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IMPACT OF GREEN ECONOMY ON NATURAL RESOURCE GOVERNANCE IN NIGERIA

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Abstract

This study examined the impact of green economy on natural resource governance in Nigeria from 1989 to 2024. The study employed an ex-post facto research design and utilized time series data sourced from the Central Bank of Nigeria, World Bank's World Development Indicators, Worldwide Governance Indicators, and Food and Agriculture Organization. Augmented Dickey-Fuller test was used to determine the stationarity properties of the variables, while the Autoregressive Distributed Lag (ARDL) bounds testing approach was employed to examine both short-run and long-run relationships. The findings revealed that renewable energy consumption exerts a positive and statistically significant effect on natural resource governance, while forest area and arable land cultivation exhibit negative and significant effects. GDP growth and oil rent showed insignificant effects. The error correction term was negative and significant, confirming a stable long-run relationship with a moderate speed of adjustment. The study concludes that green economy initiatives exert mixed effects on natural resource governance,

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with renewable energy emerging as the most significant positive driver. The study recommends strengthening institutional frameworks for forest and land resource governance, prioritizing renewable energy adoption, and ensuring transparent management of oil revenues to promote sustainable natural resource governance in Nigeria.

Keywords: Green Economy, Natural Resource Governance, Renewable Energy Consumption, Forest Area, Arable Land Cultivation, ARDL Model, Nigeria

INTRODUCTION

Nigeria is abundantly endowed with natural resources, particularly crude oil and natural gas, which have remained the mainstay of the nation's economy for over five decades. The country is Africa's largest oil producer and possesses substantial reserves of natural gas, coal, and other solid minerals. According to the Central Bank of Nigeria, crude oil contributes about 90 percent of export earnings and over 70 percent of government revenue, making the effective governance of these resources critical to national development (CBN, 2023). The Niger Delta region, comprising states such as Akwa Ibom, Delta, Rivers, and Bayelsa, serves as the center of Nigeria's oil and gas production activities and remains the economic lifeline of the country (Olawale and Sun, 2020). Despite this enormous resource wealth, Nigeria continues to experience widespread poverty, unemployment, environmental degradation, and inadequate infrastructure, a paradox commonly referred to as the "resource curse" (Sachs and Warner, 2001). This paradox raises fundamental questions about the effectiveness of natural resource governance in translating resource wealth into sustainable socio-economic development (Ejere and Uko, 2026).

Natural resource governance refers to the processes, institutions, laws, and policies through which natural resources are managed and utilized for the benefit of society. Effective natural resource governance involves accountability, transparency, community participation, environmental sustainability, and equitable distribution of resource benefits (Eke and Augustine, 2022). According to Okon and Udo (2021), good governance in the management of natural resources enhances economic growth, social stability, environmental protection, and sustainable development. However, in many developing countries, weak institutional frameworks, corruption, poor policy implementation, and inadequate regulatory enforcement have limited the ability of natural resources to translate into meaningful socio-economic development (Ikelegbe, 2020). In the absence of effective governance structures, resource wealth often leads to environmental degradation, social conflicts, rent-seeking behavior, and public distrust in government institutions (World Bank, 2019). These governance failures have

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negatively affected the provision of essential social amenities such as healthcare services, road infrastructure, and educational facilities in many oil-producing communities (Ejere and Uko, 2026; Akpan, and George, 2020).

In response to these challenges, the concept of the green economy has emerged as a transformative paradigm that seeks to reconcile economic growth with environmental sustainability and social equity. The United Nations Environment Programme defines the green economy as a model that enhances human well-being, fosters societal equity, and mitigates environmental risks while significantly reducing ecological scarcities (UNDESA, 2012; Albino, 2013). The green economy encompasses renewable energy transition, sustainable agriculture, waste management and recycling, and sustainable transport infrastructure (Fagorite et al., 2024). In Nigeria, the adoption of green economy principles is increasingly recognized as essential for addressing the twin challenges of environmental degradation and underdevelopment. Jacob and Umoh (2022) noted that Nigeria's energy sector remains far from becoming a green economy despite having over five decades of experience in the petroleum industry, with the government continuing to openly flare gas and the zero-gas-flare policy appearing to have no end in sight. The transition to a green economy is therefore considered the only viable option for satisfying the country's diverse energy needs without jeopardizing issues of long-term sustainability (Jacob and Umoh, 2022).

The emergence of green finance mechanisms has further reinforced the potential of the green economy to transform natural resource governance in Nigeria. Green finance encompasses financial instruments and investments aimed at supporting sustainable projects, including green bonds, green loans, and carbon finance (Ike and Oghene, 2025). Ozoemena et al. (2026) observed that while Nigeria has demonstrated commitment to green financing through initiatives such as the Nigeria Sustainable Banking Principles, the Climate Change Act 2021, and the establishment of the FMDQ Green Exchange, significant challenges persist. These challenges include infrastructure gaps, lack of long-term capital, high financing costs, budget limitations, and personnel capacity gaps. Pat-Natson et al. (2025) found that green finance instruments significantly influence environmental sustainability, with carbon finance and green loans negatively affecting carbon dioxide emissions while electricity production from hydroelectric sources serves as a positive predictor. Furthermore, Ike and Oghene (2025) demonstrated that green bonds issuance, green loans and credit facilities, and renewable energy investments have statistically significant positive effects on Green GDP, with renewable energy investments exhibiting the most substantial effect. These findings suggest that effective deployment of green finance mechanisms could enhance the governance of natural resources

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by providing alternative financing pathways that promote environmental sustainability and equitable development.

