THREATENED FUTURES, COUNTLESS POLICIES, AND THE YOUTH CLIMATE POLICE

Another limp body with sunken eyes was brought into the pediatric hospital. It was the fifteenth case since I resumed. "Cholera, right?" The definite diagnosis rang in my head as I pored through my medical textbook, searching for the signs of severe dehydration. Three months later, it was shocking to realise that the floods caused the cholera outbreak. And that the floods were linked to climate change. The imminent danger was parading the hospital's entrance. Unless my fellow youths and I took the law into our own hands, our siblings and friends would suffer for sins they did not commit.

The Children Climate Risk Index (CCRI) report by the United Nations Children's Fund(UNICEF) in 2021 found that almost 1 billion children globally are at incredibly high risk of the impacts of the climate crisis.¹ From water vulnerability and other environmental shocks to disruption of lives and climate anxiety, children and young people are bearing a heavy brunt, experiencing serious jeopardy of their rights to live. Unsurprisingly, low- to middle-income countries like Nigeria, which contribute less to net emissions than developed countries, are taking and will take the most significant hit on their children if measures are not implemented. Due to their vulnerability, children are more exposed to air pollution than adults and more susceptible to increased asthma attacks, respiratory damage, cancers, and developmental damage.¹ The spread of deadly diseases killing children has also skyrocketed in recent times. These lethal pathogens are transported in freshwaters because of higher temperatures, increasing waterborne diseases. Perhaps the most compelling effect of the climate crisis on young people's health is anxiety and psychological distress.

In Nigeria, the direct health implications of extreme heat and changing precipitation patterns include cerebrospinal meningitis, malaria, and cholera, with vulnerable children under the age of 5 years mostly being affected.^{2,3} Nigeria, for the third year in a row, has the highest number of severely malnourished children.³ The Nigerian health system lacks the structure to cater to these children's climate-changed health needs adequately. In the face of overburdened healthcare workers and dilapidated or non-existent health facilities, Nigeria has to find another way of mitigating these health risks. It begs the critical question: "Are there policies or climate action documents geared to prevent the leaders of tomorrow from dying like animals"?

A turning point for Nigeria in its effective response to climate change and its challenges occurred in 2015 with the signing of the Paris Agreement. Upon ratification of the Agreement in 2017, the Federal Ministry of Environment, with the National Climate Change Council, developed, reviewed, and outlined various strategies and policy documents to be implemented. This includes the National Climate Change Policy for Nigeria 2021-2030 and Nigeria Long Term Low-Emission Development Strategy(LT-LEDS) 2060 documents. These documents show the tenacious spirit of the Nigerian government in tackling the climate crisis. In fact, one of these ambitious goals includes Nigeria revising its Nationally Determined Contributions in July 2021 and committing to reducing its emissions by 47% below Business As Usual by 2030, conditional on international support.⁴ This support will come mainly from

climate financing, paramount to implementing sustainable climate-resilient pathways in Nigeria. However, implementation will only be a daydream if the largest demography of the Giant of Africa remains on the sidelines. What is more paramount is the integration of youths and children into the climate picture. The roles of the youths, who constitute 70% of the entire population,⁵ have been defined vaguely. Securing climate financing yet leaving the populace illiterate is not only erroneous but also disastrous.

60% of Nigerians living in urban areas have never heard about climate change.⁶ Although stated in policy documents, this directly results from a lack of feasible Action for Climate Empowerment(ACE) strategies. ACE is a term adopted by the UN Framework Convention on Climate Change under the Paris Agreement. Its six pillars aim to empower everyone in every society to involve themselves in climate action actively. In Nigeria, the youths and children are best positioned to spearhead this movement. Therefore, I propose the Youth Climate Police.

The Youth Climate Police represent not just an association but a force. It comprises visionary, climate-knowledgeable, handpicked youths from all states and geopolitical zones in Nigeria. They are patriotic and well-versed in their local languages and cultural idiosyncrasies. Similar to the training received by the police force in our country, these youths will be rigorously trained in foundations like GreenHub Africa on the various facets of climate change as it relates to health. They will have rare opportunities to rub minds with climate action drivers like Adenike Oladosu, Salisu Dahiru, and many others. They will be responsible for developing unique strategies peculiar to the needs of their states, not individually but as a team. Once fully equipped, they will be deployed back to their respective states to begin a crucial phase. Their mission is simple: to create awareness of the effects and mitigation of climate change on health and to direct a youth-led community surveillance structure. They will mobilise youths and children, transfer the knowledge they have garnered, and enlighten their communities on sustainable and climate-resilient practices like water and sanitation hygiene, afforestation and deforestation, sustainable nutrition, etc. When there is a defaulter, they will ensure the individual is reoriented and set on his climate action journey.

"Nigeria has an astonishing opportunity to grow and prosper through its climate leadership". These words by Simon Steill, the UN Climate Change Executive Secretary, are incredibly accurate. While we ensure climate financing to put sustainable models in place, we must not take climate empowerment of our communities lightly. Too much is at stake, particularly the health of the leaders of tomorrow. Rather than fold its hands at the sound of impending doom, Nigeria must harness its most valuable and readily available resource: the youths. Climate-resilient pathways and sustainable environmental models will only be ink on paper without enlisting the Youth Climate Police. Thus, surveilling our land will save our children's lives.

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MINI-GRIDS AND OFF-GRID SOLUTIONS: THE FUTURE OF RURAL ELECTRIFICATION IN AFRICA

INTRODUCTION

Darkness cannot drive out darkness; only light can do that.

While Martin Luther King meant this quote in the context of his philosophy of non-violent resistance for millions of Africans living in rural areas, this is more than a figurative rhetoric. It reflects how their inability to access electricity has hampered the continental drive towards economic growth, adequate healthcare and efficient education. This energy inadequacy is primarily tied to the overdependence of African economies on centralised grids and the substantial financial and logistic costs of connecting these grids to rural areas.¹

This essay explores the possibilities of off-grid and mini-grid electrification for Rural Africa as immediate solutions to these concerns while supporting the continental quest for sustainability.

THE RISE OF MINI-GRIDS AND OFF-GRID SOLUTIONS

The concept of mini-grid electrification hovers around the localisation of electricity distribution in a manner that functions independently or conjunctively with the central grid.² The energy sources for mini-grid systems can be solar, hydro, wind or hybrid sources.

The benefits of mini-grids for rural users are wide-ranging. First, they boost the local economy. For example, thousands of businesses and households in Tanzania, including local wielders, millers and fish distributors, have benefited from JUMEME's solar hybrid mini-grid project.³

Adopting mini-grids could also help resolve the issue of unreliable electricity bedevilling more than 60 per cent of Sub-Saharan Africa's healthcare facilities,⁴ more so in the rural areas. This approach is already underway in Togo, with the West African country successfully electrifying over 300 rural health centres in partnership with the Africa Development Bank, elevating the quality of nighttime and emergency care while improving vaccine storage.⁵ By the World Bank's estimation, mini-grid systems, if holistically adopted as soon as possible, could also reduce carbon emissions by 1.2 billion tons before the end of 2030.⁶

While mini-grids may operate together with central grids, off-grid electrification emphasises standalone generation and distribution of electricity. This includes micro-hydro systems, solar

¹ Pistelli, L. (2020). Addressing Africa's energy dilemma. In *Lecture notes in energy* (pp. 151–174). https://doi.org/10.1007/978-3-030-39066-2_7.

