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Smart land governance for sustainable development in Nigeria

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ABSTRACT

Context and background:

This study explored the relevance of smart land governance (SLG) for sustainable development in Nigeria. Generally, land governance plays a critical role in land accessibility, security, economic growth, social equity, and environmental preservation. In fairness, Nigeria has recorded numerous successes in the land governance system. Yet, various deficiencies in the land sector are yet to be addressed, disrupting the system effectiveness. These deficiencies impose insecurity on stakeholders while gradually depreciating national values. Reforming the land sector in a smart way is a recent practice that addresses land governance deficiencies using newly developed technological innovations, which are important to accomplish traditional, political, and social goals. This helps to create an inclusive society through equal and accessible land distribution by reshaping policy instruments, financing mechanisms, rules, protocols, and guidelines that govern land matters using technology tools for sustainable development to prevent harm from the present and future generations.

Goal and Objectives:

The relevance of smart land governance (SLG) in the study area was examined to enhance stakeholders' proper decision-making in the land sector to promote sustainable development in Nigeria. The objectives examined; a. how smart land governance could enhance the proper decision making of stakeholders in the land sector; b. the ways smart land governance could promote sustainable development for the present and future generations in Nigeria; and c. develop a framework that could enhance smart land governance.

Methodology:

The study used quantitative research methods to obtain meaningful and useful information. Purposive, systematic, and stratified research sampling techniques, i.e., mixed methods of data collection and analysis, were used. Primary and secondary data were sourced. 120 questionnaires were distributed, and 108 were retrieved. Key stakeholders who are in strategic positions in both the formal and informal land sector were surveyed.

Results:

The study revealed that smart land governance (SLG) system in Nigeria is possible but require full stakeholder support to maximize their workability and effectiveness, as it will promote transparency and boast an inclusive society for the benefit of present and future generations. Also, an insight into the benefits of smart land governance (SLG) was presented. A framework to enhance stakeholder and policy-maker decision-making was developed. Hence, it was concluded that an investment in advanced technological implements is necessary to stimulate strategic principles with respect to the principal multidimensional mechanisms of SLG.

Keywords: Land, Sustainable Development, Smart Land Governance, Land Sustainability, ICT.

1.0 INTRODUCTION

1.1 Background of the Study

Land and its related potentials in Africa and the world at large are fundamental to human existence and livelihood (Practices, 2023). This frequently appears as a pattern where 'man' or 'land' are no longer seen as isolated entities. Hence, the generosity in the nature of land consistently craves man's strong desire to own a piece of land for different purposes. Land as a unique possession can never be undermined in this present generation because it helps promote the sustainability of human existence. Harnessing land and its potential remains key to unlocking economic stability on any continent, and the African nation is not excluded (Rutherford, 2017). Hence, proper regulation and effective governance of land are needed for sustainable development in all spheres across the universe.

In many developed countries like the U.K. and U.S.A., land governance operating systems work meritoriously, unlike the majority of African nations. In their land sector, information and communication technologies (ICT) have been helpful to stakeholders in different categories (Schlimmer, 2021). They have been using advanced technological tools to administer and manage land regulatory systems and procedures, transparency, and structures through which decisions are implemented on land and its use (United Nations, 2016). This system has been helpful in executing and imposing techniques that address competing interests in the land sector. With a population of approximately 1,466,909,000 people and approximately 30.37 million kilometers of land mass in Africa and significant reserves of natural resources, Africa has the potential to build a prosperous economy and a well-functioning environment via land and its resources (Silva & Fernandes, 2020). However, key weaknesses in the land governance system pose potential constraints on the country's ability to realize its full economic and social potential.

In Nigeria, achieving successful governance in the land sector is typically technical, procedural, political, and slightly challenging in nature. This is pivotal to the effectiveness of the land delivery system, and it is about decision-making by selected leadership in the land sector. These selected leaders use diverse ideas, mechanisms, and tools for task execution. The decision-makers rule with sovereignty. Whatever their decisions, whether bad or good, favorable or against the beneficiary, they have superiority (Manasi & Change, 2017). The fact is that sound land governance is fundamental to achieving sustainable development and creating an inclusive society (Azadi et al., 2023). Recently, there have been huge changes in the invention of technological innovations that have changed the world completely (Toan & Nhu, 2020). It is crucial to address land governance for a well-functioning urban and rural land delivery system. Hence, smart land governance is needed as a pragmatic solution to land issues in Nigeria.

Land is a critical asset that needs to be protected and respected by the public and private sectors. Using technological approaches to address land governance challenges has gained relevance in many advanced countries and has come to stay globally. It has provided valuable solutions to land governance deficiencies. It has been helping policymakers make sensitive decisions on land allocation, conservation, and urban planning, among others (Bryan Ovie Ejumudo, 2015). In this way, smart land governance not only promotes sustainable development but also helps in transparency, accountability, and equitable access to land resources (Lawanson et al., 2018). There are numerous advantages of smart land governance (SLG), including but not limited to the eradication of costly conflicts that destroy termite lives, destroy property, eradicate delayed titling document registration, and restore economic growth. It secures land rights and allows communities to contribute in many important ways to protecting forests and biodiversity, lessening the harmful impacts of global climate change (Soyinka et al., 2016).