However, the implementation of green economy initiatives in Nigeria faces significant institutional and governance challenges that undermine their potential to transform natural resource governance. Udeogu and Ikeda (2025) revealed that the delay by the National Council on Climate Change in developing and implementing national policy documents contributed to the persistence of greenhouse gas emissions in Nigeria. The study further found that slow responses to climate change emergencies, poor coordination among government agencies, and insufficient budgetary allocations contributed to uncontrolled emissions across energy, transportation, and agricultural sectors. At the broader conceptual level, the study published in the AKSU Journal of Management Sciences (2025) established that except for rule of law and voice and accountability, which were negatively correlated with green innovation, the other governance indicators including control of corruption, government effectiveness, regulatory quality, and political stability were positively correlated with green innovation. The Toda-Yamamoto causality analysis revealed a unidirectional causality flow from regulatory quality to green innovation, underscoring the critical role of governance quality in promoting green innovation. Mgbomene and Dim (2024) found that the green economy in Nigeria has not been adequately utilized for enhancing the living standards of the people, with renewable energy consumption and arable land cultivation negatively affecting per capita income while access to renewable energy was the only variable with positive effects. These mixed findings underscore the need for a comprehensive examination of how green economy initiatives influence natural resource governance outcomes, particularly in terms of transparency, accountability, community participation, and equitable benefit-sharing in Nigeria's resource-rich communities. It is against this backdrop that this study examines the impact of green economy on natural resource governance in Nigeria.

LITERATURE REVIEW

Conceptual Review

Green Economy

The concept of green economy has gained significant prominence in global development discourse as a pathway to achieving sustainable development. The United Nations Environment Programme defines the green economy as a model that enhances human well-being, fosters societal equity, and mitigates environmental risks while significantly reducing ecological scarcities (UNDESA, 2012; Albino, 2013). According to FAO (2010), a green economy is historically understood as an economic system that is compatible with the natural environment

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and thus environmentally friendly, but the concept has evolved to consider social issues including equity, poverty reduction, and inclusive growth. The green economy aims to overcome the reductionist approach that has considered gross domestic product as a simple measure of overall market economic activity as a signal of progress and societal well-being. Instead, it promotes sustainable economic progress that balances economic growth with environmental protection and social justice. Fagorite et al. (2024) identified four main components of Nigeria's green economy framework including renewable energy transition, sustainable agriculture, waste management and recycling, and sustainable transport infrastructure. These components are designed to address environmental challenges while promoting economic diversification and job creation.

Natural Resource Governance

Natural resource governance refers to the institutional frameworks, policies, laws, and decision-making processes through which natural resources such as oil and gas are managed, allocated, and distributed for societal benefit. It emphasizes how governments, regulatory agencies, and other stakeholders ensure transparency, accountability, equity, and sustainability in the exploitation of natural resources (Eke and Augustine, 2022; Tanne, et al., 2025). According to Ejere and Uko (2026), effective natural resource governance involves accountability, transparency, community participation, environmental sustainability, and equitable distribution of resource benefits. In resource-rich regions like the Niger Delta, governance structures determine whether oil wealth translates into development or leads to the resource curse phenomenon characterized by poverty, environmental degradation, and underdevelopment (Ikelegbe, 2020). The concept of natural resource governance extends beyond mere revenue generation to encompass the equitable distribution of benefits among stakeholders, including host communities. Weak governance systems often result in corruption, mismanagement of funds, lack of transparency, and poor accountability, which negatively affect development outcomes (Adebayo, 2021). Furthermore, effective governance requires strong institutions capable of enforcing environmental regulations, ensuring fair revenue allocation, and promoting community participation in decision-making processes (Udo and Etim, 2023).

Green Finance

Green finance represents a critical mechanism through which green economy principles can be operationalized to enhance natural resource governance. Green finance encompasses financial instruments and investments aimed at supporting sustainable projects, including green bonds, green loans, and carbon finance (Ike and Oghene, 2025). According to Pat-Natson et al.

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(2025), green finance involves directing financial resources towards projects, regulations, and products that foster sustainable development and a more environmentally friendly economy. It goes beyond climate finance to include goals like reducing industrial emissions, improving water quality, and protecting biodiversity. Ozoemena et al. (2026) noted that Nigeria has demonstrated commitment to green financing through initiatives such as the Nigeria Sustainable Banking Principles, the Climate Change Act 2021, and the establishment of the FMDQ Green Exchange. These initiatives are designed to mobilize financial resources towards environmentally friendly and sustainable projects while promoting transparency and accountability in resource management. The emergence of green finance mechanisms provides alternative financing pathways that can enhance the governance of natural resources by promoting environmental sustainability and equitable development (Pat-Natson et al., 2024).

Green Innovation

Green innovation is a key driver of the transition to a green economy and has significant implications for natural resource governance. Green innovation comprises various terms such as eco-innovation, environmental innovation, eco-technologies, and green technologies (Hakim and Shafi, 2020). According to the study published in the AKSU Journal of Management Sciences (2025), green innovation is defined as an innovation activity in which a business gathers and applies outside knowledge to facilitate innovation activities or takes knowledge to external markets to earn money. Green innovation encompasses the development and deployment of technologies, processes, and practices that aim to reduce environmental harm while promoting sustainable economic development. The study found that governance quality indicators, particularly regulatory quality and control of corruption, are positively correlated with green innovation in Nigeria. This finding underscores the critical role of governance institutions in promoting green innovation and by extension, enhancing natural resource governance. Jacob and Umoh (2022) noted that a key component of green innovation is its contribution to sustainable development as it seeks economic development that achieves environmental balance while addressing challenges caused by climate change.

Climate Change and Environmental Sustainability

Climate change poses significant threats to natural resource governance in Nigeria and has emerged as a critical driver of green economy initiatives. According to Udeogu and Ikeda (2025), climate change remains a major threat to the protection and sustainability of the environment with Nigeria being among the most severely affected countries globally. The study revealed that Nigeria's agricultural sector, accounting for 42 percent of GDP and employing

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about 60 percent of the workforce, is highly climate-sensitive with impacts ravaging northern states through desertification while southern regions cope with coastal and soil erosion. Elisha and Ebelogu (2023) identified several major ways climate change affects Nigerians including low crop yield and food security challenges, reduced livestock production, loss of income, public health crises, and decreased hydroelectric power supply. These environmental challenges underscore the urgent need for green economy initiatives that can enhance environmental sustainability while promoting economic development. Nwosu (2025) argued that environmental sustainability is a critical driver for achieving sustainable development in Nigeria, emphasizing that ecological health is necessary for long-term development outcomes. The transition to a green economy therefore represents a strategic pathway for addressing climate change impacts while simultaneously improving the governance of natural resources through enhanced transparency, accountability, and community participation.

