



Is green the new gold? Charting Nigeria's growth frontier through green innovation and green entrepreneurship

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Abstract

Green innovation and green entrepreneurship are pivotal in addressing Nigeria's pressing environmental challenges while fostering sustainable economic growth. As the country faces critical issues such as energy shortages, waste management, deforestation, and climate change, innovative solutions are emerging to mitigate environmental impact and promote sustainability. Green innovation in Nigeria encompasses advancements in renewable energy, sustainable agriculture, waste management, water conservation, and carbon footprint reduction technologies, all of which are reshaping industries and contributing to more eco-friendly practices. Concurrently, green entrepreneurship is gaining momentum, with entrepreneurs developing environmentally conscious products and services that address these challenges while creating economic value. These entrepreneurial ventures are not only driving job creation in renewable energy, waste management, and sustainable agriculture but are also contributing to the growing green economy. Despite facing challenges such as limited access to finance, inadequate infrastructure, and a need for more robust policies, Nigeria's green innovation and entrepreneurship landscape shows immense potential for fostering a sustainable future. By supporting green businesses and technologies through policy frameworks, investment, and public awareness, Nigeria can pave the way toward a greener, more resilient economy that balances environmental stewardship with economic development.

Keywords: Green innovation, green entrepreneurship, sustainable economic growth, environmental impact, eco-friendly practices and green economy

Introduction

In recent years, Nigeria has emerged as a significant focal point for discussions on sustainability, environmental resilience, and green economic transformation (UNEP 2020)^[11]. Confronted with mounting environmental challenges—such as energy insecurity, waste management crises, land degradation, and the impacts of climate change—Nigeria is increasingly turning toward innovation and entrepreneurship that aligns economic development with ecological sustainability. Green innovation and green entrepreneurship have therefore become critical pathways for addressing these complex issues while unlocking new opportunities for inclusive growth and job creation. Zhang, B., & Ding, L. (2019)^[23]. Refers to green innovation as the development and application of new technologies, products, or processes that reduce environmental harm, conserve natural resources, and promote sustainability. In the Nigerian context, this includes renewable energy technologies, waste-to-value solutions, sustainable agriculture practices, and other eco-friendly technological advances designed to support economic resilience and ecological well-being. According to Abideen *et al.* (2024)^[6], Nigeria emphasises the role of green innovation in nurturing sustainable development amid rising urbanisation and environmental degradation, highlighting both its potential and the barriers that still constrain its growth—such as limited finance, policy gaps, and infrastructure deficits.

According to Mugisha, A., & Frossard, F (2020)^[11], Green entrepreneurship, focuses on entrepreneurial ventures and business models that prioritise environmental objectives

alongside economic profitability. These ventures seek to transform environmental challenges into commercially viable opportunities. In Nigeria, this is reflected in a growing ecosystem of startups and SMEs engaged in solar energy deployment, waste management innovations, sustainable agricultural services, and other green sectors. Analysts note that Nigeria's abundant renewable energy potential (e.g., solar, wind, and hydropower) and its youthful entrepreneurial population can create a fertile ground for green enterprises growth (Olaifa O.I., & Ilesanmi D.O., 2025)^[15].

The expansion of green entrepreneurship is also reshaping Nigeria's labour market and economic structures. By integrating sustainability into business operations, eco-enterprises are contributing to job creation, enhancing competitiveness, and strengthening resilience against environmental shocks. However, critical challenges remain, including inadequate access to finance and technology, limited regulatory support, and insufficient awareness of sustainable business practices—issues echoed in recent academic and policy analyses of Nigeria's green economy. (Ibrahim, H. M., & Yusuf, A. M., 2021)^[9]

The urgent need for green innovation and entrepreneurship in Nigeria is further reinforced by its strategic importance in advancing global climate goals and sustainable development frameworks. With the global green economy valued in the trillions and local renewable energy sectors alone representing significant market potential, Nigeria stands at a pivotal moment in transforming environmental liabilities into engines of economic opportunity and social progress. (Adigun, O.H., Laosebikan, J and Oladele, S. 2024)^[2].