² Babayomi, O. O., Olubayo, B., Denwigwe, I. H., Somefun, T. E., Adedoja, O. S., Somefun, C. T., Olukayode, K., & Attah, A. (2023). A review of renewable off-grid mini-grids in Sub-Saharan Africa. *Frontiers in Energy Research*, *10*. https://doi.org/10.3389/fenrg.2022.1089025.

³ JUMEME's business model for mini-grids reaping multiple benefits in Tanzania. (2020, 27 May). Sustainable Energy for All. <u>https://www.seforall.org/news/jumemes-business-model-for-mini-grids-reaping-multiple-benefits-in-tanzania</u>.

⁴ World Health Organization (2023, 31 August). *Electricity in health-care facilities*. <u>https://www.who.int/news-room/fact-sheets/detail/electricity-in-health-care-facilities</u>.

⁵ Thomas, D. (2025, 7 February). *Bringing light and opportunity: How solar electrification is transforming rural Togo. African Business.* <u>https://african.business/2025/02/quick-reads/bringing-light-and-opportunity-how-solar-electrification-is-transforming-rural-togo.</u>

⁶ World Bank (2022, 27 September). Solar Mini Grids Could Power Half a Billion People by 2030 – if Action is Taken Now. *World Bank*. <u>https://www.worldbank.org/en/news/press-release/2022/09/27/solar-mini-grids-could-power-half-a-billion-people-by-2030-if-action-is-taken-now</u>.

home systems (SHS) and standalone wind turbines.⁷ Off-grid electricity is advantageous to rural areas because of logistic and distance difficulties caused by grid-based connections.

The scalability of off-grid electrification is another of its many benefits. It enables consumers to start up at any level and scale up or down according to personal or household usage changes. Reports also exist of households that have reduced their annual energy expenditure by more than 70 per cent by bringing their grid dependence to the bare minimum.⁸

Off-grid solutions based on renewable energy also assure the best energy security and climate resistance by reducing dependence on climate-vulnerable centralised grids. This energy strategy is already enjoying widespread adoption in sub-Saharan Africa, with notable examples including Nigeria, where today's off-grid capacity is three times its on-grid capacity.⁹

FINANCING RURAL ELECTRIFICATION

While mini-grid and off-grid rural electrification can be key drivers of sustainable development, financing them can be challenging due to uncertainty in rural revenue streams and lack of investment attraction.¹⁰ The following financing options offer valuable solutions to these funding difficulties.

- 1. **Blended Finance**: This involves the provision of grants and guarantees of concessional loans by government, development finance institutions and donors to mobilise investments from private sector actors in projects with socioeconomic benefits. Blending this public or philanthropic capital with private investment improves the bankability of these projects while reducing risk exposure for the investors. The International Finance Corporation's Scaling Solar Program is a prime example of how blended finance can lower capital costs.¹¹
- 2. **Results-Based Financing**: This mechanism links financial incentives directly to achieving pre-agreed performance milestones, which, in the case of rural electrification, may include the volume of energy distribution or the number of new connections. Under this system, investment utility is more or less assured, while developers are driven towards delivering high-quality, sustainable projects. Thanks to the Global Partnership on Output-Based Aid, this is already being used to subsidise the electrification of targeted rural areas in Tanzania.
- 3. **Public-Private Partnership**: Under this arrangement, private companies would bring in their technical expertise and capital while national or regional governments would support the development and operation of mini-grid projects through subsidies, favourable policies and, in

⁷ Manohar, R., & Hikihara, T. (2024). Design of a stand-alone hybrid dispersed generation network unified by passivity-based control. *Royal Society Open Science*, *11*(7). <u>https://doi.org/10.1098/rsos.230458</u>.

⁸ Garcia, A. (2024, 11 September). *In conversation with Oti Ikomi on Proton Energy's vision and the future of Nigeria's energy sector*. Energy & Utilities. <u>https://energy-utilities.com/in-conversation-with-oti-ikomi-on-proton-energy-s-news125348.html</u>.

⁹ Pagan, K. (2024, 22 November). We're retired and save over £200 a month on our energy bills – here's how you could save too. . . *The Scottish Sun*. <u>https://www.thescottishsun.co.uk/money/13901199/retired-couple-save-money-energy-bills-off-grid/</u>.

¹⁰ Nyarko, K., Whale, J., & Urmee, T. (2023). Empowering Low-Income Communities with Sustainable Decentralized Renewable Energy-Based Mini-Grids. *Energies*, *16*(23), 7741. <u>https://doi.org/10.3390/en16237741</u>.

¹¹ Stritzke, S. (2018). 'Clean energy for all': the implementation of Scaling Solar in Zambia. *World Journal of Science Technology and Sustainable Development*, *15*(3), 214–225. <u>https://doi.org/10.1108/wjstsd-11-2017-0042</u>.

some cases, burden-relaxing finances. India's collaboration with Tata Power¹² and Nigeria's World Bank-backed electrification project¹³ has yielded immense deployment results for minigrid and off-grid solutions in the respective countries.

4. **Pay-As-You-Go (PAYG) Models**: PAYG models recognise the access difficulties of lowincome consumers and resolve the same by allowing them to cover their total energy costs in small instalments. Under this system, operators are also assured of steady revenue streams. For consumers, there is the opportunity for reduced upfront costs in exchange for subsequent payments using mobile payment technology.¹⁴

POLICY AND REGULATORY FRAMEWORKS

The role of government incentives in promoting mini-grid deployment is crucial as it can help create an attractive renewable energy market. One incredibly unique incentive here is the introduction of feed-in tariffs, which ensures that mini-grid developers are paid a fixed price for the energy they feed into the central grid.

Still, on governmental policies, volatility and uncertainty in regulatory trajectories tends to create delays and disruptions in mini-grid deployment. This must be remedied or avoided by developing clear, long-term policy frameworks, thereby mitigating investment risks.

Considering the highly communal nature of African rural areas, community engagement is another crucial factor that can induce the success or failure of renewable energy projects. Involving local communities in this vision through orientation and as owners, operators, and managers of minigrid projects has produced positive results in countries like Tanzania.¹⁵

CONCLUSION

A careful examination of the electricity deficiency currently being suffered by Rural Africa reveals an interesting opportunity in disguise. Mini-grid and off-grid solutions offer environmentally sustainable alternatives to the coal and natural gas that presently dominate the centralised systems of generating electricity across Africa. If the policy and financing initiatives discussed above are applied, renewable energy can quickly become the beacon illuminating the future of Africa's rural residents.

¹² India Times (2023, 14 December). *Tata Power's TPRMG recognized for clean energy initiative in rural India by World Economic Forum*. Indian Times. <u>https://energy.economictimes.indiatimes.com/news/renewable/tata-powers-tprmg-recognized-for-clean-energy-initiative-in-rural-india-by-world-economic-forum/105985995.</u>

¹³ Tunji, S., & Tunji, S. (2024, 31 July). *World Bank restructures \$350 million loan to Nigeria to allow completion of seven power plants*. Nairametrics. <u>https://nairametrics.com/2024/07/31/world-bank-restructures-350-million-loan-to-nigeria-to-allow-completion-of-seven-power-plants</u>.

¹⁴ Barry, M. S., & Creti, A. (2020). Pay-as-you-go contracts for electricity access: Bridging the "last mile" gap? A case study in Benin. *Energy Economics*, 90. <u>https://doi.org/10.1016/j.eneco.2020.104843</u>.

¹⁵ Ngoti, I. F. (2024). The role of sense of ownership in rural community mini-grid management: qualitative case study from Tanzania. *Energy Sustainability and Society*, *14*(1). <u>https://doi.org/10.1186/s13705-024-00496-7</u>.