Theoretical Framework

This study is anchored on the Resource Curse Theory and the Institutional Theory of Governance, which collectively provide a robust framework for understanding the nexus between green economy initiatives and natural resource governance in Nigeria. Resource Curse Theory, as articulated by Auty (1993) and Sachs and Warner (2001), posits that countries endowed with abundant natural resources often experience slower economic growth, weak institutions, and poor development outcomes due to corruption, mismanagement of resource revenues, and inequitable distribution of benefits. In the Nigerian context, this theoretical lens explains why the Niger Delta region, despite decades of oil exploration and huge revenue generation, continues to experience widespread poverty, environmental degradation, and inadequate infrastructure (Adebayo, 2021). Ejere and Uko (2026) applied this theory to Akwa Ibom State, demonstrating that despite substantial oil revenues, poor governance practices, corruption, weak institutional frameworks, and inadequate accountability hindered effective socio-economic development in many oil-producing communities. Complementarily, the Institutional Theory of Governance, as postulated by Meyer and Rowan (1977), emphasizes that institutions—laws, regulations, norms, and values—significantly shape the behavior of individuals and organizations, with weak institutions hindering effective policy implementation. Udeogu and Ikeda (2025) applied this theory to Nigeria's climate change governance, explaining that the National Council on Climate Change's effectiveness and the implementation of the Climate Change Act are hindered by bureaucratic inefficiencies, weak enforcement mechanisms, and lack of coordination among government agencies.

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Together, these theories predict that the resource curse is not inevitable but contingent upon institutional quality, and that green economy initiatives—such as renewable energy transition, sustainable agriculture, green finance, and community participation—can mitigate the negative effects of resource abundance by strengthening governance frameworks characterized by transparency, accountability, and effective institutions. The Resource Curse Theory establishes the imperative for transforming resource governance, while the Institutional Theory provides the mechanism through which such transformation can occur. Empirical studies have confirmed these theoretical expectations, as the study published in the AKSU Journal of Management Sciences (2025) demonstrated that governance quality indicators, particularly regulatory quality and control of corruption, are positively correlated with green innovation in Nigeria, while Jacob and Umoh (2022) found that countries or regions adopting strong governance frameworks can convert resource wealth into sustainable development outcomes. Fagorite et al. (2024) further corroborated this framework by showing that Nigeria's green economy framework holds significant potential for addressing environmental challenges while promoting economic diversification. This dual theoretical framework thus provides a compelling foundation for hypothesizing that green economy initiatives enhance natural resource governance by reducing corruption, strengthening institutional capacity, and promoting equitable distribution of resource benefits, consistent with the empirical findings of this study.

Empirical Literature Review

The relationship between green economy initiatives and natural resource governance has attracted considerable attention in both developed and developing economies, particularly given the growing recognition that sustainable resource management is essential for long-term economic prosperity. Generally, green economy principles can promote effective natural resource governance when environmental considerations are integrated into economic decision-making processes. However, weak institutional frameworks, inadequate policy implementation, and competing economic interests may undermine the capacity of green economy initiatives to transform resource wealth into sustainable development outcomes. Evidence from the broader literature therefore suggests that the effect of green economy on natural resource governance depends on the quality of institutions, the capacity for policy enforcement, the availability of green financing mechanisms, and the level of community participation in resource management decisions.

At the broader conceptual level, Jacob and Umoh (2022) examined the green economy paradigm and how Nigeria can make the shift, using a comprehensive review of the notions of sustainable development and green economy. The study found that the green economy is

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defined as a system of economic activities related to the production, distribution, and consumption of goods and services that improves human well-being over time while avoiding significant environmental risks or ecological scarcities for future generations. The study revealed that Nigeria's energy sector is far from becoming a green economy despite having over five decades of experience in the petroleum industry, with the government continuing to openly flare gas and the zero-gas-flare policy appearing to have no end in sight. The study concluded that transitioning to a green economy is the only viable option for satisfying the country's diverse energy needs without jeopardizing issues of long-term sustainability and recommended a strategic policy framework incorporating energy efficiency, distributed energy mix, capacity building, and market-based instruments.

Similarly, Oyebanji et al. (2017) investigated the long-run equilibrium between green growth and environmental variables including deforestation, energy depletion, and carbon dioxide emissions in Nigeria from 1980 to 2015. Using the autoregressive distributive lag bound testing approach to cointegration, the study found evidence of a negative long-run relationship between carbon dioxide emission, environmental depletion, and renewable energy, which served as the proxy for green growth variables. Inversely, a positive long-run relationship existed between green growth variables and deforestation. The error correction mechanism coefficient of -3.17 indicated that approximately 3.12 percent of any disequilibrium in green growth is corrected within one period. The study submitted that efficient investment in green growth technologies and policies in Nigeria would assist in ensuring a sustainable environment and recommended that government should fully be involved in the implementation of green growth policy strategies by ensuring appropriate financing, subsidizing products for easy access, and simplifying licensing for investors.

Turning to the governance dimensions of green innovation, the study published in the AKSU Journal of Management Sciences (2025) explored the nexus between governance quality and green innovation in Nigeria using Pearson correlation and Toda-Yamamoto causality techniques on annual time series data from the World Bank's Worldwide Governance Indicators and World Development Indicators spanning 1996 to 2023. The findings revealed that except for rule of law and voice and accountability, which were negatively correlated with green innovation, the other four governance indicators including control of corruption, government effectiveness, regulatory quality, and political stability were positively correlated with green innovation. The Toda-Yamamoto causality analysis established a unidirectional causality flow from regulatory quality to green innovation, while causality also ran from green innovation to control of corruption. The study concluded that regulatory quality is a driver of green innovation and

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recommended improving regulatory quality to stimulate green innovation levels while enhancing control of corruption through higher levels of green innovations.

In the specific context of climate change legislation and green economy implementation, Udeogu and Ikeda (2025) examined the implementation challenges of Nigeria's Climate Change Act 2021 on the green economy using institutional theory and qualitative methods combining documentary data and interview responses from staff of the Federal Ministry of Environment. Content analysis revealed that the delay by the National Council on Climate Change in developing and implementing national policy documents contributed to the persistence of greenhouse gas emissions in Nigeria. Furthermore, challenges of carbon pricing undermined the implementation of Development Association of Renewable Energy projects. The findings showed that slow responses to climate change emergencies, poor coordination among government agencies, and insufficient budgetary allocations contributed to uncontrolled emissions across energy, transportation, and agricultural sectors. The study recommended strengthening emergency responses, improving institutional coordination, providing adequate funding, establishing a clear carbon pricing mechanism, and diversifying the Nigerian economy.

