land resources.

2.7.1 Sustainable Development Theory

The Sustainable Development Theory gained global prominence following the publication of Our Common Future by the World Commission on Environment and Development in 1987. The theory defines sustainable development as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. It advocates the integration of economic growth, social equity, and environmental protection as mutually reinforcing pillars of development. The theory recognizes that while urban expansion is necessary for economic progress and improved living standards, such development must occur within the ecological limits of the environment to ensure the long-term availability of natural resources. Within the context of land resource management, Sustainable Development Theory emphasizes the efficient and responsible utilization of land through sound planning, environmental protection, and resource conservation. It encourages governments and development agencies to adopt policies that minimize environmental degradation, conserve biodiversity, reduce pollution, and promote climate resilience. The relevance of Sustainable Development Theory to this study lies in its emphasis on balancing urban development with environmental sustainability. The theory, therefore, provides an appropriate framework for evaluating how sustainable urban planning can reduce the adverse environmental effects of urban expansion and promote the efficient use of land resources.

2.7.2 Urban Ecology Theory

Urban Ecology Theory originated from the work of scholars associated with the Chicago School of Sociology, particularly Robert E. Park, Ernest W. Burgess, and Roderick D. McKenzie, who viewed cities as dynamic ecosystems where human activities interact continuously with the natural environment. The theory explains that urban areas function as ecological systems composed of interconnected physical, biological, social, and economic components. Changes in one component, such as land-use conversion or infrastructure development, inevitably influence the structure and functioning of the entire urban ecosystem. Urban Ecology Theory emphasizes that uncontrolled urban expansion alters ecological processes through habitat destruction, increased pollution, fragmentation of natural landscapes, and excessive exploitation of land resources. It also recognizes that urban ecosystems can be made more resilient through environmentally sensitive planning, green infrastructure, urban forestry, sustainable transportation systems, and effective environmental governance. By promoting ecological principles within urban planning, the theory supports the development of cities that are environmentally sustainable, economically productive, and socially inclusive. The theory is particularly relevant to this study because it explains how rapid urban expansion influences land resources and environmental sustainability. It provides a framework for understanding the ecological consequences of converting agricultural land, forests, wetlands, and open spaces into built-up areas. Furthermore, it highlights the importance of integrating ecological conservation into urban development policies to maintain biodiversity, protect ecosystem services, and improve environmental quality. Consequently, Urban Ecology Theory complements Sustainable Development Theory by demonstrating that sustainable urban

growth depends on maintaining healthy interactions between human settlements and the natural environment.

2.7.3 Application of the Theoretical Framework to the Study

The integration of Sustainable Development Theory and Urban Ecology Theory provides a robust foundation for examining the effects of urban expansion on land resources and environmental sustainability. While Sustainable Development Theory emphasizes the need to balance economic growth with environmental conservation, Urban Ecology Theory explains the ecological interactions between urban development and natural systems. Together, these theories support the argument that sustainable urban planning, effective land-use management, environmental governance, and ecosystem conservation are essential for minimizing the adverse effects of urban expansion. They therefore provide an appropriate theoretical basis for achieving the objectives of this study and for developing practical recommendations that promote sustainable urban development and environmental sustainability.

3.0 Methodology

This study adopted a qualitative research approach based on a desktop review (documentary research) design to examine urban expansion and its effects on land resources and environmental sustainability. The desktop review approach was considered appropriate because it facilitates the systematic identification, collection, evaluation, and synthesis of existing scholarly evidence on a particular research problem without undertaking primary field investigations. The study relied exclusively on secondary data obtained from peer-reviewed journal articles, books, conference proceedings, government publications, policy documents, and reports from reputable international organizations, including the United Nations Human Settlements Programme, the United Nations Environment Programme, the Food and Agriculture Organization, the Intergovernmental Panel on Climate Change, and the World Bank. Priority was given to publications produced between 2020 and 2025, while a limited number of seminal publications were included to provide conceptual and theoretical foundations. Data for the study were collected through a comprehensive search of internationally recognized electronic databases, including Scopus, Web of Science, ScienceDirect, Springer Link, Taylor & Francis Online, Wiley Online Library, Google Scholar, and institutional repositories. Search terms included urban expansion, urban sprawl, land resources, land-use change, environmental sustainability, urbanization, land degradation, green infrastructure, sustainable urban development, and Nigeria. Retrieved publications were screened based on their relevance to the study objectives, publication quality, methodological rigor, and credibility of the source. Only studies that directly addressed urban expansion, land resource management, or environmental sustainability were included in the final review. The collected information was analyzed using thematic content analysis, which involved organizing and synthesizing evidence into themes corresponding to the study objectives. The major themes included the drivers of urban expansion, the effects of urban expansion on land resources, the implications of urban expansion for environmental sustainability, and sustainable urban