WORLD Resources Institute



YOUTH ENVIRONMENTAL AND CLIMATE LEADERSHIP (YELC) ESSAY COMPETITION

Essay Theme: Climate Finance and Grant Writing

Essay Topic: Grant Writing Fellowship For Addressing Climate Change In Nigerian Marginalized Areas



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Introduction

We are in 2025 - fifty-two years after the United Nations Environment Programme (UNEP) was established, thirty-three years after the United Nations Framework Convention on Climate Change (UNFCCC) was adopted, ten years after the Paris Agreement was ratified, ten years after the Nationally Determined Contributions (NDCs) was submitted, and two years four months after the Long-Term Low Emission Development Strategy (LT-LEDS) was submitted, with one mission - to tackle climate change. Yet, in Nigeria, food insecurity is sailing on the flood, carting away hundreds of thousands of metric tons of food that should have fed millions of us. Our carbon sinks are being bored by the continuous burning of fossil fuels and deforestation, and we have already lost over 1.25 million hectares of trees to logging. That is not all; Lake Chad is shrinking, our blue economy might sooner or later turn red, thirty-three million Nigerians are projected to suffer from malnutrition, and by 2050, more plastics could be in our ocean than fish. Do all these mean these goals, plans, and targets are ineffective? The answer to this question is no. However, the country has not met its climate goals, targets, and plans primarily because of insufficient finance. A recent report on the state of climate finance in Nigeria reveals that the country receives only 4% of the \$17.7 billion it needs yearly to tackle the impact of the climate crisis. These statistics mean that without innovative and sustainable climate finance instruments, millions of lives, especially in marginalised communities, would be put at risk. Climate Finance can be defined as local, national, or transnational financing - drawn from public, private, and alternative financing sources seeking to support mitigation and adaptation actions to address climate change. The question is, what is the most adequate and sustainable climate finance instrument? How can it serve vulnerable, underrepresented communities? In addition to answering the questions, this essay aims to briefly explore the concept of climate finance.

Body

Climate finance took the world by storm in 1992 at the first UNFCCC meeting in Rio de Janeiro, Brazil, where countries recognised the need for climate financial assistance for developing countries. This climate funding mechanism went on to birth others such as the <u>Global</u> <u>Environment Facility</u> (1994), the <u>Kyoto Protocol</u> and the Clean Development Mechanism (1997), the <u>Adaptation Fund</u> (2001), the <u>Bali Action Plan</u> (2007), the <u>Copenhagen Accord</u> (2009), the <u>Green Climate Fund</u> (2010), the <u>African Climate Funds</u> (2014), the <u>Paris Agreement</u> (2015), the <u>Glasgow Climate Pact</u> (2021), among others. The types of climate finance are Loans, Equity, Bonds, Insurance, Guarantees, Grants, and Debt Swaps. Climate finance is a viable mechanism for funding Nigeria's climate mitigation, adaptation, and education projects, especially in underrepresented areas. However, between <u>2015 and 2021</u>, the country received \$4.9 billion in climate funding, of which 75% (\$3.7 billion) came from concessional loans - adding to the nation's debt portfolio. Given this reality, there is a need for a more adequate and sustainable source of funding, such as a grant.

Regarding this essay, grants are patterned to propel progressive solutions tackling pressing issues such as climate change mitigation, biodiversity loss, clean water, and agricultural and land use activities. While grants are provided for knowledge management programs, capacity-building programs, ongoing activities that do not generate financial returns and technical and costing plans, this essay argues they are sustainable for solving climate-related issues, especially in marginalised communities. For instance, In 2023, <u>Oluwaseyi Jesuton</u>, Nigerian environmentalist, and her team at U-recycle Initiative Africa and twenty-two others

secured a \$100,000 grant from <u>GEF</u> to tackle plastic pollution in marginalised coastal communities.

However, the groundwork in Nigeria primarily addresses only national and transnational grants, reflecting the financial consequences of efficiency in execution. Financing climate-related projects in marginalised areas is under-explored and lacks sufficient funding to demonstrate their effectiveness. This essay proposes a grant writing fellowship to address climate change in marginalised Nigerian areas.

The grant writing fellowship in Nigerian disadvantaged areas is a unique grant writing program focused on empowering young people who are passionate about helping marginalised communities tackle the climate crisis to become sustainability grant writers who will go on to write compelling and world-class grant proposals for reducing carbon footprint, protect biodiversity, and promote climate education. Irrespective of whether their projects are new, ready to scale, seeking expansion, fostering resilience and sustainability, or indirectly impacting cross-sectoral goals, this solution is designed to teach, support, and empower young Nigerians to develop grant writing skills. The key goals of the fellowship are to support Indigenous youth in addressing pressing climate issues such as climate adaptation, education and awareness, and mitigation, as well as to promote inclusivity in the movement for climate and environmental leadership.

The grant writing fellowship is critical in making sustainable, impactful climate mitigation and adaptation outcomes. Even the most promising project may struggle to get funding without adequate grant writing skills. Also, it provides project promoters with the necessary capital to hire the right people and invest in essential climate infrastructure. Furthermore, this fellowship enables the focus on the mission rather than being distracted by resource constraints. In addition, the fellowship provides insights into strategic planning, robust project management, and evaluation.

While this novel approach has immense potential, lack of interest from potential beneficiaries, lack of access to the Internet and computers, conflict, political instability, and access to experts and support staff could be barriers. However, strategic partnerships with local community leaders, learning centres, grant-writing agencies, and technical organisations would remove the barriers.

Conclusion

The climate crisis is an opportunity, grants are a more viable and sustainable climate finance instrument than concessional loans and debts, and grant writing is an opportunity to break the silos and leave no one behind. Passion for writing can turn into a passion for writing for climate actions to create a better, safer, and just Nigeria. A grant is needed to execute this solution. The big question to ask ourselves now is whether we can consider the solution provided by this essay. The clock is ticking!



NO ONE LEFT IN THE DARK: ACHIEVING ENERGY JUSTICE IN NIGERIA



We have the chance to build this new energy economy in ways that reflect our deepest values of inclusion, diversity, and equal opportunity for everyone—Van Jones.

1.0. Introduction

Heat! Sweltering heat, baked soil, little rain and a people nearly breaking under the glare of the unforgiving sun and its attendant effects on the environment. This is the reality of Nigeria—a country where over 85 million of her people lack access to electricity; and where the serenity of the night is long lost to the drum of petroleum-based generators which pump tons of carbon into the atmosphere, ripping the fragile ozone layer to shreds and ushering in unprecedented heat.¹ This trend—if left unchecked—spells disaster.

It is clear that survival necessitates a transition in Nigeria's energy policies and efforts to ensure energy justice and equity for everyone while simultaneously slowing or halting the galloping climate change that has befallen her. Energy justice is defined as a multi-layered, human-centric theoretical approach that challenges injustice and inequality in the energy sector.² Thus, achieving true energy justice and equity in Nigeria requires affordable, decentralized renewable energy, community-driven initiatives, regulatory safeguards, and a fair transition for oil sector workers.

2.0. The Energy Crisis in Nigeria

Since her independence, Nigeria has held the title of the most populous country in Africa with an estimated 45 million people in 1962.³ Since then, there has been an astronomical increase in her population to over 236 million people.⁴ It stands to reason that for the country and all her inhabitants to function optimally, a tremendous amount of energy is required.