In a related study, Fagorite et al. (2024) analyzed the dynamics of the green economy in Nigeria using narrative literature review and document analysis following the PRISMA methodology, reviewing 83 publications from 2013 to 2023. The findings identified four main components of Nigeria's green economy framework including renewable energy transition, sustainable agriculture, waste management and recycling, and sustainable transport infrastructure. The benefits of transitioning included job creation, poverty reduction, improved public health, and climate change mitigation. However, challenges such as limited awareness, policy inconsistencies, financial constraints, infrastructure deficiencies, and political interests hindered implementation. The study recommended coordinated efforts to enhance policy coherence, strengthen regulatory frameworks, mobilize financial resources, and foster multi-stakeholder partnerships while scaling up green economy practices through renewable energy, sustainable agriculture, circular economy initiatives, eco-tourism, urban green infrastructure, digital innovation, and international cooperation.

Furthermore, Ozoemena et al. (2026) reviewed the landscape of green finance in Nigeria, highlighting policy frameworks, challenges, and global experiences using a narrative review approach. The findings revealed that while Nigeria demonstrated commitment to green financing through initiatives such as the Nigeria Sustainable Banking Principles, the Climate Change Act 2021, and the establishment of the FMDQ Green Exchange, significant challenges persisted. These challenges were categorized into strategic challenges including infrastructure gaps, sectoral challenges encompassing lack of long-term capital and high financing costs, and

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institutional challenges comprising budget limitations and personnel capacity gaps. The study recommended addressing these issues through enhanced regulatory frameworks, operationalization of extant regulations, enforcement of compliance to regulatory provisions, and significant boosts in private sector engagement while fostering technology transfer through local and international initiatives.

More directly related to the present study, Ejere and Uko (2026) examined the impact of natural resource governance on socio-economic development in Niger Delta's Akwa Ibom State using survey research design with 400 respondents from six oil-producing local government areas. Using Chi-square statistical techniques at 0.05 significance level, the findings revealed that natural resource governance had significant relationships with access to healthcare services, road infrastructure development, and provision of educational facilities. The calculated Chi-square values for all three hypotheses exceeded critical values, leading to rejection of null hypotheses. Despite substantial oil revenues, poor governance practices, corruption, weak institutional frameworks, and inadequate accountability hindered effective socio-economic development in many oil-producing communities. The study recommended improved transparency, accountability, community participation, and increased investment in healthcare, road infrastructure, and educational facilities in oil-producing areas.

Similarly, Ike and Oghene (2025) investigated the impact of green finance on sustainable development in Nigeria, focusing on the role of green bonds, green loans, and renewable energy investments from 2015 to 2024. Using an ex post facto research design analyzing secondary data from the Nigerian Development Bank with descriptive statistics and Ordinary Least Squares regression, the results demonstrated that green bonds issuance, green loans and credit facilities, and renewable energy investments had statistically significant positive effects on Green GDP. Renewable energy investments exhibited the most substantial effect, followed by green loans and bonds. The model's R-squared value of 99.73 percent indicated that these green finance instruments collectively explained a substantial portion of the variation in Green GDP. The study recommended increasing green bond issuance, expanding green loans, and investing in renewable energy to foster economic resilience and environmental sustainability.

In a related study, Pat-Natson et al. (2025) assessed the impact of green financing on Nigeria's environmental sustainability by evaluating carbon finance, green credit, and green securities using quantitative data from the Central Bank of Nigeria statistical bulletin from 2009 to 2023. Employing descriptive and inferential statistical techniques including unit root tests, co-integration tests, panel cointegration, and panel cointegration regression estimation with a dynamic fixed effect model, the findings revealed coefficients of -0.0367631, -0.002511, and

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0.0265807 for carbon finance, green loans, and electricity production from hydroelectric sources respectively. The results indicated that while carbon finance and green loans negatively affected carbon dioxide emissions, electricity production from hydroelectric sources served as a positive predictor. The study recommended that policymakers and financial institutions should eliminate market barriers, mitigate risks, provide technical and financial support for project planning and execution, improve access to funding, and strengthen local lenders' capacity to finance green initiatives.

Furthermore, Pat-Natson et al. (2024) examined the impact of green financing on Nigeria's economic sustainability from 2009 to 2023 using an ex post facto research design with secondary data from the Nigeria Development Bank. Using descriptive statistics and Ordinary Least Squares regression analysis, the findings indicated that carbon finance and electricity production from hydroelectric sources had negative predictive values for GDP growth, while green loans exhibited positive predictive values. The R-squared value of 0.8279 indicated that green financing variables collectively influenced GDP growth by approximately 83 percent. The regression model demonstrated that green credit, security, and carbon finance significantly impacted Nigeria's economic sustainability. The study recommended substantially increasing investment in research and development in clean energy technologies while developing local expertise in renewable energy solutions to address current climate challenges, achieve renewable energy targets, and ensure long-term economic resilience.

However, subsequent evidence has produced mixed results regarding the relationship between green economy initiatives and poverty reduction. Mgbomene and Dim (2024) examined the impact of green economy on poverty reduction using quantitative analysis of per capita income as the dependent variable with renewable energy consumption, arable land cultivation, and access to renewable energy as independent variables from 1990 to 2023. Using the Autoregressive Distributed Lag approach, the results revealed that renewable energy consumption negatively affected per capita income in both short and long run periods, with significance only in the long run. Arable land cultivation also negatively affected per capita income with significance only in the long run, while access to renewable energy was the only variable with positive effects in both periods. The study concluded that the green economy in Nigeria had not been adequately utilized for enhancing living standards and recommended that government and individuals protect arable lands for cultivation and improve actual utilization of renewable energy by providing necessary infrastructure to enhance income prospects of households.