1. An Overview of Nigeria's Current Economic and Environmental Landscape

Nigeria, Africa's most populous nation and a leading economy on the continent, presents a complex mix of economic potential and environmental vulnerabilities. Over the past decades, the country's economic growth has been driven largely by its abundant natural resources—especially oil and gas—alongside expansions in agriculture, telecommunications, and services. However, structural weaknesses, including corruption, inadequate infrastructure, and political instability, have constrained sustainable development and undermined investor confidence. Sustainable economic growth remains elusive amid challenges such as high unemployment, poverty, and limited social safety nets, which together deepen socio-economic inequalities across the nation (Atayi A. V *et al.* 2024) ^[6].

In recent years, Nigeria has pursued macroeconomic reforms aimed at stabilising growth, such as fuel subsidy removal and currency liberalisation. These measures have contributed to inflationary pressures and rising living costs for millions of citizens. Economic recovery, while visible in modest growth figures, continues to be tempered by persistent deficits in infrastructure, energy supply, and basic public services (Le Monde, 2025).

Alongside economic challenges, Nigeria faces significant environmental pressures that interact with and often exacerbate social and economic concerns. Environmental degradation in the country is pervasive, reflected in widespread deforestation, air and water pollution, soil erosion, and waste management crises. Rapid urbanisation and poor regulatory enforcement have worsened ecological outcomes, particularly in major cities, where industrial emissions and generator use contribute to harmful air quality, and solid waste routinely overwhelms municipal systems (Atayi A. V *et al.* 2024) ^[6].

Nigeria's varied ecosystems—from the mangrove forests of the Niger Delta to arable lands across the south and savannahs in the north—are under threat from pressures such as oil spills, land clearing, and desertification. The Niger Delta's mangrove forests, for example, have suffered extensive loss due to oil extraction activities, with millions of barrels spilt over decades, compounding habitat destruction and community health risks.

Climate change further compounds Nigeria's environmental vulnerability. The country experiences rising temperatures, changing rainfall patterns, increased frequency of extreme events such as floods and droughts, and growing threats to agricultural productivity—an important sector that contributes roughly a quarter of GDP yet remains highly climate-sensitive. Without adaptive policies, climate impacts may significantly suppress long-term economic performance and development goals (Wilson-Oshilim U.D & Omoye A.S 2025) ^[19].

Environmental challenges also carry economic costs: pollution and ecological degradation impose burdens on public health, loss of productivity, and remediation expenses, while climate-related damages to infrastructure and livelihoods are projected to increasingly strain fiscal resources. These intertwined economic and environmental pressures underscore the importance of pursuing sustainable development pathways (Foyeke O. I, Oluwatoyin M. A (2024) ^[7]).

In this context, green innovation and green entrepreneurship offer promising avenues to leverage Nigeria's demographic

dynamism and creative capacity for sustainable growth. By integrating environmentally friendly technologies and entrepreneurial solutions into the nation's development strategy, Nigeria can address pressing ecological challenges while fostering economic diversification, resilience, and inclusive prosperity—principles central to long-term sustainable development (Atayi A. V. *et al.*, 2024) ^[6].

2. The Need for Green Innovation and Entrepreneurship in Nigeria

Green innovation and green entrepreneurship are not merely desirable in Nigeria—they are essential for addressing the intertwined economic and environmental challenges facing the country today. As Nigeria grapples with rapid population growth, environmental degradation, and persistent socio-economic challenges such as unemployment and poverty, adopting sustainable solutions becomes critical for long-term development.

First, environmental challenges in Nigeria demand innovative and sustainable responses. Rapid urbanisation, industrial expansion, and weak waste management infrastructure have contributed to pollution, deforestation, and ecosystem degradation in many regions of the country (Abideen *et al.*, 2024) ^[6]. Without green innovation, these environmental problems will worsen, threatening public health and undermining natural resource-based livelihoods. Green technologies—such as sustainable agriculture, clean energy systems, and efficient waste-to-energy processes—offer pathways to mitigate these impacts by reducing emissions, conserving resources, and promoting ecological restoration (Ibrahim, 2025) ^[8].