planning strategies for mitigating environmental degradation. Findings from different studies were critically compared to identify recurring patterns, areas of agreement, emerging trends, and knowledge gaps. This analytical approach enabled the integration of diverse perspectives and facilitated a comprehensive understanding of the relationship between urban expansion, land resources, and environmental sustainability. To ensure the credibility and reliability of the findings, the review was limited to publications from recognized academic journals, government institutions, and internationally accredited organizations. Information obtained from multiple authoritative sources was triangulated to enhance the validity of the synthesized evidence and minimize potential bias associated with reliance on individual studies. Since the research utilized only publicly available secondary data and did not involve human participants, ethical approval was not required. Nevertheless, all sources of information were appropriately acknowledged through APA 7th edition in-text citations and referencing to maintain academic integrity and avoid plagiarism. The adopted methodology provides a robust and reliable basis for achieving the study objectives and generating evidence-based conclusions on urban expansion and its effects on land resources and environmental sustainability.

4.0 RESULTS AND DISCUSSION

4.1 Results

The thematic review of the selected literature revealed that rapid population growth, rural–urban migration, economic development, industrialization, infrastructure expansion, and weak land-use planning are the dominant drivers of urban expansion. Across the reviewed studies, urban growth was consistently associated with the outward conversion of agricultural land, forests, wetlands, and open spaces into residential, commercial, industrial, and transportation infrastructure. The findings further showed that inadequate enforcement of urban planning regulations, informal settlement development, and ineffective environmental governance have accelerated urban sprawl, particularly in developing countries such as Nigeria. Evidence from recent literature indicates that the rate of urban land consumption has continued to exceed population growth in many cities, resulting in inefficient land utilization and increasing pressure on natural ecosystems. The review further established that urban expansion has significant adverse effects on land resources. The synthesized evidence showed widespread conversion of fertile agricultural land into built-up areas, leading to declining agricultural productivity and increased concerns about food security. Studies also reported extensive soil sealing due to roads, buildings, and other impervious surfaces, which reduce groundwater recharge, increase surface runoff, and accelerate urban flooding. Furthermore, land degradation resulting from excavation, quarrying, vegetation removal, and uncontrolled construction activities has contributed to declining soil quality and reduced ecosystem productivity. Habitat fragmentation and biodiversity loss were identified as common consequences of expanding urban landscapes, particularly where development encroached upon forests, wetlands, and protected areas. Regarding environmental sustainability, the review revealed that rapid urban expansion has intensified environmental pollution, climate change vulnerability, and ecosystem degradation. The reviewed literature consistently reported increasing levels of

air pollution from transportation and industrial activities, water pollution from untreated domestic and industrial waste, and solid waste accumulation resulting from rapid population growth. Urban expansion was also found to increase greenhouse gas emissions, reduce carbon sequestration through deforestation, and intensify the urban heat island effect. However, the findings equally demonstrated that sustainable urban planning approaches, including compact city development, green infrastructure, urban forestry, ecosystem restoration, integrated land-use planning, and effective environmental governance, can substantially reduce these environmental impacts while promoting resilient and sustainable cities.

4.2 Discussion of Findings

The findings demonstrate that uncontrolled urban expansion remains one of the principal drivers of land-use change and environmental degradation globally. The identification of population growth, rural–urban migration, industrialization, and infrastructure development as major drivers is consistent with recent studies, which emphasize that the increasing concentration of economic opportunities in urban areas has accelerated the conversion of natural landscapes into built environments. While urbanization contributes significantly to economic growth and improved living standards, the absence of effective land-use planning and environmental regulation often leads to unsustainable urban sprawl, inefficient land consumption, and degradation of valuable land resources. This finding supports the Sustainable Development Theory, which advocates balancing socioeconomic development with environmental conservation to ensure the long-term sustainability of natural resources. The review also confirms that urban expansion has serious implications for land resources. The widespread conversion of agricultural land into residential and commercial developments threatens food production, rural livelihoods, and national food security. Soil sealing, erosion, and land degradation reduce the productive capacity of land while disrupting natural hydrological processes, thereby increasing flood risk and limiting groundwater recharge. These findings are consistent with the principles of Urban Ecology Theory, which explains that changes in land use alter ecological processes and weaken ecosystem resilience. Consequently, continued urban growth without effective land management poses significant risks to biodiversity conservation, ecosystem services, and sustainable development. The findings further indicate that urban expansion undermines environmental sustainability through increased pollution, biodiversity loss, habitat fragmentation, greenhouse gas emissions, and climate-related risks. The destruction of forests, wetlands, and other natural ecosystems reduces their capacity to regulate climate, purify water, sequester carbon, and support biodiversity. Nevertheless, the review demonstrates that these negative impacts can be significantly minimized through sustainable urban planning and integrated land management. Strategies such as compact urban development, green infrastructure, urban forestry, ecosystem restoration, effective zoning regulations, and community participation enhance environmental resilience while supporting economic growth. These findings highlight the importance of strengthening environmental governance, promoting

evidence-based planning, and integrating sustainability principles into urban development policies to achieve resilient cities and the sustainable management of land resources.