Unfortunately, Nigeria's energy infrastructure has been unable to cope with the energy demands of the nation, creating an energy crisis. This crisis is the outcrop of Nigeria's overreliance on crude oil as a primary a source of both income and power since the 1970s and an inefficient electricity service industry.⁵ Nigeria's power generation capacity is less than demand, and her transmission infrastructure is aged, leading to frequent collapse.⁶ The centralized grid also leads to huge rural-urban disparities in energy access.⁷ This deepens economic inequalities and limits development potential.

Climate change is exacerbated by the use of fossil fuels in Nigeria's energy mix and emissions from generators and firewood. This worsens the energy crisis by affecting water in

¹ The World Bank, 'Nigeria to Improve Electricity Access and Services to Citizens' (*World Bank*, 5 February 2021) <<u>https://www.worldbank.org/en/news/press-release/2021/02/05/nigeria-to-improve-electricity-access-and-services-to-citizens</u>> accessed 22 March 2025.

² Ramit Debnath and others, 'Words against Injustices: A Deep Narrative Analysis of Energy Cultures in Poverty of Abuja, Mumbai and Rio de Janeiro' (2021) 72 Energy Research & Social Science 101892.

³ Natonal Population Commission, 'History of Population Census in Nigeria' (*nationalpopulation.gov.ng*) <<u>https://nationalpopulation.gov.ng/census-enumeration</u>> accessed 24 March 2025.

⁴ Worldometer, 'Nigeria Population' (*Worldometers*, 2025) <<u>https://www.worldometers.info/world-population/nigeria-population/</u>> accessed 30 March 2025.

⁵ Mgbeodichinma Eucharia Onuoha and Isa Olalekan Elegbede, 'The Oil Boom Era: Socio-Political and Economic Consequences' in Prince E Ndimele (ed), *The Political Ecology of Oil and Gas Activities in the Nigerian Aquatic Ecosystem* (Academic Press 2018).

⁶ Adeyinka Adebayo and Kenneth Ainah, 'Addressing Nigeria's Electricity Challenges: Past, Present, and Future Strategies' (2024) 2 American Journal of Applied Sciences 1

<<u>https://www.researchgate.net/publication/383743075_Addressing_Nigeria</u>> accessed 22 March 2025.

⁷ K Kaygusuz, 'Energy Services and Energy Poverty for Sustainable Rural Development' (2011) 15 Renewable and Sustainable Energy Reviews 936.

hydroelectric dams, increasing extreme weather conditions that destroy infrastructure, and causing heat waves to boost electricity demand.⁸ Unless there is urgent reform and investment in renewable power, Nigeria's energy and climate crisis may become her undoing.

3.0. The Potential of Renewable Energy Sources

Charles Darwin Darwin once said, "It is not the strongest of the species that survives, nor the most intelligent. It is the one most adaptable to change."⁹ In an attempt to avert catastrophe with the earth's temperature reach a record 2.30 degrees Celsius in 2024,¹⁰ Nigeria adopted the Paris Agreement in 2015, promising to reach her net-zero goals (2050–2070).¹¹ In order for this to become a working reality, renewable energy development is given topmost priority.

The Nigerian environment is richly blessed with an abundance or renewable energy alternatives. Northern Nigeria is blessed with high solar irradiation, which can be used in large-scale solar power schemes, and its agriculture provides biomass and biogas opportunities.¹² The Middle Belt has large rivers like Niger and Benue, which are appropriate for large and small-scale hydropower solutions.¹³ Coastal and Niger Delta areas are fairly potential for wind energy, especially in Delta and Lagos, and biomass from the oil palm and fishing industries.¹⁴ For better results, hybrid systems can be used for all zones.

4.0. Ensuring Energy Equity and Just Transition for Oil Sector Workers: Policies, Funding and Community-Based Solutions

The transition to renewable energy is just half the battle; ensuring equal access and affordability completes the process. Unreliable and expensive electricity is what most Nigerians, particularly rural residents, have to deal with.¹⁵ Thus, just transition must prioritize economic inclusion and sustainability, to avoid inducing energy poverty during the transition.

The Electricity Act 2023 further encourages decentralized and privatized electricity generation, by which private companies and states can develop independent power projects. Thus, decentralized mini-grids offer a viable solution for rural areas, with localized access to power not dependent on the unstable national grid. These renewable projects can be set up

⁸ Chinazaekpere Ofodile, Salihu Abdulkadir and Patrick Igiligi, 'Climate Change and Energy Security in Nigeria: Analyzing the Role of Renewable Energy Solutions Institution: IGreen Republic' (2024) 10 International Journal of Agriculture and Earth Science

<<u>https://iiardjournals.org/get/IJAES/VOL.%2010%20NO.%2010%202024/Climate%20Change%20and%20Energ</u> y%2056-79.pdf> accessed 28 March 2025.

⁹ Charles Darwin, On the Origin of Species (Macmillan Collector's Library 2017).

¹⁰Roxana Bardan, 'Temperatures Rising: NASA Confirms 2024 Warmest Year on Record' (*NASA*10 January 2025) <<u>https://www.nasa.gov/news-release/temperatures-rising-nasa-confirms-2024-warmest-year-on-record/</u>>.

¹¹ UNFCCC, 'The Paris Agreement' (*United Nations Climate Change*2015) <<u>https://unfccc.int/process-and-meetings/the-paris-agreement</u>>.

¹² SL Habib and others, 'Unlocking Nigeria's Solar PV and CSP Potentials for Sustainable Electricity Development' (2012) 3 International Journal of Scientific and Engineering Research.

¹³ SA Fatounde, JA Olowonubi and MC Ibegbulam, 'Small Hydropower (SHP) Development in Nigeria: An Assessment, Challenges, and Opportunities' (2023) 7 International Journal of Physical Sciences Research 11 <<u>https://eajournals.org/ijpsr/wp-content/uploads/sites/81/2023/09/Small-Hydropower.pdf</u>> accessed 30 March 2025.

¹⁴ Ibid.

¹⁵ Setu Pelz and others, 'Electricity Supply Quality and Use among Rural and Peri-Urban Households and Small Firms in Nigeria' (2023) 10 Scientific Data 273 <<u>https://www.nature.com/articles/s41597-023-02185-0</u>> accessed 28 March 2025.

using community-owned cooperatives and be run by them collectively.¹⁶ Their efforts can be supported by government subsidies and microfinance centres.

Furthermore, there must be a just transition as well for oil workers, whose destiny is wrapped up in fossil fuel. There must be training programs, vocational training, and incentives to take them into renewable energy. Solar panel industry work, hydropower maintenance, and biofuel production can provide such alternative employment opportunities.¹⁷ This will also retain local expertise and encourage indigenous innovation in energy technology.

Alongside the Climate Change Fund, Nigeria requires diversified instruments of finance to support an equitable energy transition. Green bonds will attract investors seeking sustainable projects, raising funds for renewable energy infrastructure¹⁸; public-private partnerships (PPPs) enhance innovation and efficiency in energy schemes; also international climate financing from institutions like the World Bank and the Green Climate Fund can provide grants and low-interest loans.¹⁹

Finally, there is a need for regulatory frameworks to prevent exploitation in the privatized system. Private investors may favour profitability over affordability without sufficient regulation.²⁰ Policies need to implement fair pricing, protect consumers, and retrain erstwhile oil industry employees.