In the same vein, Nwosu (2025) explored environmental sustainability as a pathway to sustainable development in Nigeria using a qualitative approach. The study examined the

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concept of environmental sustainability within the Nigerian context, highlighting its correlations with sustainable development and examining threats to the nation's rich biodiversity including deforestation, pollution, and climate change impacts. The findings identified significant challenges impeding Nigeria's efforts such as weak policy enforcement, industrial pollution, urbanization pressures, and low public environmental awareness. The study proposed an Innovation Model for Sustainable Development as a strategic pathway to foster resilience against environmental degradation, drive economic growth, and ensure social equity. The model emphasized promoting green technologies, empowering communities, enhancing environmental governance, and fostering cross-sectoral partnerships. The study recommended strengthening environmental sustainability efforts through innovative approaches for Nigeria's pursuit of long-term economic growth, social equity, and environmental stewardship.

Further evidence was provided by Mshelia (2013), who examined the climate-conflict nexus in Nigeria and its implications for natural resource governance and human security. The study revealed that climate change acts as a threat multiplier, exacerbating existing stresses and creating volatile situations. Nigeria's agricultural sector, accounting for 42 percent of GDP and employing about 60 percent of the workforce, was found to be highly climate-sensitive, with impacts ravaging northern states through desertification while southern regions coped with coastal and soil erosion. The findings indicated that inefficient management of natural resources and widespread corruption contributed to ongoing militancy in the Niger Delta, with agitation for equitable distribution of dwindling resources linked to new waves of violence in northern regions. The study concluded that the lack of a compelling, unifying socially-inclusive vision and the absence of a robust sustainable development strategy, combined with rising unemployment, widespread poverty, growing population, and over-dependence on natural resources sensitive to climatic changes, made Nigeria highly vulnerable to resource-based conflicts (Akpan, and Chukwurah, 2022; Alakwe, 2024). The study recommended that the government foster an atmosphere of social justice and equity, empowering the poor to actively participate in decision-making processes regarding natural resource management while making governance more transparent and accountable.

Likewise, Elisha and Ebelogu (2023) analyzed climate change and economic opportunities in Nigeria. The study revealed that while climate change poses significant threats to human well-being and planetary health, it also creates opportunities for economic transformation. The findings identified several major ways climate change affects Nigerians including low crop yield and food security challenges, reduced livestock production, loss of income, public health crises, and decreased hydroelectric power supply. However, addressing climate change was found to be necessary to create a resilient and sustainable future, with

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opportunities emerging in growing markets for renewable energy, eco-friendly construction, clean energy, resilience, and energy efficiency. The study concluded that climate change is causing income divergence across individuals, sectors, and regions, with adjustments in energy markets, increased inflation variability, financial markets stress, intensified innovation, increased migration, and rising public debt. The Nigerian government's recognition of regulatory risk and responsibility to proactively manage the transition to a low-carbon economy through supportive planning of economic and environmental strategies as well as investment in efficient and clean infrastructure creates room for economic opportunities. The study recommended formulating supportive economic policies that encourage effective carbon pricing policies capable of maintaining competitiveness, creating jobs, encouraging innovation, and delivering meaningful emissions reductions.

Also focusing on green growth and sustainable development, Ike (2024) examined the benefits and challenges of green growth as a tool for achieving sustainable economic development in Nigeria using a qualitative study with document collection and in-depth interviews with experts in the field. The research data was analyzed using qualitative content analysis with SWOT analysis to identify internal and external factors impacting the process of greening the economy. The findings identified strengths including abundant natural capital, progressive socio-economic reform, stable political environment, abundant labor force, and potential agriculture, forestry, and fishery sectors. Weaknesses included limited awareness of green growth, lack of policy measures, inconsistent legal systems and policies, large share of brown growth, and huge capital investment requirements. Opportunities included transforming growth models, international support, and advanced technology transfer, while threats included the need for further study, being severely affected by climate change, and limited domestic resources. The study recommended raising awareness of green growth, improving institutions and policies to promote green growth, accelerating economic restructuring, reforming economic growth models, and considering priority sectors and localities to pilot green growth.

Similarly, FAO (2010) examined payments for environmental services within the context of the green economy, analyzing how the implementation of payment for environmental services fits into the green growth strategy framework. The study found that most enabling conditions for green economy are also crucial for implementation of payment for environmental services schemes, implying that green growth policies can highly influence the success of such schemes while payment for environmental services schemes can promote social acceptance and stakeholder participation in green economy transitions. The analysis revealed that payment for environmental services is a market tool through which the public sector can directly and actively enter the green market and become a buyer of environmental services. However, the study

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identified that payment for environmental services would not work if governance is weak and unable to set favourable enabling conditions, transaction costs are very high, competing destructive resource usages are highly lucrative, or resource tenure and use rights are insufficiently defined or enforced.

Consistent with this perspective, Eke and Augustine (2022) noted that natural resource governance involves not only resource extraction and revenue generation but also the equitable distribution of benefits among stakeholders, including host communities. In resource-rich regions like the Niger Delta, governance structures determine whether oil wealth translates into development or leads to the resource curse phenomenon characterized by poverty, environmental degradation, and underdevelopment. The study emphasized that weak governance systems often result in corruption, mismanagement of funds, lack of transparency, and poor accountability, which negatively affect development outcomes. Furthermore, effective governance requires strong institutions capable of enforcing environmental regulations, ensuring fair revenue allocation, and promoting community participation in decision-making processes.

In a similar recent study, Olaifa and Adewumi (2023) examined transparency and accountability in oil revenue management in Nigeria and found that weak governance practices significantly reduce the effectiveness of public spending on social infrastructure. Their study revealed that mismanagement of oil revenues contributes to poor service delivery in key sectors such as health and education, thereby limiting socio-economic development in oil-producing communities. The findings underscored the importance of strengthening governance institutions and ensuring transparent management of oil revenues as critical for sustainable development in the Niger Delta region.

Furthermore, Ekanem and Ibok (2024) investigated socio-economic development in oil-producing regions and found that there is a strong relationship between resource governance and human capital development. Their study revealed that improved governance leads to better investment in education, healthcare, and transportation systems, which in turn enhances living standards. The findings emphasized that without strong governance structures, the socio-economic benefits of natural resources may not be fully realized, and therefore strengthening governance institutions and ensuring transparent management of oil revenues are critical for sustainable development.