Second, Nigeria's economic structure and development priorities underscore the need for sustainable growth models. The nation's economy is heavily reliant on fossil fuel extraction and informal sectors, exposing it to global energy price volatility and creating limited opportunities for inclusive job creation. Eco-entrepreneurship, which integrates environmental responsibility with business innovation, can help diversify the economy by stimulating growth in renewable energy, sustainable agriculture, and green technologies—sectors with high potential for job creation, especially among youth (Green Goldmine, 2025) ^[3]. These green ventures not only contribute to GDP growth but also support climate resilience and environmental stewardship.

Third, green entrepreneurship aligns with global and domestic sustainable development commitments. With international frameworks such as the United Nations Sustainable Development Goals (SDGs) emphasising climate action, decent work, and inclusive growth, Nigerian policymakers, stakeholders, and the private sector are increasingly recognising the role of sustainable business innovation in achieving these objectives (Okafor & Onuoha, 2021) ^[14]. A well-developed green entrepreneurial ecosystem could redirect entrepreneurial talent toward ventures that balance profitability with environmental and social goals, contributing to national and global sustainability targets.

Finally, education, awareness, and capacity building are key drivers for advancing green innovation and entrepreneurship in Nigeria. Studies highlight the need for enhanced green entrepreneurship education and supportive policy frameworks to mobilise communities, equip future innovators with relevant skills, and encourage the adoption

of sustainable practices (Anabaraonye *et al.*, 2023) ^[4]. Increasing knowledge and incentives for sustainable enterprise can expand the adoption of green business models and foster a culture of innovation that values long-term environmental health alongside economic success.

3. Green Innovation and Green Entrepreneurships in Nigeria

The academic and policy literature on green innovation and green entrepreneurship in Nigeria is growing, reflecting a broader global emphasis on sustainability as both an environmental necessity and an economic opportunity. Researchers emphasise that green innovation is not merely about developing new technologies, but also about business models and processes that reduce environmental harm while enhancing competitiveness. Studies focusing on Nigerian contexts highlight how green innovation can improve brand reputation and performance among Small and Medium Enterprises (SMEs), especially through visible product and service innovations that resonate with environmentally conscious customers. (Olaifa O.I and Ilesanmi D.O 2025) ^[15].

In Southwest Nigeria, literature shows that green innovation and entrepreneurship are critically shaped by drivers such as economic incentives, environmental awareness, and technological advancements, but are also constrained by systemic barriers like poor access to financing, inadequate infrastructure, and weak regulatory frameworks. (Abideen *et al.* 2024) ^[1]

Research also indicates that Nigeria's green entrepreneurial landscape spans diverse sectors—including renewable energy, waste management, and sustainable agriculture—and that effective policy support, incentives, and capacity-building are necessary to unlock the full potential of green ventures. (Amokomoyen J.M, Lamino & Bakare A.A 2025) ^[3] Furthermore, sustainability scholars argue that green entrepreneurship in Nigeria is part of a larger “sustainable entrepreneurship” paradigm, which integrates environmental goals with socioeconomic development objectives, highlighting its relevance to national development strategies and Sustainable Development Goals (SDGs). (Adigun, O.H., Laosebikan, J and Oladele, S. 2024) ^[2].

Overall, scholarly work points to a multidimensional understanding of green innovation in Nigeria: as technological change, business strategy, and socio-economic transformation. The literature underscores both opportunities—for job creation, competitiveness, and climate mitigation—and challenges, such as financing gaps, lack of awareness, and insufficient policy support.