5.0. Conclusion

Energy injustice in Nigeria is not only an environmental need but a social and economic one. The path ahead is through decentralised renewable energy, affordability measures, just transitions for oil workers, and long-term financial investment. By accessing regional renewable resources, investing in community-driven projects, and establishing regulatory safeguards, Nigeria can construct an inclusive and robust energy system. Policymakers, investors, and citizens must act now to ensure that no Nigerian is left in the dark, committing to a cleaner, more inclusive, and more sustainable energy future.

<<u>https://earth.org/power-to-the-people-an-overview-of-community-energy/</u>> accessed 28 March 2025. ¹⁷ Stefan Ellerbeck, 'How Renewable Energy Transition Is Creating a Green Jobs Boom' (*World Economic*

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Rising Heat Waves in Northern Nigeria: Public Health Implications and Sustainable Mitigation Strategies

The Nigerian Meteorological Agency (NiMeT) has recently warned of escalating heat waves in Nigeria, particularly the northern region, where temperatures rise up to 42°C¹. This extreme heat poses a serious risk to public health by increasing disease transmission and even triggering complications like premature delivery. Rapid urbanization intensifies the situation by creating Urban Heat Island (UHI) effects that trap heat in cities and urbanizing rural areas. Despite Nigeria's climate action progress, local effects like UHI receive less attention. Therefore, targeted urban planning with heat-reflective roofing systems serves as an effective mitigation approach to the impact of heat waves.

According to research by NiMeT², high heat waves are caused by climate change and worsened by the Urban Heat Island (UHI) effect. UHI is a phenomenon in which materials in cities trap heat within themselves and release it slowly into the environment. So, when regional heat waves occur, UHI contributes to additional thermal stress, raising temperatures from merely uncomfortable to potentially lethal levels.

The cause of UHI is modern construction materials like concrete, asphalt, and, most significantly, iron roofing. It is important to note that this problem is not exclusive to cities. As many rural areas are urbanizing rapidly and replacing traditional plant-based roofing with modern materials, certainly, the ember that scorches the town can also reach the village with time.

Studies ³ have shown that the main factor contributing to UHI in northern Nigeria is the use of corrugated iron roofing. One shocking aspect of these roofs is that, in addition to releasing trapped heat slowly at night, they also significantly raise indoor temperatures during the day, reaching up to 45°C ⁴. This can make moving from the hot sun into a room feel like moving from a frying pan into a fire.

A cityscape showing the prevalence of corrugated iron roofs. (source ⁹)

Although high heat waves are known to cause severe economic and environmental impacts, their most important yet often overlooked effect in Nigeria is on public health⁵. Heat waves increase disease transmission by accelerating pathogen growth and weakening immunity. For example, in the current summer, the Kebbi State government confirmed an outbreak of meningitis in three LGAs, with 248 suspected cases and 26 fatalities recorded⁶. Also, in the same summer, an outbreak of malaria was recorded in Kano State. These, along with other similar cases, highlight the impact of heat waves on the spread of diseases.

Moreover, the consequences of heat waves can reach unimaginable levels. Data from a number researches⁷ have revealed that heat stress can cause premature delivery—that is, the birth of a baby before it is fully developed, which can result in death or severe disability. This is especially concerning, considering that Nigeria, particularly the northern region, is already struggling with high maternal mortality.

Even though these effects are assumed to expose only vulnerable populations in danger, such as children, the elderly, pregnant women, and people with pre-existing health conditions like asthma. However, the coincidence of the heat waves with Ramadan fasting, recent power outages, and the fact that most of the northern population relies on hard labour to survive, along with the constantly expanding population of the northern states, are factors that put even the non-traditionally vulnerable population at risk.

A man pouring cold water on his head to cool off during Ramadan fasting in Kano, Nigeria. (source ⁹)



The 2024 SDG report shows that SDG 13 (climate action) in Nigeria is on track to achievement⁸. This proves that the country's response to climate change is paying off. This response includes the Climate Change Act of 2021, the update of Nationally Determined Contributions (NDCs) that pledge to reduce greenhouse gas emissions and foster adaptability to the impact of climate change, and the development of a National Climate Change Policy. However, it appears that most efforts are focused on reducing gas emissions, while adaptability measures like tackling the local Urban Heat Island (UHI) effect to reduce the impact of heat waves have received comparatively less attention⁴. This is primarily because UHI is seen as a state or local issue, making the responsibility of handling it rely on local authorities.

Therefore, realizing the importance of state and local authorities in solving this problem, we propose that northern states' urban planning and development authorities—such as KNUPDA in Kano and KASUPDA in Kaduna—should include the use of at least aluminum roofs as a requirement for approving new buildings. Apart from aluminum roofs, other types of heat-reflective roofing should also be considered. Aluminum roofing should be given priority because, beyond heat wave relief, it is also cost-effective. Aluminum reflects 70% of solar radiation compared to iron's 30%⁴. Though slightly costlier, aluminum lasts twice as long as iron, making it more economical.

However, even if all urban centers adopt this, gradually, urbanizing rural areas will face the same problem as cities. Therefore, the government and climate action NGOs should collaborate to educate these communities through campaigns via radio and local programs to promote the adoption of aluminum roofing. This approach would help address the problem in urban areas and prevent future challenges in rural communities undergoing urbanization.

In conclusion, the increasing heat waves across northern Nigeria create serious climate hazards that endanger public health and are exacerbated by the Urban Heat Island (UHI) effect stemming from rapid urban development. Although Nigeria has achieved progress in climate change response, insufficient attention to UHI maintains public health risks. The interplay between these challenges and urban infrastructure choices highlights the urgent need for localized climate adaptation measures. Implementing heat-reflective roofing materials, particularly aluminum, can help reduce thermal stress and protect public health. Ultimately, as climate challenges intensify, addressing localized issues like UHI is just as important as reducing global emissions, which aligns with the NDC objective that emphasizes both emission reduction and climate adaptation. *"The wise adapt themselves to circumstances, as water molds itself to the pitcher."* — Chinese Proverb

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Biogas Innovation: Turning Waste into Clean Energy and Green Jobs

For decades, Nigeria has battled with the challenges of waste pollution and energy shortage. Every day, tons of organic waste from households, markets, businesses and farms are left unused and rot. This releases greenhouse gases into the air, which greatly contributes to environmental pollution, health issues and low economic growth. At the same time, millions of Nigerians still lack access to clean cooking fuel and reliable electricity, forcing many to rely on firewood, kerosene, and expensive cooking gas. This heavy dependence on fossil fuels has deeply contributed to deforestation, high cost of living, and climate change. Also, this cycle of energy scarcity and environmental challenges has also made it harder for Nigeria to achieve its climate goals under the Nationally Determined Contributions (NDC), National Adaptation Plan (NAP), and Long-term Low Emission Development Strategy (LT-LEDS). If care is not taken, Nigeria's energy crisis and environmental problems will keep getting worse, but one promising solution to these challenges is Biogas Technology. Inspired by Sweden's success in biogas production, this project introduces a small-scale bio-digester to convert organic waste into clean energy (biogas) and organic fertilizer (bio-slurry), offering an affordable and sustainable solution to both energy and agriculture.

Biogas is a form of renewable energy, produced from the breakdown of organic waste, such as food waste, agricultural residues, and animal manure, in a bio-digester where anaerobic digestion takes place. This process not only produces biogas for cooking and electricity but also generates bio-slurry, which can be used as a natural fertilizer to improve soil health and boost agricultural productivity. The adoption of biogas technology has been widely successful in Sweden, a country strongly known for its global sustainability leadership, with over 83.3% of its energy coming from sustainable sources, has integrated biogas into its transport, industry, homes and farming sectors, proving that waste-to-energy solutions can drive national sustainability. Farmers now rely on bio-slurry instead of chemical fertilizers, improving soil fertility and reducing costs. If Sweden, with a much smaller agricultural sector, can maximize biogas as a clean energy source, then Nigeria with its numerous wastes and rich agriculture has greater opportunity to leverage biogas to gain energy security, environmental protection, and economic growth.