5.0 SUMMARY AND CONCLUSION

5.1 Conclusion

This study examined urban expansion and its effects on land resources and environmental sustainability through a comprehensive review of current scholarly literature and international policy reports. The findings revealed that rapid population growth, rural–urban migration, industrialization, infrastructure development, and weak land-use planning are the primary drivers of urban expansion. While urban growth contributes to economic development, employment creation, and improved access to infrastructure and social services, uncontrolled expansion has accelerated the conversion of agricultural land, forests, wetlands, and other natural ecosystems into built-up areas. Consequently, urban expansion has intensified land degradation, habitat fragmentation, biodiversity loss, soil sealing, and environmental pollution, thereby placing increasing pressure on limited land resources. The study further established that the adverse effects of urban expansion extend beyond physical land transformation to broader environmental sustainability challenges. The review showed that uncontrolled urban development contributes to declining ecosystem services, increased greenhouse gas emissions, disruption of natural hydrological systems, flooding, reduced groundwater recharge, and heightened vulnerability to climate change. These findings underscore the importance of integrating sustainable land-use planning, effective environmental governance, and ecosystem conservation into urban development policies. The application of Sustainable Development Theory and Urban Ecology Theory further demonstrates that balanced urban growth is achievable when environmental considerations are incorporated into planning and decision-making processes. In conclusion, urban expansion presents both opportunities and challenges for sustainable development. Although urbanization remains an important driver of economic growth and social transformation, its long-term benefits can only be sustained through responsible land management and environmentally sound planning practices. Achieving environmental sustainability requires coordinated efforts among governments, urban planners, researchers, private-sector actors, and local communities to promote compact urban development, protect ecologically sensitive areas, restore degraded landscapes, and strengthen the enforcement of land-use regulations. By adopting integrated and evidence-based approaches to urban planning, cities can accommodate future growth while conserving land resources, enhancing ecosystem resilience, and improving the quality of life for present and future generations.

5.2 Recommendations

The findings of this study highlight the need for governments at the federal, state, and local levels to strengthen urban land-use planning and environmental governance in order to manage urban expansion sustainably. Planning authorities should update and enforce comprehensive master plans, zoning regulations, and development control standards that discourage indiscriminate urban sprawl and protect agricultural land, forests,

wetlands, and other environmentally sensitive areas. Environmental Impact Assessments (EIAs) should be made mandatory for major urban development projects, while Geographic Information Systems (GIS) and remote sensing technologies should be integrated into urban planning to monitor land-use changes and support evidence-based decision-making. These measures will help achieve the study's objective of mitigating the adverse effects of urban expansion on land resources. To address the environmental challenges associated with rapid urban growth, policymakers should promote sustainable urban development strategies that enhance ecosystem resilience and improve environmental quality. Governments should invest in green infrastructure such as urban forests, parks, green belts, permeable pavements, and stormwater management systems to reduce flooding, improve biodiversity conservation, and mitigate the urban heat island effect. Policies should also encourage compact city development, mixed land-use planning, efficient public transportation, renewable energy adoption, and sustainable waste management. Furthermore, stronger collaboration among environmental agencies, planning authorities, academic institutions, and civil society organizations should be encouraged to ensure coordinated implementation of environmental sustainability initiatives. These interventions directly address the study's findings on the environmental implications of uncontrolled urban expansion. Finally, governments should establish policy frameworks that promote sustainable land management through stakeholder participation, institutional capacity building, and continuous environmental monitoring. Farmers, community leaders, private developers, and local residents should be actively involved in urban planning processes to encourage compliance with land-use regulations and foster community ownership of conservation initiatives. Regular monitoring of land-use changes, biodiversity status, and environmental quality should be institutionalized to evaluate the effectiveness of urban policies and guide adaptive management. In addition, increased funding should be allocated for environmental education, ecological restoration, and research on sustainable urban development to generate reliable evidence for policymaking. The implementation of these policy recommendations will contribute significantly to balancing urban expansion with the conservation of land resources and the achievement of long-term environmental sustainability.

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