4. The Intersection of Green Innovation and Green Entrepreneurship in Nigeria

The intersection of green innovation and green entrepreneurship in Nigeria represents a synergistic relationship that drives both environmental sustainability and socio-economic development. Green innovation refers to the development and application of new technologies, products, processes, and systems that reduce environmental impact and promote sustainability. On the other hand, green entrepreneurship involves translating these innovations into scalable business ventures that generate economic value while addressing environmental challenges.

In the Nigerian context, green innovation provides the technological foundation for new business models that prioritize sustainability. Examples include renewable energy technologies, waste-to-energy systems, and eco-friendly agricultural practices. These innovations often arise from research efforts and entrepreneurial experimentation that focus on reducing carbon emissions, improving resource efficiency, and enhancing environmental performance. Empirical studies have shown that green products, processes, and green management practices are positively associated with improved performance among small and medium enterprises (SMEs), suggesting that innovation contributes directly to business sustainability and competitiveness when applied effectively. (Abideen *et al.* 2024) ^[6]

Green entrepreneurship, in turn, serves as the vehicle for scaling green innovation across markets. Nigerian entrepreneurs are increasingly recognizing environmental challenges not merely as problems but as opportunities for creating sustainable enterprises. These ventures often blend profitability with environmental stewardship, fostering job creation, economic diversification, and community empowerment. For instance, eco-entrepreneurial initiatives in renewable energy, waste recycling, and sustainable agriculture illustrate how environmental technologies can be commercialized to generate income while addressing pressing ecological issues. (Ibrahim, N. 2025) ^[8]

Importantly, the intersection occurs where innovation meets enterprise—where technological advances are commercialized into businesses that contribute to Nigeria's sustainable development agenda. Research reveals that this intersection enhances the sustainability of startups by encouraging investments in environmental technologies and practices such as environmental reporting and disclosure, which in turn strengthen long-term business viability. (Mauraise *et al.* 2025) ^[3].

However, barriers at this intersection—such as limited access to finance, insufficient infrastructure, and a lack of supportive policy frameworks—can inhibit the full integration of green innovation into entrepreneurial ventures. These challenges highlight the need for robust institutional support, capacity building, and strategic incentives to foster an enabling environment where green innovation and green entrepreneurship can thrive together. (Abideen *et al.* 2024) ^[6]

5. Green Innovation and Green entrepreneurship as game changers for charting Nigeria's growth frontier

According to Okafor, C. E., & Obi, N. A.,(2021) ^[14] Green innovation and green entrepreneurship in Nigeria are multi-layered phenomena, encompassing technology, business strategy, community action, and policy interactions. The growing ecosystem of green ventures demonstrates the country's potential, leading to green economic growth, thereby charting Nigeria's growth frontier. It is also expected that green innovation and green entrepreneurship will usher in so many opportunities as buttress below:

▪ Job Creation

Green entrepreneurship can generate employment opportunities, especially in rural areas where traditional job markets may be limited. This can lead to poverty reduction and improved living standards. The International Labour

Organization (ILO) reported in 2020^[18] that the transition to a green economy could create 24 million new jobs globally by 2030. This highlights the employment potential of sustainability-focused entrepreneurship.

▪ **Growing Environmental Awareness**

While Nigeria still faces challenges regarding green business adoption, there is a rising public perception of environmental issues, such as deforestation, climate change, and waste management. This growing awareness provides an opportunity for green businesses that is in line with consumer concerns about sustainability.

▪ **Waste Management and Recycling**

With Nigeria's waste management system facing serious problems, there are major opportunities for green entrepreneurs to leverage in recycling, waste-to-energy solutions, and sustainable waste disposal. The rising demand for eco-friendly waste management practices has also presented a feasible business opportunity.