Therefore, a small-scale biodigester, which this project promotes, is a low-cost and adaptable system that converts organic waste into clean energy and organic fertilizer. The process includes: Feeding the waste into an airtight biodigester, allowing micro-organisms to break down waste that will produce methane gas (biogas), testing the produced gas for purification in the lab, before collecting the gas for cooking, heating or generating electricity, as well as extracting the organic fertilizer which is the by-product (bio-slurry) for farming. The best part about this system is that it is simple, affordable, uses local available materials (plastic tanks, pipes), requires minimal maintenance, and provides a continuous source of energy as long as there is a supply of organic waste.

In rural areas, farmers can use animal manure and crop waste to generate biogas for cooking and electricity, and bio-slurry to enrich their farmlands. While in urban areas,

restaurants, markets, and food processing industries can adopt biogas to reduce waste pollution and lower fuel costs. Unlike solar or wind energy, biogas works 24/7 because waste is constantly being generated, making it a stable and reliable renewable energy source.

Beyond providing clean energy, biogas presents an opportunity for job creation and economic growth, particularly for young entrepreneurs and women. Nigeria has a high youth unemployment rate, and biogas entrepreneurship can provide sustainable business opportunities in areas such as: Biogas Production, Sales and Distribution, Bio-digester Installation and Maintenance, and Waste Collection for Biogas, so as to activate young entrepreneurs who can set up biogas refill stations for the purchase of clean energy, skilled professionals offering installation, repair, and maintenance services for biogas systems, and businesses that establish waste collection networks where organic waste from markets, farms, and restaurants is gathered and converted into clean energy. Sweden's biogas success story shows that investing in biogas entrepreneurship leads to a self-sustaining green economy, and Nigeria can replicate this model by funding biogas startups, offering training programs, and integrating biogas into national energy policies.

Even though biogas has numerous benefits and potentials in Nigeria, there are still alot of challenges that will hinder the success and implementation of it, and one of the biggest challenges is the lack of biogas awareness. Many people are unfamiliar with biogas systems and how they work, and that's an issue. Another challenge is the initial set-up cost. Even though it is affordable, it can be expensive for low-income communities. And most importantly, weak government policies and lack of financial incentives will also make it difficult for biogas businesses to scale. So to solve this problems, education and awareness campaigns must be launched to teach communities, farmers, and businesses about the benefits of biogas technology. The government should provide subsidies, grants, and low-interest loans to support startups and small businesses in the biogas sector. And public-private partnerships should also help in expanding biogas adoption, similar to what has been done in Sweden. If these solutions are implemented, biogas can become the major source of energy in Nigeria, reducing fossil fuel dependence while creating sustainable economic opportunities.

Ban Ki Moon once said that "Energy is the golden thread that connects economic growth, social equity, and environmental sustainability." and biogas is a practical, scalable, and economically feasible solution that addresses Nigeria's energy crisis, waste pollution, and youth unemployment. And with the numerous waste produced in our communities each day, Nigeria can leverage biogas technology to provide clean energy, boost agriculture, and create green jobs. With the right policies, funding, and awareness, biogas can empower young entrepreneurs, support food security, and position Nigeria as a leader in clean energy innovation. **Waste is only waste if we waste it**, so the time to act and embrace biogas is now, for it is the future of sustainable clean energy and green entrepreneurship in Nigeria.



BUILDING A CLIMATE-RESILIENT HEALTH SECTOR



Introduction

Nigeria faces a growing climate crisis, evidenced by rising temperatures, recurrent flooding, prolonged droughts, and unpredictable rainfall patterns. These environmental changes significantly impact public health, exacerbating existing diseases and introducing new health risks. Rising temperatures contribute to increased cases of heatstroke, malaria, and cholera. Air pollution fuels respiratory diseases such as chronic obstructive pulmonary disease (COPD), which is the fourth leading cause of death worldwide.

Malnutrition is another harmful consequence of the climate crisis. Extreme and unpredictable weather patterns significantly affect agricultural productivity. With a reported 80 percent of Nigerian farmers practicing rain-dependent agriculture, and over 70 percent of the Nigerian farmers being subsistence farmers, it is not hard to establish the correlation between climate change and poor yields, leading to malnutrition.

In response to this growing problem, Nigeria must adopt a multi-sectoral approach that integrates preventive and adaptive climate strategies with public health innovation. This essay outlines actionable plans for building a climate-resilient health sector, providing implementation strategies while exploring the long-term benefits of these measures, particularly — but not limited to — the health sector.

Strategies for a Climate-resilient Health Sector

1. Investment in Climate-Resilient Energy Sources.

The government of Nigeria should invest in solar-powered health facilities in rural and urban centres. Government incentives should encourage private sector involvement in renewable energy projects for hospitals and clinics. This will eliminate reliance on carbon-emitting generators, key contributors to respiratory diseases like COPD and asthma. Also, solar panels with battery storage can help ensure uninterrupted power supply during extreme weather events.

This project can be launched in regions with the highest exposure to sunshine and expanded to more robust off-grid solar and wind solutions. In the long term, integrating renewable energy sources into major healthcare facilities will reduce dependence on the national grid and ensure access to uninterrupted life-saving equipment.

2. Leveraging Big Data Analytics for Climate-Health Prediction

The government should work with big data companies, the research and development industry, and the third sector to establish data collection frameworks integrating health, meteorological, and environmental data. They can devise AI-driven models to predict climate-related disease outbreaks through this framework. This will provide early warning systems for disease outbreaks, reducing response time and improving preparedness.

With a robust framework established, climate health analytics can be incorporated into national health policymaking, with real-time data informing medical interventions.

3. Climate-Smart Agriculture for Food Security and Nutrition

The government should partner with relevant stakeholders in the agriculture and health sectors to promote climate-resilient crops and agroforestry techniques to reduce food scarcity. A good example is the implementation of agrivoltaics, a system that combines solar energy with agriculture on the same piece of land. Agrivoltaics entails installing solar panels above crops or grazing regions, ensuring electricity is generated while maintaining agricultural productivity. This maximises land efficiency while ensuring that energy generated can be used for irrigation and stored or sold to energy companies. It also provides microclimate benefits, reducing water evaporation and heat stress and increasing yield for crops that thrive under partial shade.

With nationwide agricultural extension services to educate farmers on climate-smart techniques, food security can be ensured, reducing malnutrition and diet-related diseases.

4. Community-Based Climate-Health Interventions

Despite the need for innovative climate health solutions, we must not neglect the importance of training community health workers on climate-related illnesses. Also, grassroots awareness campaigns should highlight the importance of eco-friendly practices like recycling, proper waste disposal and reforestation programs. In addition to extensive sensitisation campaigns, grassroots healthcare programs for early detection and treatment of climate-induced diseases should be established. The government can utilise mobile clinics to reach remote communities, ensuring equitable healthcare access.

5. Policy-Driven Actions and Regulations

The government should implement air quality monitoring regulations in major cities. This will regulate the amount of pollutants released into the atmosphere (by vehicles, industries and other sources), helping create a less toxic environment. Also, policies on deforestation should be strengthened, and afforestation programs should be enforced. If climate resilience is integrated into key national health and environmental policies, there is bound to be an upturn in the fortunes of Nigeria's health and environmental landscape.