1.2 Statement of the Problem

The statement of problem identifies the subject matter challenges from two different points of view to provide a balance between reality and the literature. First, the current issues in reality and, second, the gap in the literature were briefly explained. Considering the modern trends of information and communication technology (ICT) advancement and its global merits, the land sector in Africa at large needs smart approaches to stay abreast of the revolutionary paradigm shift of this era. Over the years, many African countries have operated conventionally on land-related matters (Udoekanem et al., 2014). Although this system of operation has tremendously helped the land sector in Nigeria, it is now facing numerous challenges and limitations. These challenges include inefficient land administration systems, corruption, a lack of transparency, and inadequate access to land information for both individuals, businesses, and government agencies (Rutherford, 2017). Additionally, the rapid urbanization and population growth in Nigeria have further exacerbated these issues, making it imperative for the country to adopt innovative and technology-driven solutions for effective land governance. However, it is not yet perfect; the incorporation of technological innovation would contribute to a robust outcome to facilitate inclusive societal operation and transparency in land governance. The present rapid urbanization and population growth in Nigeria bring high challenges to managing land and land resources.

A number of studies have documented the problems associated with inefficiency in Nigerian land government in both developed and developing countries, although with different peculiarities. For example, in a developing country like Nigeria, land governance issues include inadequate land administration systems, corruption, a lack of proper land documentation, improper land use, a lack of indigenous land protection, and weak land tenure security, among others. These challenges hinder effective urban planning, land use regulation, and the equitable distribution of land resources. Therefore, embracing technological advancements such as Geographic Information Systems (GIS) and blockchain technology can help address these challenges and improve land governance in Nigeria. These tools can enable efficient land administration, transparent land transactions, and secure land tenure, thereby promoting inclusive societal operations and sustainable development in the country.

According to studies conducted by Azadi et al. (2023), Oliveira et al. (2020), Lawanson et al. (2018), and Rutherford (2017), their studies examined land governance and explored the concepts and factors to achieve greater sustainability and revealed that traditional land governance has shown little success due to the lack of intellectual and flexible thinking over governing the land sector. They advised that reforming land governance "in a smart way" is one of the most critical actions that could contribute to achieving effective land goals but did not develop a framework that could enhance smart land governance, which this study focused on.

According to Oladokun (2023), Fateye (2021), and Toan & Nhu (2020), their studies focused on improving land governance in Nigeria. The study used Edo State to analyze the case of compulsory acquisition and compensation practices with the aim of minimizing conflicts in land acquisition and compensation practices in Nigeria. It further explains the implications of uncoordinated land allocations arising from informal transactions. The paper revealed that the compensation for acquired landed properties in Nigeria violated the principles of good governance as compared to what is obtainable in advanced countries. It was also observed that the inadequacy of the compensation paid and the delay in payment are the causes of conflict between the acquiring authorities and the affected community or people. The paper concluded that a review of land policies on acquisition and compensation will be a panacea for achieving the principles of good governance. However, the study did not focus on smart land governance as a remedy to the challenges of compulsory acquisition and compensation practices; hence, this study did.

According to Schlimmer (2021) and Lawanson & Agunbiade (2017), their study focused on land governance and megacity projects in Lagos, Nigeria. The study used the Lekki Free Trade Zone as a point of investigation. This paper ponders the Nigeria Export Processing Zones Authority (NEPZA) Act, which focuses on economic

development in free-trade zones without thinking about the social and environmental effects and has a lot of problems. The study showed that there were big problems with the payment of compensation and resettlement arrangements, which left many residents in a bad financial situation. A more balanced approach to the megacity's development was proposed, incorporating social and environmental considerations alongside economic objectives. The study did not examine ways smart land governance could promote sustainable development for present and future generations in Nigeria; hence, this study bridges the gaps to introduce smart land governance for sustainable development. Therefore, the study addressed the following research questions:

- Could smart land governance enhance the proper decision-making of stakeholders in the Nigerian land sector?
- Could smart land governance aid sustainable development for present and future generations in Nigeria?
- What framework could enhance smart land governance in Nigeria?

1.3. Aim and Objectives of the study

The study examined smart land governance with a view to providing information that will enhance sustainable development in Nigeria. Hence, the specific objectives of this study were to:

- a. examine how smart land governance could enhance the proper decision making of stakeholders in the land sector;
- b. examine the ways smart land governance could promote sustainable development for the present and future generations in Nigeria; and
- c. develop a framework that could enhance smart land governance.

2.0 LITERATURE REVIEW

2.1 Land Governance in Nigeria.

Land governance in Nigeria consists of a series of frameworks, including rules and regulations, organizational arrangements, and techniques, that govern the ownership, use, administration, and management of land. The beginnings of land governance in Nigeria may be traced to the pre-colonial period (Agbosu, 1988). Then, ownership and management of land were held jointly by multiple ethnic groups. Each tribe has a unique land tenure system that was established around customary law. With the advent of colonialism, the British colonial government introduced a system of land registration and titling. The main aim of this system was to improve the growth of commerce and agriculture. However, this occurrence ended up resulting in the gradual eradication of customary land tenure systems and the displacement of several individuals from their ancestral territories.