▪ **Sustainable Agriculture**

Agriculture is a very critical sector in the Nigerian economy, and sustainable farming practices are gaining attention. Green entrepreneurs can key into organic farming and other sustainable agriculture initiatives to meet the ever increasing demand for healthy, eco-friendly food options. (Ige, B. O., & Akintoye, O. O. 2019) ^[10]

▪ **Eco-Tourism**

Nigeria's rich biodiversity and natural landscapes create opportunities for eco-tourism businesses. Entrepreneurs can create sustainable travel experiences that can promote environmental preservation while still leveraging the economic benefits for local communities. Ogunlade, O. M. (2020) ^[12]

▪ **Market Demand for Green Products**

As Nigerians are becoming conscious of the global environmental issues, consumers, especially in urban areas, are showing increasing interest in green products, such as organic food, eco-friendly packaging, and energy-efficient appliances. This paradigm move provides opportunities for green entrepreneurs to expand and meet this demand.

▪ **International Trade and Export Potential**

The global markets for green products are expanding very fast. Nigerian green entrepreneurs can leverage the export market for eco-friendly products like organic produce, renewable energy products, and recycled goods. Exporting to countries with higher demand for greener products presents a new growth opportunities World Bank. (2020) ^[22]

▪ **Renewable Energy Potential**

According to Ogunlade, O. M. (2020) ^[12], Nigeria has substantial potential for renewable energy, particularly solar, wind, and hydroelectric power. Green entrepreneurs can leverage Nigeria's ample natural endowments by investing in greener energy solutions, which will undoubtedly assist to address energy shortages and environmental concerns. Green entrepreneurs can also introduce affordable and sustainable energy solutions, such as solar, which can provide sustainable electrical energy to off-grid communities. According to the International Energy

Agency (IEA), in 2020^[21], renewable energy accounted for nearly 90% of the increase in global electricity capacity, indicating a significant shift towards sustainable energy sources (WEO: IEA 2020) ^[21]

▪ **Global Market Access**

A survey by Nielsen in 2019^[17] found that 81% of global respondents felt strongly that companies should help improve the environment (NYSE: NLSN) (2019) ^[10]. Clients are progressively selecting goods and services from businesses that assure sustainability. Green products from Nigeria, such as coffee and artisanal crafts, can access profitable global markets, providing economic benefits to the local producers.

6. Case Studies of Green Innovations and Entrepreneurships in Nigeria

To ground this discussion in real practice, here are notable examples of green ventures in Nigeria that illustrate how innovation and entrepreneurship are contributing to sustainability:

▪ **Wecyclers – Recycling and Waste Management**

Wecyclers is a Lagos-based social enterprise focused on incentivised recycling. It partners with communities to collect recyclable waste—such as plastic bottles—in exchange for rewards, turning waste into economic value and reducing environmental pollution. The venture has attracted both local and international partnerships to expand recycling infrastructure.

▪ **Salubata – Circular Fashion and Plastic Waste Reuse**

Salubata is a Nigerian-born company that transforms plastic waste into modular, customizable shoes. Utilising patented recycling technologies, the firm represents how fashion and sustainability can intersect through circular economy principles, diverting plastics from landfills and creating marketable consumer products.

▪ **Ecotutu – Solar-Powered Cold Storage for Agriculture**

Ecotutu is a cleantech company addressing post-harvest losses among farmers by providing solar-powered cold storage solutions. Their pay-as-you-chill model enables food producers to access affordable, renewable energy-based refrigeration, reducing food waste and improving food security.

▪ **Grassroots Environmental Initiatives**

Youth-led initiatives like the one by a 17-year-old Nigerian who won the 2025^[8] Earth Prize for transforming a landfill into a playground and green hub exemplify community-driven green innovation. These projects blend environmental stewardship with social impact, inspiring broader environmental engagement in urban areas.

▪ **Environmental Support Organisations**

Organisations like the Eleven Eleven Twelve Foundation support green entrepreneurship by providing advocacy, mentorship, and platforms for innovators in the environmental and agricultural sectors. Such support networks are critical for nurturing green ventures and bridging gaps in knowledge, funding, and policy engagement.