Overall, the reviewed literature presents mixed evidence regarding the effect of green economy initiatives on natural resource governance in Nigeria. Some studies found a positive relationship between green finance mechanisms and sustainable development outcomes, particularly when green bonds, green loans, and renewable energy investments were effectively

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deployed. Other studies reported negative or insignificant effects, especially where policy implementation was weak, institutional capacity was limited, or green economy benefits were not adequately distributed. Importantly, most Nigerian studies concentrated on aggregate indicators such as Green GDP, environmental sustainability, or economic growth. Only a limited number of studies, particularly Ejere and Uko (2026), directly examined the relationship between natural resource governance and socio-economic development in oil-producing communities. This creates an important empirical gap because improvements in aggregate green economy indicators do not necessarily translate into effective natural resource governance and improved welfare for communities hosting resource extraction activities. Therefore, the present study contributes to the literature by focusing specifically on the impact of green economy on natural resource governance in Nigeria, thereby providing evidence on whether green economy initiatives have translated into improved governance of natural resources and enhanced developmental outcomes for resource-rich communities.

METHODOLOGY

This study adopts an ex-post facto research design, with data sourced from the Central Bank of Nigeria Statistical Bulletin, the World Bank's World Development Indicators (WDI), the World Bank's Worldwide Governance Indicators (WGI), the Food and Agriculture Organization (FAO), and the National Bureau of Statistics (NBS), covering the period from 1989 to 2024. The choice of 1989-2024 offers a thorough examination of Nigeria's economic environment, covering important data on green economy and natural resource governance in Nigeria. Thus, this study specifies a model with natural resource governance proxy by a composite index of regulatory quality, control of corruption, and government effectiveness as the dependent variable, while the independent variables capturing green economy include Forest Area (FAR), Arable Land Cultivation (ARL), and Renewable Energy Consumption (REC), with two control variables: GDP Growth Rate (GDPg) and Oil Rent (OIL), with the functional relationship expressed as;

$$NRG = f(FAR, ARL, REC, GDPG, OIL) \quad (1)$$

Where NRG captures the institutional quality dimensions of natural resource governance, providing a holistic measure of governance effectiveness beyond mere economic indicators (Ogunsakin & Philip, 2026; Ejere & Uko, 2026). Hence, the model is specified in econometric form as;

$$NRG_t = \beta_0 + \beta_1 FAR_t + \beta_2 ARL_t + \beta_3 REC_t + \beta_4 GDPg_t + \beta_5 OIL_t + \varepsilon_t \quad (2)$$

Where NRGt is Natural Resource Governance composite index at time t, FARt represents forest area as a percentage of total land area at time t, ARLt denotes arable land cultivation as a percentage of total land area at time t, RECt represents renewable energy

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consumption as a percentage of total final energy consumption at time t, GDPgt is real GDP growth rate at time t, OILt is oil rent as a percentage of GDP at time t, β_0 is the intercept term, β_1 to β_5 are the coefficients measuring the impact of each green economy variable on natural resource governance, and εt is the stochastic error term capturing other unobserved factors influencing governance outcomes. Therefore, the Autoregressive Distributed Lag (ARDL) form of the model is specified as follows to capture both short-run dynamics and long-run equilibrium relationships between green economy initiatives and natural resource governance:

$$\Delta NRG_t = \alpha_0 + \sum_{i=1}^{p} \beta_{1i}\Delta NRG_t + \sum_{i=0}^{p} \beta_{2i}\Delta FARt + \sum_{i=0}^{p} \beta_{3i}\Delta ARLt + \sum_{i=0}^{p} \beta_{4i}\Delta RECt + \sum_{i=0}^{p} \beta_{5i}\Delta GDPgt + \sum_{i=0}^{p} \beta_{6i}\Delta OILt + \lambda_1 NRGt + \lambda_2 FARt + \lambda_3 ARLt + \lambda_4 RECt + \lambda_5 GDPgt + \lambda_6 OILt + \varepsilon t \quad (3)$$

Where Δ represents the first difference operator, p is the optimal lag length determined by the Akaike Information Criterion (AIC) or Schwarz Information Criterion (SIC), β_1 to β_6 represent the short-run coefficients measuring the immediate impact of changes in green economy variables on NRG, λ_1 to λ_6 represent the long-run coefficients capturing the equilibrium relationship between green economy initiatives and natural resource governance, and εt is the white noise error term (Oyebanji et al., 2017; Mgbomene & Dim, 2024; Pat-Natson et al., 2025). On a priori grounds, it is expected that forest area will have a positive coefficient ($\beta_1 > 0$), indicating that forest conservation enhances transparency and accountability in land resource management through sustainable forestry practices; arable land cultivation will have a positive coefficient ($\beta_2 > 0$), indicating that sustainable agricultural practices promote equitable benefit-sharing in land resource governance; renewable energy consumption will have a positive coefficient ($\beta_3 > 0$), indicating that reduced dependence on fossil fuels fosters inclusive governance of energy resources; GDP growth will have a positive coefficient ($\beta_4 > 0$), indicating that economic growth provides resources for institutional strengthening and governance improvements; and oil rent will have a negative coefficient ($\beta_5 < 0$), indicating that oil rent dependence exacerbates rent-seeking, corruption, and weak accountability in natural resource governance, consistent with the findings of prior studies that established the negative impact of resource dependence on governance quality (Sachs & Warner, 2001; Ejere & Uko, 2026). While the study employed Augmented Dickey-Fuller (ADF) to test for stationarity of the variables.

RESULTS AND DISCUSSION

Descriptive Statistics

The result of the descriptive statistics on Natural Resource Governance (LNRG), Forest Area (FAR), Renewable Energy Consumption (REC), GDP Growth Rate (GDPG), Oil Rent (OIL), and Arable Land Cultivation (ARL) is presented in Table 1.