After the attainment of independence in October 1960, the Nigerian government proceeded to uphold the practice of land registration and titling. Nevertheless, it is important to acknowledge that the government of the post-colonial era made significant efforts to address the challenges that had emerged as a result of colonial rule. As an example, the Land Use Act of 1978 conferred sole ownership of all land to the state while likewise ensuring the safeguarding of customary land rights for those who could substantiate their claims. Another significant policy was the National Land Policy of 1991, which aimed to promote sustainable land management, protect the rights of rural

communities, and address historical land injustices. Other main statutory laws governing land are the Customary Land Tenure Law, the Land Use Charge Law of Lagos State, Rent Control and Recovery of Premises Acts, Tenement Rate Laws, Registration of Titles Act, Land Registration Ordinance, Land Instruments Registration Laws, and Land Disputes Resolution, among others (Mcneil, 2021). These are statutory laws that grant land management, administration, protection, and usage privileges to citizens. The laws are characterized by their complexity and diverse nature because land is an asset collectively owned by Nigerians, and citizens should have legal rights to inheritance, transfer, and use, as the case may be (Haagsma & Mouche, 2020). Hence, the laws serve the purpose of safeguarding the rights pertaining to land ownership and use, both at the public and private levels. Additionally, it establishes a structured system for the resolution of conflicts arising from land-related matters.

The impact of land governance in Nigeria so far as to fairly promote the distribution of land and its resources, resolving land disputes, and promoting sustainable development in both rural and urban settlements This involves approaches that can improve transparency, efficiency, and accountability in land administration processes. Additionally, proper land governance helps in securing land tenure, which is essential for attracting investment opportunities, solving land conflicts, eradicating poverty, and promoting sustainability and economic development. These initiatives were important steps towards achieving land reform in Nigeria, but challenges such as corruption, inadequate resources, and conflicting legal frameworks continue to hinder their successful implementation.

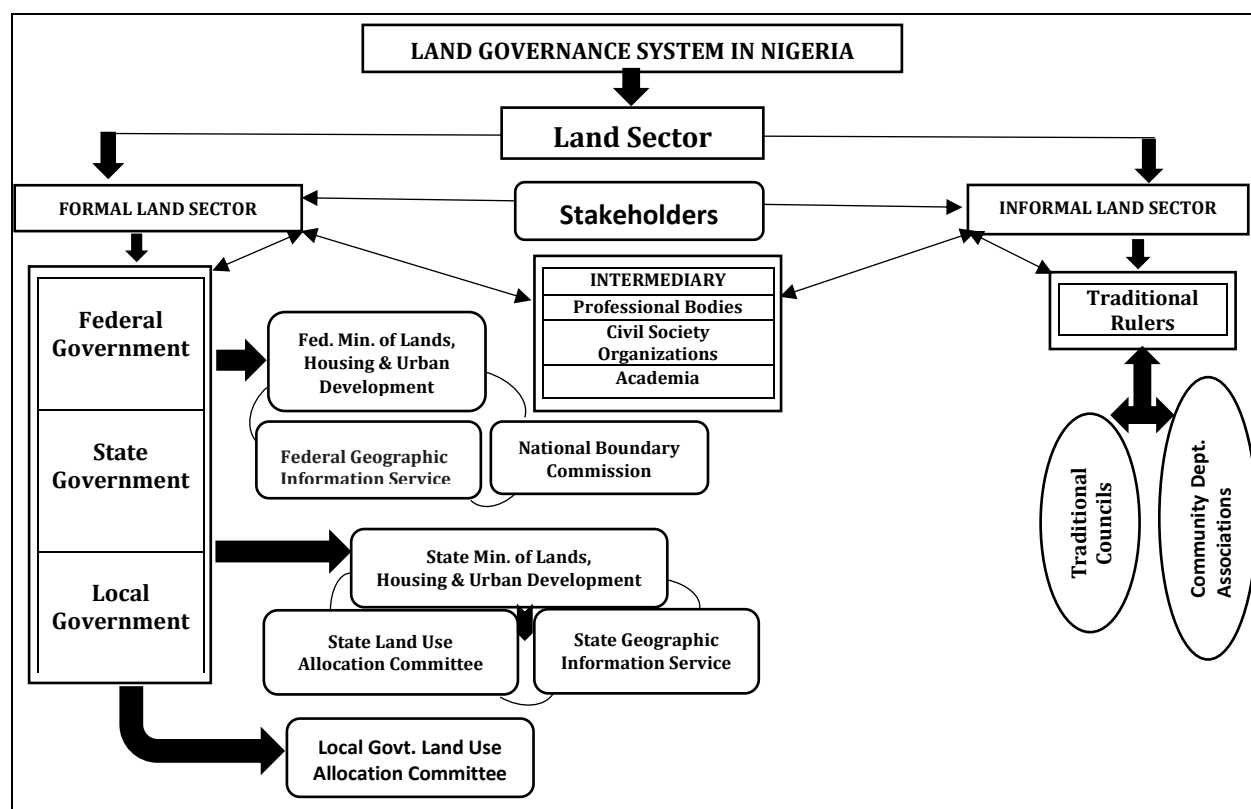


Fig. 1: Land Governance System in Nigeria
 Source: Author, (2023).

Figure 1 briefly illustrates the land governance system structure in Nigeria, showing the two (2) key groups of participants in the land sector (formal and informal). The system is complex, with multiple stakeholders

involved at different levels. The formal sector is the federal government, which has overall responsibility for land policy and administration, including the state and local governments, which play a significant role in implementing land policies and managing land resources at the state and local levels. The informal land sector is ruled by traditional rulers through traditional councils and community departmental associations. These groups also play important roles in land governance, particularly in rural areas.