6. Public Awareness and Education Campaigns

The government, educational institutions, the health sector, the private sector, and all other relevant stakeholders must join in concerted efforts to create awareness of the growing effect of climate change on health and best practices to curb this trend. This can be done through social media campaigns on climate-health risks and prevention. For effective penetration, the infusion of traditional media, such as local dialects and cultural festivals, is encouraged.

Climate health should be introduced in school curricula, and outstanding students should be remunerated to stir interest.

With more awareness, there will be a heightened sense of responsibility and more solution-based innovations from the large pool of creative Nigerians.

7. Cross-Sector Collaboration for Climate-Health Innovation

The synergistic relationship between government agencies, health institutions, and private sector stakeholders is integral to the success of the plans for a climate-resilient health sector. Developing research hubs dedicated to climate-health innovations will help the nation's quest for long-term solutions. Also, the protection of the intellectual property (IP) of citizens through collaboration with IP bodies like the World Intellectual Property Organisation (WIPO) and the National Office for Technology Acquisition and Promotion (NOTAP) will stimulate them to find lasting solutions, as they are assured that their innovations will be protected.

Conclusion

Building a climate-resilient health sector in Nigeria requires a combination of adaptive strategies, preventive measures, and multi-sectoral collaborations. Investing in renewable energy, big data analytics, climate-smart agriculture, and policy reforms will fortify Nigeria's health infrastructure against climate-induced risks. Public awareness and grassroots interventions will enhance community resilience, while cross-sector partnerships will drive innovation and funding. Nigeria can mitigate climate change's health effects by implementing these measures with the intentionality and immediacy required, ensuring a sustainable and resilient healthcare system for future generations.

PLAS-BRICK: BUILDING SUSTAINABLE, MOVABLE INFRASTRUCTURE

EXECUTIVE SUMMARY

Nigeria, a developing nation holds an important position in the world of innovation and is indirectly burdened with leading the African continent in innovative ways of handling environmental and societal issues. With plastic pollution reaching our groundwater, food, atmosphere and animals driving changes in composition of the environment and affecting day-today lives of societies and economies across the world. Plas-brick is intentional in recycling the often left-out plastics as current recycling campaigns are focused on plastic bottles especially those in good shape. To Plas-brick every piece of plastic is a resource, and that resource will be used to solve a problem which can be seen and felt by the people in a short period of time. If financed and adequately implemented, we as a nation will pioneer the fastest recycling campaign the world has ever seen while solving to perfection our emergency housing needs in healthcare, IDP interventions on accommodation, quarantine facility options, research projects outside civilized areas and even interventions within and around communities where erecting a structure within a short period seems impossible. Plas-brick will create a wide range of employment opportunities for different professionals across board and ensure that our academia not only champions plastic recycling research and action but lead the charts on the global stage. I hereby humbly present PLAS-BRICK.

WHY PLAS-BRICK

Plastic pollution in Nigeria is not an issue that lacks fame resulting from the large usage of plastic for different things such as packaging and storage, plumbing. Every city and town in Nigeria has points and places where plastic pollution has claimed farmlands, developable lands and water bodies. No matter the uses, the bottom line is that almost all plastics used end up in the environment where it constitutes a strong pollutant to the environment. In the present of this big menace of plastic pollution, a few people have seen wealth and opportunities in it with some venturing into recycling. However, the level of recycling done in Nigeria have not been able to cover all plastic ranges especially leaving out nylon (polyethylene). Plas-brick as a preference is first of its kind to consider nylon as a huge recycle possibility with a much-needed application in housing deficiency during interventions for Internally Displaced Persons (IDPs).

ENGINEERING AND DESIGN

Plastics are a wide range synthetic or semi-synthetic materials that use polymers as main ingredient and could be moulded into different shapes and forms and applied for different uses. The engineering and design of Plas-brick follows the aggregation of plastic materials from different sources such as landfills, water bodies, and dump sites which will be washed, compressed and weighed then crushed. The crushed plastic is then through adequate engineering mixed with cement within conditions of temperature and pressure and other engineering conditions then poured into designed moulds already designed with joining parts which allows for assembling after production. The engineering and design phase of plas-brick cuts across many professionals which includes but not limited to Structural Engineers, Civil Engineers, Chemical Engineers, Architects, Material Engineers, Builders who would all be actively involved in the project. The roof design of these structures will ultimately consider renewable power supply especially solar power as most of the areas this product will be used may not have power supply to power the needs of the households, individuals and medical storage equipments.

MULTIPLE APPLICATIONS OF PLAS-BRICK

Plas-brick can be converted into many much-needed infrastructures, especially during interventions where housing, storage and transportable options are necessary. Of the possible applications, are quick housing for IDPs, quick healthcare facility including storage for health interventions, quarantine facilities especially in outbreaks of diseases, affordable accommodation for campers, research teams and field work personnel. The beauty is that this product can be assembled by anyone using the manual and can be transported after assembling to any area as it can be dragged by a vehicle or boat.

ASSEMBLING AND TRANSPORTATION

The assembling possibility of Plas-brick is a huge distinction it has from erecting generic structures in such high times of need. The parts will be designed with simplicity such that just it looks like playing a game just by following the manual. The assembled structure can be dragged by a vehicle or boat to desired destination just in case there is the possibility of having issues assembling in the field. The product also takes note of other household needs like restrooms and incorporates that even creating room for special considerations for certain groups of individuals.

SUSTAINABILITY OF PLAS-BRICK

The sustainability of Plas-brick is one which recognizes the need for relieving our environment of the much plastic waste it is holding in water bodies, landfills and dump sites. Plas-brick views this huge tons of plastic as a huge resource and till the environment is free from plastic pollution. Also, the idea of Plas-brick seeks to solve the problems of society which in most cases take governments and other stakeholders by surprise, sometimes creating even more issues than the issue behind the emergency situation. Today, if there is an outbreak of any disease and the few identified carriers need to be quarantined, we do not have a movable option to handle it even at such small scale. Interestingly, with plas-brick this issue will be a thing of the past and will see Nigeria leading the world in climate action, fight against plastic pollution and quick response to emergency situations.

I must however, state that serious research across disciplines will be required to ensure that this wonderful idea even transcends basic usefulness to tackling future concerns for affordable housing for Nigerians.

BORDER GREEN ALLIANCE: TRANSCENDING NIGERIA BEYOND RHETHORICS IN CLIMATE GLOBAL POLICY

Nigeria's gesture in global climate negotiations has often been painted as that of a vulnerable recipient seeking fairness and financial support. While it is true that Nigeria, like many other African nations grapples with the disproportionate impacts of climate change, the time has come to harness our unique advantages and capabilities. So, I propose the formation of a "*Border Green Alliance*" (BGA)—a regional policy framework that involves collaboration with neighboring countries aimed at combating climate change through shared initiatives such as reforestation projects and solar energy grids along the Sahel.

The stark reality of climate change has become an undeniable part of Nigeria's narrative, with the past two years (2023 and 2024) serving as a haunting illustration of the urgency for effective climate action. Disturbing scenes unfolded across various states—Borno, Bauchi, Delta, Anambra, etc where flooded streets, failing crops, and oppressive heat waves became the new normal. Nigeria's Vice President Kashim Shettima for example had to fold his trousers walking through water during a visit to Borno to commiserate with Governor Babagana Zulum on the devastating flood disaster in 2024. This highlights the precarious nature of the situation. This is not to mention the humongous amount both in cash and kinds branded as palliatives that came from the Nigerian government, wealthy Nigerians and even outsiders to victims of flooding. There is arguably no better time than now in our national commitments to climate change to transit from mere rhetoric into actionable initiatives that are both effective and sustainable.