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Table 1. Descriptive Statistics

Descriptions	LNRG	FAR	REC	GDPG	OIL	ARL
Mean	-1.181062	26.16639	79.64722	4.016667	13.13833	35.44056
Median	-1.008703	26.17000	79.30000	3.700000	13.00000	34.97500
Maximum	-0.162519	29.29000	87.20000	8.200000	15.12000	40.48000
Minimum	-3.912023	23.03000	73.50000	-1.800000	10.92000	30.62000
Std. Dev.	0.855030	1.888245	3.942768	2.472535	1.266968	3.070468
Skewness	-1.221068	-0.000218	0.211419	-0.316927	0.067959	0.071742
Kurtosis	4.415016	1.796073	1.940576	2.762994	1.735695	1.644384
Jarque-Bera	11.94946	2.174161	1.951756	0.686915	2.425411	2.787424
Probability	0.002542	0.337200	0.376861	0.709314	0.297392	0.248153
Sum	-42.51822	941.9900	2867.300	144.6000	472.9800	1275.860
Sum Sq. Dev.	25.58764	124.7914	544.0897	213.9700	56.18230	329.9720
Observations	36	36	36	36	36	36

The descriptive statistics presented in the table provide a comprehensive summary of the distributional properties of the variables examined in this study over the 36-year period from 1989 to 2024. The mean value of Log of Natural Resource Governance (LNRG) is -1.1811 with a standard deviation of 0.8550, indicating that Nigeria's institutional quality for natural resource governance has persistently remained below the global average throughout the study period, with values ranging from a minimum of -3.9120 to a maximum of -0.1625. Forest Area (FAR) recorded a mean of 26.1664 percent with a standard deviation of 1.8882, reflecting the gradual decline in forest cover over the study period, while Renewable Energy Consumption (REC) averaged 79.6472 percent with a standard deviation of 3.9428, confirming the declining trend in renewable energy utilization from a maximum of 87.2000 to a minimum of 73.5000 percent. GDP Growth Rate (GDPg) averaged 4.0167 percent with a minimum of -1.8000, reflecting periods of economic recession that significantly affected governance outcomes, and Oil Rent (OIL) averaged 13.1383 percent of GDP with a range of 10.9200 to 15.1200 percent, confirming Nigeria's continued hydrocarbon dependency. Arable Land Cultivation (ARL) averaged 35.4406 percent with a standard deviation of 3.0705, indicating moderate variability in agricultural land use over the study period. Regarding distributional properties, the Jarque-Bera statistics and their associated probability values reveal that FAR ($p = 0.3372$), REC ($p = 0.3769$), GDPg ($p = 0.7093$), OIL ($p = 0.2974$), and ARL ($p = 0.2482$) are all normally distributed as their probability values exceed the 0.05 significance level, while LNRG ($p = 0.0025$) deviates significantly from normality due to its negative skewness of -1.2211 and high kurtosis of 4.4150, indicating a

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leptokurtic distribution with a long tail to the left. The skewness values show that LNRG, FAR, and GDPg are negatively skewed, while REC, OIL, and ARL are positively skewed, and the kurtosis values indicate that all variables except LNRG are platykurtic with values less than 3, confirming that parametric tests such as the Augmented Dickey-Fuller (ADF) unit root test and the Autoregressive Distributed Lag (ARDL) model are appropriate for the subsequent analysis.

Unit Root Test

The unit root test results from the Augmented Dickey-Fuller (ADF) test are presented in Table 1. The test was conducted to determine the stationarity properties of the variables before estimating the ARDL model.

Table 1: ADF Test Result

Variable	@Level	@First Difference	Status
LNRG	-	-4.642036***(a)	I(1)
FAR	-4.721675***(b)	-	I(0)
REC	-6.306281***(c)	-	I(0)
ARL	-	-5.523301***(a)	I(1)
GDPG	-	-5.945159***(a)	I(1)
OIL	-	-5.491177***(a)	I(1)

Note: Where I(d) denotes the order of integration; a= test equation with intercept, b= test equation with trend and intercept, c= test equation with none.
,, imply 1%, 5% and 10% level of significant, respectively.

The ADF test results in Table 1 reveal a mixed order of integration among the variables. LNRG, ARL, GDPG, and OIL are non-stationary at level but become stationary after first differencing, indicating they are integrated of order one, I(1). In contrast, FAR and REC are stationary at level, indicating they are integrated of order zero, I(0). Since the variables are integrated of mixed order, with none being I(2), the Autoregressive Distributed Lag (ARDL) bounds testing approach is appropriate for examining both short-run and long-run relationships among the variables.

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Bounds Test Results

Having established the stationarity properties of the variables through the unit root test, the study proceeds to examine the existence of a long-run relationship among the variables using the Autoregressive Distributed Lag (ARDL) bounds testing approach. The bound test is particularly appropriate given the mixed order of integration of the variables, as it can accommodate variables that are integrated of order zero, I(0), order one, I(1), or a mixture of both. The result of the bound test is presented in Table 2, with the appropriate lag length selected based on the Schwarz Information Criterion (SIC).

Table 2: Bounds Test Results

Model	F-Statistic	Significance Level	Critical Values	
			I(0)	I(1)
F-statistic	5.847442	10%	1.81	2.93
	K = 5	5%	2.14	3.34
		2.5%	2.44	3.71
		1%	2.82	4.21

The result of the ARDL bound test from Table 2 indicates that the F-statistic of 5.847442 exceeds the critical values at all conventional levels of significance, including the 1%, 2.5%, 5%, and 10% levels. Therefore, there exists a cointegrating relationship among the study variables in Nigeria.

ARDL Long Run Results

Following the confirmation of a long-run relationship among the variables through the ARDL bounds test, the study proceeds to estimate the long-run coefficients to determine the direction and magnitude of the impact of each green economy variable on natural resource governance in Nigeria. The long-run ARDL results are presented in Table 3.

Table 3: Linear ARDL Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FAR	-3.115255	1.492767	-2.086900	0.0493
ARL	-0.554670	0.221757	-2.501251	0.0207
GDPG	-0.404600	0.270276	-1.496985	0.1493
REC	1.282980	0.600025	2.138209	0.0444
OIL	0.082728	0.302563	0.273425	0.7872

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Table 3 presents the long-run ARDL results, and the empirical findings reveal mixed outcomes across the green economy variables. Forest area (FAR) exerts a negative and statistically significant effect on natural resource governance (coefficient = -3.115255; p = 0.0493), indicating that larger forest areas are associated with weaker governance outcomes in Nigeria. This finding contradicts the a priori expectation and suggests that Nigeria's forest resources are subject to weak institutional oversight, illegal logging, and deforestation, where vast forest areas may represent ungoverned spaces rather than effectively managed resources. This result aligns with the observation of Ejere and Uko (2026) that despite substantial natural resource wealth, poor governance practices, corruption, and weak institutional frameworks hinder effective resource management in Nigeria. Similarly, arable land cultivation (ARL) demonstrates a negative and significant relationship with natural resource governance (coefficient = -0.554670; p = 0.0207), implying that agricultural expansion does not translate into improved governance outcomes. This finding is consistent with Mgbomene and Dim (2024) who found that arable land cultivation negatively affected per capita income in both short and long run periods, and may be attributed to unsustainable agricultural practices, land degradation, and elite capture of agricultural land, as noted by Nwosu (2025) who identified weak policy enforcement and low public environmental awareness as significant challenges to environmental sustainability in Nigeria.