2.2 Current Issues with the Land Governance Systems in Nigeria

Over the years, the Nigerian land governance system has played a significant role in shaping the land sector. However, there are deficiencies that result in various damages among stakeholders. These are issues deeply rooted in customs and practices that have been manifesting over time because Nigeria is a fast-growing middle-income country that mainly relies on land and its resources for national sustainability. Among the various challenges, but not limited to those emanating from the current land governance system in Nigeria, are discussed as follows:

- **Lack of access to land data and valuation inaccuracy:** Over the years, the Nigerian land sector has suffered from a dearth of complete and current data inside their land registries. Also, valuation inaccuracy is due to a lack of a data bank. This hinders accurate value, effective management, and recording of land tenure and identity, although there are slight changes now at FCT-Abuja and Lagos State. As a result, these circumstances have given rise to disagreements and hostilities around the possession of land, along with several challenges in attracting investment opportunities and fostering economic stability.
- **Lack of technical capacity:** One of the primary obstacles in the land sector facing land governance pertains to the technological capability required for gathering data. This issue is very critical in many Nigerian states. Additionally, the inability to effectively analyze the data that is available is another significant problem. Also, the sharing of data with suitable users has been insufficient. This challenge results in the documentation and monitoring of land ownership, which emanates from contemporary mapping technologies and information systems.
- **Weak institutional capacity and governance structures:** These include a lack of coordination between different government agencies and a lack of political will to implement land reforms due to personal interests. This hinders the effective management and regulation of land administration processes, leading to inefficiencies and inconsistencies in decision-making, ultimately impeding economic growth.
- **Lack of transparency and corruption:** This is another challenging issue facing land governance in the land sector. This contributes to the increase in informal operating systems. The presence of corruption and a lack of transparency in land transactions provide substantial obstacles to land governance systems. One additional difficulty pertains to the escalating rise of the population and urbanization, resulting in heightened land rivalry and encroachment against community and customary lands. The aforementioned problems need the enhancement of the capabilities of governmental agencies and organizations engaged in land

administration, as well as the exploration of resourceful approaches to enhance land governance in Nigeria for sustainable development.

- **Outdated legal framework:** The presence of an outdated legal framework significantly increases the difficulties encountered in land governance in Nigeria. Several rules and regulations pertaining to land transactions are outdated and inadequately reflect the complexities inherent in contemporary land matters. This phenomenon gives rise to a state of perplexity, disagreements, and a dearth of lucidity about land ownership and entitlements. Few existing legal structures often exhibit deficiencies in terms of safeguarding communal and customary lands, rendering them susceptible to interruption and exploitation. To properly tackle these difficulties, it is crucial to undertake a comprehensive update and modernization of the legislative framework that governs land management in Nigeria.
- **Land Grabbing and Speculation:** Land grabbing and speculation are key problems attacking the land governance system, as recently reported in Nigeria. The practice is powered by influential personalities and organizations in society and even by collaboration with foreign investors. These actors often used political connections to unlawfully take possession of land, leaving the original landowners disenfranchised. The relocation of rural land and the destruction of traditional livelihoods have been seen as consequences of large-scale land acquisition carried out by both domestic and international investors for commercial objectives. Moreover, the issue is further compounded by speculative behaviors, which include the purchase and sale of land only for the sake of financial gain without any intention of using it for community mutual benefits. To effectively tackle these concerns, it is imperative to implement efficient legislative measures and enforcement mechanisms via a smart land governance system while also actively engaging local people and acknowledging their rightful land ownership. Nigeria may attain sustainable and inclusive land governance just through the effective resolution of these difficulties.
- **Inefficient Land Administration:** The issue of inefficiencies in land administration in many Nigerian land departments worsens the system. The land administration process in Nigeria was often characterized by inefficiency and a lack of transparency. Delays in land registration and property transactions were common, discouraging potential investors and hindering economic development.
- **Land disputes and conflicts:** This challenge often arises as a result of ambiguous land titles and insufficient documentation practices. The presence of land disputes and conflicts erodes land users confidence and poses obstacles to the advancement of sustainable growth. The implementation of transparent and effective land administration procedures, such as the digitization of land records and the establishment of systematic land registration, plays a vital role in addressing these challenges. It is essential to implement capacity-building initiatives aimed at providing training on the use of technological devices to authorities and empowering both rural and urban people, enabling them to actively engage in the land governance system. Nigeria can only construct an efficient and equitable land governance system that fosters

sustainable development and safeguards the rights of its population through the implementation of these comprehensive endeavors.