7. Synthesis and Emerging Trends in Nigeria

The Nigerian green innovation landscape reveals several emerging trends, which include the following:

- **Youth-Driven Sustainability:** Young innovators are at the forefront of new green ventures, leveraging digital technology and social enterprise models.
- **Cross-Sector Collaboration:** Partnerships between government, private sector, and NGOs are essential for scaling green innovations.
- **Integration with National Goals:** Aligning green entrepreneurship with Nigeria's climate commitments and sustainable development strategies can attract investment and policy support.
- **Focus on Practical Solutions:** Many successful ventures translate sustainability into everyday economic solutions—e.g., waste-to-value, renewable energy access, and agricultural support.

Conclusion

Charting Nigeria's growth frontier through green innovation and green entrepreneurship offers a pathway to a prosperous, sustainable future. By fostering an environment where eco-friendly technologies and sustainable business practices thrive, Nigeria can unlock immense economic potential while addressing critical environmental challenges. Green innovation presents an opportunity to diversify the nation's economy, reduce dependence on non-renewable resources, and create jobs, particularly in emerging industries. Green entrepreneurship, with its focus on creating impactful, environmentally conscious solutions, has the power to transform local communities and position Nigeria as a leader in Africa's green revolution. As the nation steers towards a greener future, the synergy between innovation, entrepreneurship, and sustainability will be key in driving growth, prosperity, and resilience for generations to come.

Policy Recommendations for Promoting Green Innovation and Green Entrepreneurship in Nigeria

1. Establish Green Innovation Funding Mechanisms

Recommendation: Establish dedicated funding mechanisms for green startups, including grants, loans, and tax incentives for businesses that develop environmentally sustainable products and services.

- **Rationale:** Green entrepreneurship often faces financial barriers, with many startups lacking access to affordable financing. By creating green venture capital funds and loan programs with favourable terms for green projects, Nigeria can unlock new opportunities for innovation. Government-backed green bonds, along with private sector involvement, can support the development of clean energy solutions, sustainable agriculture, and waste management initiatives.
- **Action Steps:**
 - a. Launch a National Green Innovation Fund that focuses on renewable energy, waste-to-energy technologies, and sustainable agricultural practices.
 - b. Provide tax incentives for companies investing in green technologies and environmentally sustainable business practices.
 - c. Create low-interest loans or grants for startups in clean tech, especially in underserved rural areas.

2. Strengthen Regulatory Frameworks for Green Technologies

Recommendation: Develop and enforce a strong regulatory framework that supports the deployment of renewable energy and environmentally friendly technologies across various sectors.

- **Rationale:** The absence of a comprehensive regulatory framework for green technologies often leads to poor adoption rates and inefficiency in implementation. A clear and consistent regulatory environment would provide entrepreneurs with the confidence to invest in green technologies and ensure that businesses comply with sustainability standards.
- **Action Steps:**
 - a. Create and implement a national renewable energy policy to regulate the growth of solar, wind, and hydropower industries, setting clear goals for energy generation from renewable sources.
 - b. Design environmental standards for businesses and manufacturers to reduce waste, emissions, and carbon footprints.
 - c. Ensure strong enforcement mechanisms for compliance with environmental laws, such as stricter penalties for non-compliance and incentives for early adopters of green technologies.

3. Enhance Public Awareness and Demand for Green Products

Recommendation: Launch public awareness campaigns to educate consumers and businesses about the benefits of sustainable products, services, and green entrepreneurship.

- **Rationale:** Consumer demand plays a pivotal role in the success of green products and services. However, in Nigeria, there is often a lack of awareness about the environmental and economic benefits of green products. Promoting eco-consciousness will create market opportunities for green entrepreneurs and incentivize businesses to adopt sustainable practices.
- **Action Steps:**
 - a. Launch nationwide campaigns that promote the importance of using green products, renewable energy, and sustainable agricultural practices.
 - b. Create green certification labels for products that meet certain environmental criteria, helping consumers easily identify eco-friendly options.
 - c. Encourage corporate responsibility by incentivizing businesses to incorporate sustainability in their operations through awards and recognition programs.

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