Conversely, renewable energy consumption (REC) exhibits a positive and statistically significant effect on natural resource governance (coefficient = 1.282980; p = 0.0444), confirming the a priori expectation that reduced dependence on fossil fuels fosters inclusive governance of energy resources. This finding corroborates Oyebanji et al. (2017) who established a negative long-run relationship between renewable energy and carbon dioxide emissions, indicating that increased renewable energy consumption promotes environmental sustainability. It also aligns with Mgbomene and Dim (2024) who found that access to renewable energy positively affected per capita income, suggesting that renewable energy adoption can enhance governance outcomes by reducing energy poverty and promoting inclusive development. Among the control variables, GDP growth (GDPG) exhibits a negative but statistically insignificant effect on natural resource governance (coefficient = -0.404600; p = 0.1493), implying that economic expansion does not robustly translate into improved governance quality. This finding supports the resource curse thesis advanced by Sachs and Warner (2001) and Ejere and Uko (2026), which posits that economic growth driven by resource extraction may not necessarily improve institutional quality. Oil rent (OIL) shows a positive but statistically insignificant association with natural resource governance (coefficient = 0.082728; p = 0.7872), contradicting the a priori

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expectation that oil rent dependence exacerbates weak accountability. This result aligns with the observation of Ikelegbe (2020) that the relationship between oil wealth and governance outcomes is complex and mediated by institutional quality, and further supports the finding of the study published in the AKSU Journal of Management Sciences (2025) that regulatory quality is a critical driver of green innovation, suggesting that the mere presence of oil revenue does not automatically undermine governance if regulatory frameworks are strengthened.

ARDL Short Run Results

The short-run results of the ARDL model are presented in Table 4. The short-run dynamics describe the speed at which equilibrium is restored in the model following a shock to the system.

Table 4: Linear ARDL Short Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ARL)	0.038318	0.041602	0.921050	0.3675
D(ARL(-1))	0.159413	0.049468	3.222566	0.0041
D(GDPG)	-0.125025	0.026024	-4.804275	0.0001
D(GDPG(-1))	-0.046693	0.018725	-2.493619	0.0211
D(REC)	0.443205	0.435977	1.016577	0.3209
D(REC(-1))	0.903134	0.412361	2.190154	0.0399
D(OIL)	0.290241	0.072241	4.017683	0.0006
CointEq(-1)*	-0.221990	0.033682	-6.590762	0.0000

The short-run estimates reveal that the error correction term (CointEq(-1)*) is negative, statistically significant ($p < 0.01$), and has a magnitude of -0.222, confirming the existence of a stable long-run cointegrating relationship with approximately 22.2 percent of any disequilibrium corrected annually.

Diagnostic Test results

The post-estimation diagnostic tests were conducted to evaluate the robustness and reliability of the estimated ARDL model. These tests examine whether the model suffers from serial correlation, heteroskedasticity, functional form misspecification, or non-normality of residuals. The results of the diagnostic tests are presented in Table 5.

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Table 5: Diagnostic Test Results

Test	Statistic	Probability	Decision
Breusch-Godfrey Serial Correlation LM Test	2.218354	0.1362	No serial correlation
Heteroskedasticity Test: ARCH	0.888144	0.3533	No heteroskedasticity
Ramsey RESET Test	11.56972	0.1128	Model correctly specified
Jarque-Bera Normality Test	-	0.5862	Residuals normally distributed

The diagnostic test results presented in Table 5 confirm that the estimated ARDL model is statistically robust and well-specified, as all test probabilities comfortably exceed the conventional 5% significance threshold, thereby validating the reliability of the long-run and short-run coefficient estimates. The Breusch-Godfrey test for serial correlation yields a p-value of 0.1362, indicating the absence of residual autocorrelation and ensuring that the error terms are not systematically related across time. Similarly, the ARCH test for heteroskedasticity returns a p-value of 0.3533, confirming that the residuals exhibit constant variance over the sample period. The Ramsey RESET test for functional form misspecification produces a p-value of 0.1128, implying that the linear ARDL specification is correctly formulated. Finally, the Jarque-Bera normality test gives a p-value of 0.5862, affirming that the residuals are normally distributed. Collectively, these diagnostic outcomes lend strong empirical credibility to the findings, assuring that the relationships between green economy variables and natural resource governance are neither spurious nor contaminated by standard econometric pathologies.

CONCLUSION AND RECOMMENDATIONS

The study concludes that green economy initiatives exert mixed effects on natural resource governance in Nigeria, with renewable energy consumption emerging as the most significant positive driver of governance quality while forest area and arable land cultivation paradoxically undermine governance outcomes, reflecting weak institutional oversight and unsustainable resource management practices. These findings suggest that the mere adoption of green economy practices is insufficient to improve natural resource governance without complementary institutional reforms that address corruption, strengthen regulatory enforcement, and promote transparency and accountability in resource management. Based on the findings, the study recommends that government should strengthen institutional frameworks for forest and land resource governance through stricter enforcement of environmental regulations, community participation, and anti-corruption measures to reverse the negative effects of forest

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area and arable land cultivation on governance quality. Furthermore, policymakers should prioritize renewable energy adoption through targeted incentives, subsidies, and infrastructure investment, while ensuring transparent and accountable management of oil revenues to mitigate rent-seeking behavior and promote sustainable natural resource governance in Nigeria.

To increase the body of knowledge, further researchers can measure the study outcomes across various countries in Sub Saharan Africa (SSA) or Global South economies using a relevant data. This to ensure a wider and broader understanding of green economy and finance as well as how natural resources are managed and utilized for the benefit of society.

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