- **Weak land rights for women:** Gender discrimination in the land sector is at a high rate in Nigeria. Customary practices and traditional norms sometimes discriminate against women's land rights. The problem of limited land rights for women is a significant concern within Nigeria's traditional land governance structures. Despite ongoing initiatives aimed at promoting gender equality, women still encounter substantial obstacles when it comes to acquiring and possessing land. Discriminatory cultural norms and customary laws sometimes exhibit a tendency to favor male inheritance rights, resulting in women being subjected to restricted or nonexistent authority over land. The absence of a reliable system for land ownership not only affects the ability of women to achieve economic empowerment but also perpetuates existing gender disparities and poses obstacles to the pursuit of sustainable development within the nation. In order to effectively transform land governance institutions, it is imperative to prioritize the resolution of gender imbalances and the establishment of equitable land ownership and control for women.
- **Inadequate Urban Planning:** Rapid urbanization in Nigeria's main cities has given rise to a range of difficulties pertaining to the management of urban land. Unplanned urban settlements, impoverished neighborhoods, and unregulated land markets were prevalent, posing challenges to the progress of urban development and the provision of essential services.
- **Insecurity:** Insecurity in various parts of Nigeria also affected land governance. Broader security concerns, such as tensions between different ethnic and religious groups, sometimes made land disputes and conflicts worse. Insecurity and inadequate safety measures in urban settings have a further impact on the persistence of gender differences.
- **Lack of Land Use Planning:** Lack of Land Use Planning has been a significant issue in many urban areas in Nigeria, and it is leading to competing interests. This has resulted in haphazard development, inefficient land use, and a variety of social and environmental problems. Without proper land use planning, cities and towns struggle to accommodate their growing populations, resulting in overcrowding, traffic congestion, and inadequate infrastructure. The absence of planning often leads to the destruction of natural habitats and the loss of valuable land. Overall, the absence of land use planning has far-reaching consequences that affect the quality of life for both rural and urban residents and the sustainability of the environment.

Summarily, it is important to recognize that addressing these issues requires a concerted effort from the government, civil society, and international organizations. Alternatively, the adoption of smart land governance systems will increase transparency, sustainability, and efforts to secure land rights for all citizens.

2.3 Why Smart Land Governance in Nigeria Now?

Addressing the deficiencies in the land governance system requires the adoption of smart land governance, as it is worthwhile to create permanent solutions. Studies by a few researchers show how technology has helped in reshaping the land governance system in many advanced countries. This can also assist in building an effective land governance system in Nigeria. Although this concept is a new area that researchers and policymakers have yet to fully explore Nigeria. Over time, the conventional land governance system has yielded great success in addressing land matters, but it has its strengths and weaknesses. The strengths have provided both equity and legal rights over the years, while the weaknesses have imposed immeasurable damages on both formal and informal land sector stakeholders. Therefore, it will be just to make efforts to reform the land sector via smart land governance, as this will eliminate the weaknesses that impose damages on society. Azadi et al. (2023) discovered that reforming land governance “in a smart way” is one of the most crucial arrangements that could contribute to achieving land sustainability in any nation. As smart land governance (SLG) is a systemic way of digitalizing land operational systems, this will help in keeping accessible a uniform system of land administration, management, specification, documentation, data storage and sharing, formal and informal land market operation, ownership, value, and uses. In Nigeria, land governance system challenges are not alien but as old as time. Ever since then, efforts have been set up towards reforming the deficiencies in the land sector, but with little to no success.

Now, the incorporation of technology into the land governance system is more important than ever before due to the country's rapid population growth and civilization to curtail the present damages in the land sector from speeding to the next generation. This rapid development has led to a surge in demand for land and its resources, which has resulted in countless land conflicts and disputes over land rights, among other issues. This demands a sense of urgency for implementing smart land governance (SLG) practices to help eradicate all the deficiencies and promote transparency, efficiency, and accountability in both the formal and informal land sectors. Thus, collective efforts towards creating smart land governance (SLG) will sustain sustainable development initiatives and ensure that land resources are utilized in a way that benefits both present and future generations in the country.

2.4 Achieving Sustainable Development via Smart Land Governance in Nigeria.

Universally, Australia, Canada, Singapore, and the United Kingdom are some of the few countries flourishing in the operation of smart land governance systems. These countries have recognized the importance of smart land governance for achieving sustainable development and have implemented various strategies and technologies to effectively manage their land resources. Nigeria is a country with vital land and rich natural resources, but its land sector has various deficiencies. The potential benefits of smart land governance in Nigeria are vast. By implementing effective strategies and technologies, Nigeria can ensure sustainable use of its land resources, leading to economic growth, improved food security, and environmental conservation. With smart land governance, the country can attract more investment, create job opportunities, and enhance overall development. However, to overcome barriers, it requires the country to prioritize capacity building, promote collaboration between stakeholders, and establish strong legal frameworks that promote both legal and equity rights in the land sector for sustainable development. Recently, the Nigerian government has been striving hard to address a wide range of land-related challenges to have an inclusive and beneficial society. This comes to light to protect the rights of vulnerable ones and create a more favorable

environment for local and foreign investors. Conclusively, smart land governance in Nigeria will play a vital role in shaping the future of present and future generations and ensuring more just and sustainable urban development.

The need for sustainable development in Nigeria at this junction is of the utmost urgency and could be enabled through a smart land governance system. These solutions have the potential to optimize land administration operations, boost transparency, and foster public involvement. An illustration of the potential benefits of implementing a digital land register system includes streamlining land registration procedures and mitigating unscrupulous practices. Furthermore, the use of advanced Geographic Information Systems (GIS) allows for the mapping and analysis of land data, facilitating more informed decision-making and planning. Through the use and integration of these new technologies, Nigeria has the potential to enhance and modernize its land governance procedures, thereby facilitating the attainment of sustainable development objectives in the long run. Hence, to incorporate the implementation of smart land governance practices, which play a pivotal role in fostering economic advancement, safeguarding the environment, and promoting social fairness, it is necessary to increase the level of technological advancement in the country. Therefore, a smart land governance system is seen as a means of ensuring sustainable development in Nigeria. Thus, a few key components of smart land governance are discussed below.

1. **Digitization of land records:** This is one of the key components is the establishment of digital land registries. This will help to achieve comprehensive and up-to-date information on land ownership and land use. The integration of these systems within the framework of Nigerian land governance has the potential to enhance transparency and efficiency in land administration. Through the process of digitization, the government may effectively convert land records into electronic format, therefore facilitating convenient access for the general public. This proactive approach has the potential to mitigate instances of corruption and conflicts arising from issues pertaining to land ownership.
2. **Geographic Information Systems (GIS) and Remote Sensing:** Another component is geospatial technology, known as Geographic Information Systems (GIS) and remote sensing, to map and monitor land use changes, which will improve the system. Through this, the Nigerian government can leverage similar technology to better manage its land resources, assess land degradation, and plan for sustainable urbanization and agricultural development. The use of Geographic Information Systems (GIS) may provide precise cartography and spatial information, facilitating enhanced land management and the allocation of land and various land resources. Also, the use of these tools and technology will not only have the potential to enhance the efficiency of land governance procedures but also have the capacity to empower individuals with accurate information, thereby building a more participatory and knowledgeable society.
3. **E-Government Services:** E-government services are necessary for sustainability. Implementing e-government services for land-related transactions will help streamline processes, reduce corruption, and enhance transparency. Nigeria can learn from the digital platforms used in advanced countries to simplify land title registration, land valuation, and property tax collection. This will also assist in achieving standard land use planning. This is

because effective land use planning is crucial for sustainable development. Nigeria can adopt best practices from these advanced countries in zoning regulations, environmental impact assessments, and urban planning to ensure that land is used efficiently to achieve sustainable development goals. Similarly, it is not bad to encourage public participation; this will encourage citizens to get involved in land governance decisions for societal inclusivity and transparency. Nigeria can learn from the public consultation processes used in the United Kingdom to involve citizens, communities, and stakeholders in land-related decisions.

4. **Land rights and access to land:** This should be prioritized without any bias. Ensuring secure land rights for all citizens, especially marginalized communities. Nigeria can take inspiration from the land tenure and land rights systems in these countries to address land tenure issues. Thus, this will help reduce land grabbing and promote equitable land access, while also increasing land sustainability. In doing this, we will help in capacity building. Building the capacity of government officials and land administrators is crucial for the successful implementation of a smart land governance system. Nigeria can establish training programs and partnerships with international organizations to enhance the skills and knowledge of its land management professionals.
5. **Land governance requires proper data management.** The Nigerian government can establish data repositories and standards in the land sector. This will ensure precise and trustworthy land-related data to support decision-making and policy formulation. However, this required the system to be updated using a workable legal framework. This will strengthen the legal framework. Nigeria can review its land laws and regulations to align them with best practices and ensure that they promote sustainable land management.
6. **International collaboration:** International collaboration on land matters is essential to achieving sustainable development goals. By working together, countries can share knowledge and resources, pool expertise, and develop common solutions to solve common problems. Collaborating with international organizations and seeking technical assistance can help Nigeria implement a smart land governance system successfully. These partnerships can provide funding, expertise, and access to best practices.

Thus, Nigeria can achieve sustainable development through smart land governance by learning from the experiences of advanced countries like Australia, Canada, Singapore, and the United Kingdom

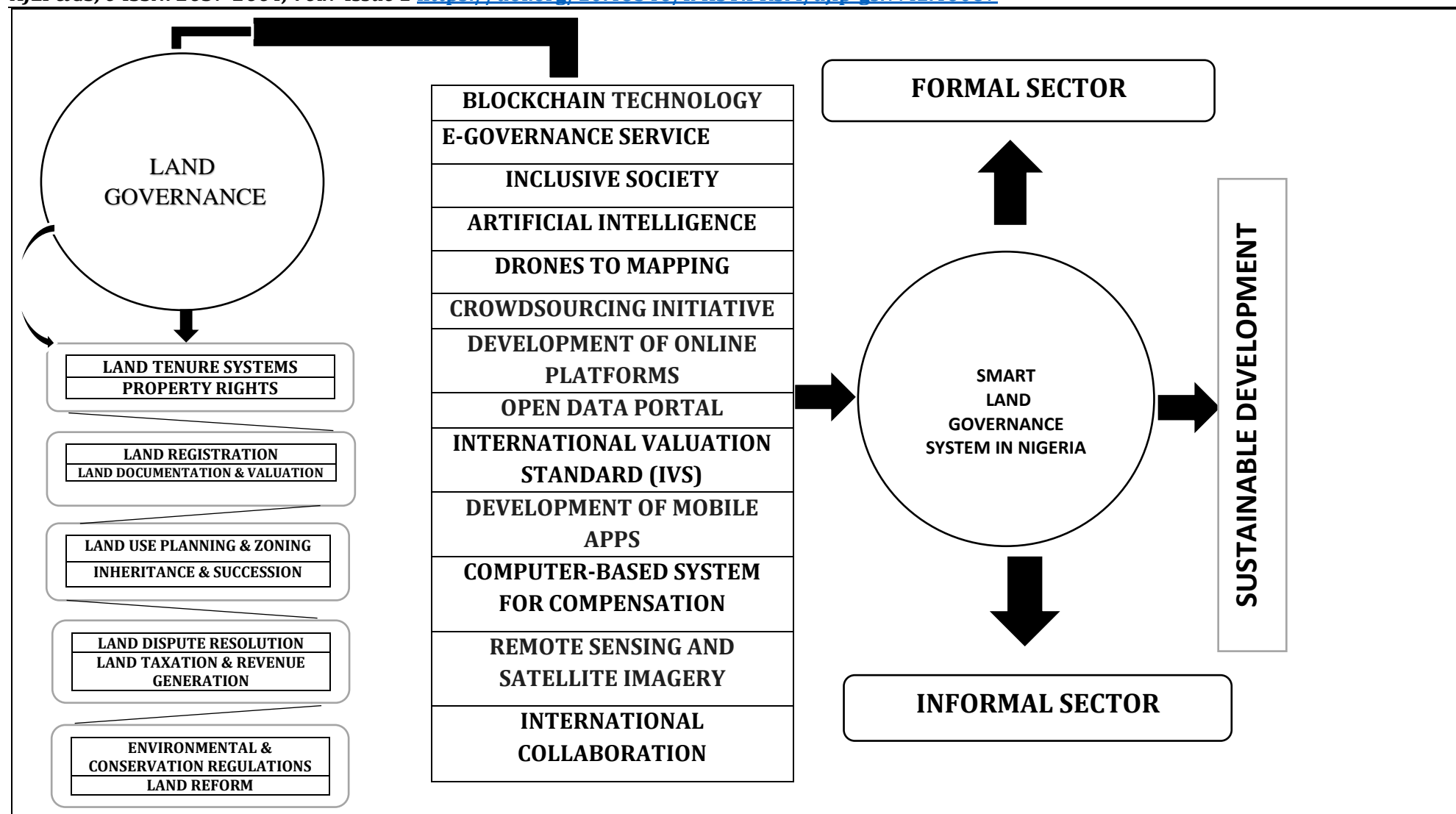


Fig. 2: Framework for smart land governance (SLG) for sustainable development in Nigeria.

3.0 RESEARCH METHODOLOGY

3.1 Area of the Study

The study area for this research is Nigeria, South-West of Africa.



Fig. 3: Map of Nigeria Showing the six geo-political regions

Source: Internet.

3.2 Scope of the Study

The scope of the study was to examine how smart land governance systems can enhance stakeholders' decision-making in the land sector. Also, the study envisages how smart land governance (SLG) can help promote sustainable development for present and future generations, with the expectation that the outcome will help in developing a framework to enhance smart land governance (SLG) in Nigeria.

3.3 Research Design

The study adopted quantitative and qualitative research methods. Also, a systematic and purposive sampling technique was used. Thus, the six geopolitical zones in Nigeria, namely, the south-west, north-east, north-west, north-central, south-east, and south-south, were examined. 120 questionnaires were administered to the targeted respondents, with a target of 20 questionnaires for each geopolitical zone. At the end of the exercise, 108 questionnaires were retrieved. The author and three (3) research assistants were engaged to obtain data from all the geopolitical regions in Nigeria. The research assistance helped to bridge language barriers with community leaders in a few communities. This strategy helped to increase the number of responses. This is justified because Nigeria is composed of different ethnicities, with educated and uneducated people. Additionally, the retrieved data expressly states respondents' dissatisfactions about land challenges affecting them.

3.3.1 Data Analysis and Interpretation

i. The Respondent Characteristics:

This section discuss the key characteristics of the respondents for this study.

Table 1: Respondent Characteristics

RESPONDENTS		Formal	Informal	Total
Sex	Male	30	47	77
	Female	12	19	31
	Total	42	66	108
Level of Education	Not educated	3	9	12
	Primary/secondary	9	4	13
	ND/NCE	1	7	8
	BSc/HND	3	9	12
	Postgraduate	5	0	1
	Total	42	66	108
Status	Government Agencies	16	22	38
	Private agencies	15	14	29
	Financial institution	11	0	11
	Residents / citizens/ Community heads	0	30	30
	Total	42	66	108

Source: field survey (2023).

Table 1 above shows the characteristics of the respondents in the study area. Thus, exploring comprehensive knowledge of respondent characteristics as stated above such as sex, educational level, status in the land sector, and other various influencing elements that shape individuals' views towards the subject matter will enhance government agencies, policymakers, and practitioners ability to formulate and carry out programs that are more likely to have an increased chance of achieving success in smart land governance in Nigeria.

ii. Adequacy of Land Governance in Nigeria:

The adequacy of land governance in Nigeria is a complex issue, with both strengths and weaknesses. Nigeria has made significant progress in recent years in terms of land reform. However, there are also a number of weaknesses in the land governance system. This section explored the level of adequacy and inadequacy of land governance in Nigeria.

Table 2: Adequacy of Land Governance in Nigeria.

Respondents	Level of Adequacy and Inadequacy of Land Governance in Nigeria		
	Adequate	Inadequate	Total
Formal Sector	15(35.70%)	27 (64.30%)	42 (100%)
Informal Sector	12 (18.18 %)	54 (81.82%)	66 (100%)
Total	27 (25.00%)	81 (75.00%)	108 (100%)

Source: field survey (2023).

Table 2 above shows respondents' perceptions of the land governance system in Nigeria. The study examined the targeted respondents using both formal and informal land sector participants to obtain data on the level of adequacy and inadequacy of the current land governance system in Nigeria. From the formal land sector participants, 35.70% of the respondents affirm that the current land governance in Nigeria is adequate, while 64.30% disagree that the system is inadequate enough to sustain the present and future generations. As for

the informal land sector participants, 81.82% confirmed that the land sector is not adequate enough, while the other 18.18% agreed that the system is adequate. In summary, 75.00% of the respondents state that the land governance system is not functioning adequately, while 25.00% state it is adequately functioning. Hence, this implies that there are still deficiencies in the land sector that the land governance system has yet to address.

iii. Adoption of Smart Land Governance in Nigerian Land Sector.

The adoption of smart land governance in the Nigerian land sector is still in its early stages and alien to many, although there are a number of initiatives the government is working upon. Thus, this section explored land sector stakeholders’ responsiveness to this initiation.

Table 3: Adoption of Smart Land Governance in Nigerian Land Sector.

Respondents	Frequency
Formal Sector	
Acceptance of SLG	35 (83.33%)
Rejection of SLG	7 (16.60%)
Total	42 (100%)
Informal Sector	
Acceptance of SLG	52 (78.79%)
Rejection of SLG	14 (21.21%)
Total	66 (100%)

Source: field survey (2023).

Table 3 above shows the respondents’ reactions to the adoption of smart land governance in the Nigerian land sector. 42 respondents were surveyed from the formal segment of the land sector. 83.33% want the adoption of smart land governance (SLG), while 16.60% reject the adoption. On the contrary, the informal land sector respondents were 66 in number; 78.79% want a smart land governance system, while 21.21% are not willing. This implies that the smart land governance (SLG) system will succeed if fully implemented in the Nigerian land sector, as many stakeholders in the land sector are willing to receive a system that promotes inclusiveness and land sustainability.

iv. Tools for Enhancing Smart Land Governance for Sustainable Development in Nigeria.

As technology continues to develop, the land governance system needs robust tools to keep abreast of global standards. This will assist in improving the efficiency, transparency, and accountability of land governance in a smart way, which will in turn address many of the challenges facing land governance, such as corruption, fraud, and inefficiency. Thus, this section explores different tools that will enhance the Nigerian land sector’s operational system in a smart way.

Table 4: Tools for stakeholders’ decision making for Sustainable Development

Tools for enhancing SLG
1. Creation of data base for land valuation exercise
2. Creation of open data portal
3. Crowdsourcing initiative to collect data on land ownership in rural areas.
4. Development of mobile apps to help farmers manage their land more sustainably
5. Development of online platforms for citizens to access land information and submit land-related applications.
6. Moderate adoption of artificial intelligence (AI) and machine learning

7. Promotion of an adequate computer-based system for compensation of land forcefully acquired for public interest
8. Usage of blockchain technology to create secure and tamper-proof land records system
9. Usage of drones to map land use and identify areas that are at risk of deforestation.
10. Usage of remote sensing and satellite imagery to monitor illegal logging and mining activities.

Source: Field survey (2023).

Table 4 above shows different tools to enhance stakeholders' decision making. It shows that smart land governance is not just about technology but also about creating a more inclusive and participatory process for about land. Thus, this implies that smart land governance (SLG) tools should be used in a way that empowers citizens and gives them power in land decision-making.

4.0 CONCLUSION

In this era, technology will continue to evolve. Smart land governance (SLG) is still a relatively new concept in Nigeria but is massively gaining influence. The Nigerian government has recognized the potential of smart land governance (SLG) as a way to address the challenges facing land governance in the country and has committed to supporting the development and implementation of the initiatives. Now, the land governance system in Nigeria needs more technological tools for the full implementation of smart land governance. The study observed that there are some key challenges that need to be addressed in order to successfully implement smart land government (SLG) in Nigeria.

First, there is resistance to change and a lack of awareness and understanding of smart land governance (SLG). There is an observation that many Nigerians are unaware of what smart land governance (SLG) is or how it can benefit them, and those that are aware are resilient to change and may be reluctant to adopt new technologies, improvements, and practices. Hence, it is important to engage with stakeholders and build consensus around smart land governance (SLG) initiatives. It is also advisable to raise awareness and understanding of the concept among the public and government officials.

Second, the high cost of technological tools can discourage the government and other land participants. The technology required to implement smart land governance (SLG) can be expensive for land sector participants. It is important to find ways to make SLG more affordable, such as through public-private partnerships. Third, there is a limited capacity among the experts. Nigerians have a limited number of experts with the skills and knowledge necessary to implement smart land governance (SLG). Hence, it is important to invest in training and capacity-building programs to develop a workforce that is skilled enough. Therefore, despite the challenges of land governance, the potential benefits of smart land governance (SLG) for sustainable development in Nigeria are significant and needed at this time to protect the present and future generations. Thus, this study will help government agencies, policymakers, experts, and researchers improve land governance in decision-making, reduce insecurity and corruption, and promote land sustainability that is productive and equitable for all in Nigeria.

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7.0 ADDITIONAL READING

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8.0 KEY TERMS AND DEFINITIONS

Sustainable Development: Sustainable development is an approach to development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is a holistic approach that takes into consideration the economic, social, and environmental dimensions of development. Sustainable development is a challenging goal, but it is essential for the future of our planet and our species.

Smart Land Governance (SLG): This is a new approach to land governance that leverages technology and innovation to improve the efficiency, transparency, and inclusiveness of land management. It is based on the idea that by using data and technology, we can make better decisions about how to use and manage land and its resources.

Land Sustainability: Land sustainability is the ability of land to meet the needs of the present without compromising the ability of upcoming generations to meet their own needs. It is about using land and its resources in a way that protects the environment, promotes economic development, and ensures inclusiveness.