As enshrined in our Nationally Determined Contributions (NDCs) and Long-Term Low Emission Development Strategy (LT-LEDS), Nigeria has made ambitious pledges to cut greenhouse gas emissions and enhance resilience to climate impacts. However, these commitments alone are insufficient if they remain theoretical; we must seek to transcend them and engage in tangible, lasting solutions. A trans-formative approach is needed—one that shifts Nigeria's position from being a mere participant in global dialogues about climate mitigation to becoming a trailblazer of innovative solutions that could influence policy both regionally and internationally.

Hence, the *Border Green Alliance* can capitalize on Nigeria's natural resources and strategic geography to transform the border regions into renewable energy and agricultural hubs. This initiative presents numerous opportunities, showcasing Nigeria not only as a rising leader in climate adaptation and innovation, but as a pivotal player in redefining the narrative of African nations at global climate discussions. By establishing partnerships for technological exchange, knowledge sharing, and collaborative funding opportunities, Nigeria can foster regional resilience against climate-related vulnerabilities while simultaneously promoting economic growth.

The *Border Green Alliance* can serve as a platform for developing innovative, sustainable agricultural practices that integrate traditional knowledge with modern techniques. Such practices could include agroforestry, permaculture, and organic farming, which not only fight desertification but also bolster food security in a region often devastated by erratic weather patterns. By leveraging and amplifying local knowledge systems, we can cultivate an agricultural

model that prioritizes ecological health and community livelihood, ensuring that both farmers and the ecosystem flourish.

To harness these opportunities, Nigeria must embrace a vision of itself as a proactive leader in the global climate conversation. No longer can we perceive climate change merely as an environmental threat; rather, it should be understood as an opportunity to re-frame our national identity and rapidly pivot towards a sustainable future. Nigeria can in fact set a powerful precedent for sustainable growth that resonates beyond its borders. Through creativity, collaboration, and empowerment, we can redefine Nigeria's role from a victim of climate change to a proactive architect of solutions that will be pivotal in the global response to the climate crisis.

From a closer lens, one would notice that the outcome of the November, 2024 COP29 climate talks in Baku, Azerbaijan demonstrated the persistent divide, between developed and developing countries like Nigeria over climate finance; hence, watering down the stance of negotiators from Africa. For example the draft deal of the talks did rocognised that developing nations require at least \$1 trillion annually to tackle the climate crisis. Yet, it failed to specify how much wealthy nations are willing to provide or how these funds will be disbursed—a situation that should be blamed on poor or insatiable negotiation provess of African countries whom Nigeria is her giant.

Besides, the stakes are particularly high for Nigeria. Nigeria is among African nations grappling with the devastating impacts of climate change, including recurring floods and desertification. The absence

of concrete financial commitment poses significant challenges. But, it is apparently difficult to surmount this challenge without a native African negotiation approach like *Border Green Alliance* proposed here. This is particularly unique and feasible because it will generate a common position in the negotiations table that will favour Africa in her pursuit of climate justice in the global theatre. This initiative is clearly in consonance with the tone of the Nigeria's Minister of Environment, Balarabe Abbas Lawal who has been vocal even at the COP29 talks in calling for justice rather than charity from wealthier nations.

In 2023, President Bola Tinubu emphasised Nigeria's need for climate finance from developed countries and expressed the need for action on climate change. This can only go beyond mere wish when Nigeria wears her thinking cap in the negotiation table, deploying peculiar strategies like "*Border Green Alliance*" (BGA). The notion of *Border Green Alliance* (BGA) approach in championing Nigeria's regional climate action in the global circle holds many glaring prospects. Rather than being passive recipients of climate aid, Nigeria and its West African neighbors will spearhead the alliance to establish cross-border renewable energy grids to reduce reliance on fossil fuels; create a joint reforestation and afforestation initiative to combat desertification; advocate for regional climate financing mechanisms to attract green investors. With *Border Green Alliance* initiative, carbon markets can be expanded, climate accountability enforced and nations like Nigeria turn her climate challenges into economic and environmental opportunities even at the negotiation desk in the global scene.

CLIMATE CHANGE AND HEALTH: KANO STATE IN VIEW

In our world today, we are battling with a crisis that we inadvertently created – Climate Change. Burning of fossil fuels, felling of trees and unsustainable agricultural practices, have become the order of the day. These acts increases the concentration of greenhouse gases that trap heat in the atmosphere. As a result, nature has punished us with extreme temperatures, floods, unpredictable weather and more diseases.

The streets of Kano State are no strangers to grief, like many other cities around the world. Every rainy season, as floodwaters rise, so does the death toll from cholera and diarrheal diseases. The relationship between climate change and public health, once an ignored global crisis, is now manifesting in our communities.

Climate Change War on Health:

There are many ways climate change links to health challenges, which often intersect with one another. The changes in rainfall patterns contribute to droughts, flooding, food insecurity and malnutrition. It also leads to poor water quality and water scarcity, triggering water-borne diseases. There is increased spread of vector-borne diseases such as malaria due to expansion of mosquito habitats. Extreme heat waves lead to dehydration, heat strokes and heat related illnesses.



It is estimated by the World Health Organization that between 2030 and 2050, climate change will cause about 250,000 additional deaths per year from malnutrition, diarrhea and heat stress. [1]. The World Resources Institute report on climate change and health highlights that flooding, worsened by climate change, significantly increases exposure to waterborne pathogens, particularly in regions with inadequate sanitation and waste management. Kano, with its dense population and fragile health infrastructure is a prime example of this crisis.

Cholera and Diarrheal Diseases in Kano:

The prevalence of cholera is higher during flooding and drought due to contaminated water and inadequate sanitation and this has been an annual nightmare in Kano. In 2021, Nigeria experienced one of its worst cholera outbreaks, with over 110,000 reported cases and more than 3,600 deaths. [2]. Kano was among the worst hit states. The floods submerged entire communities, contaminating water sources and overwhelming an already struggling healthcare system.

I still remember the sadness on the face of Hadiza, a mother of three, when she recounted how she lost her youngest child to cholera last year. She said "He was fine in the morning, playing with his brothers, by evening, he was gone. The hospital was too far, the roads were flooded, and we had no clean water to rehydrate him". Her story is one of the many and without urgent intervention, these numbers will rise.

Fighting Back Against Climate-Induced Water Diseases:

Addressing this crisis requires more than short-term emergency responses, it demands sustainable, innovative, cost-efficient, climate-resilient solutions. I propose four key interventions that will improve this situation:

- 1. **Project Ruwa-Guard:** At the core of cholera is unsafe water and this project will tackle it by providing solar-powered water purification centers in flood-prone areas. The basic principle involves harnessing the power of the sun to generate heat and electricity, which is then used to remove contaminants and pathogens from water, ensuring access to clean drinking water even during floods. Communities will no longer have to rely on contaminated wells and rivers.
- 2. **Project EcoDefenders Bayan Gida:** Open defecation and poor sanitation fuel the spread of cholera. This consists of two types of toilets: a raised composting toilet that is built above ground to prevent contamination of groundwater with a ventilation pipe. Dry soil can be sprinkled after usage to absorb moisture, water is not needed. The chamber is emptied after 6 months. The second toilet is a water-efficient, self-cleaning toilet. These toilets will use biodigesters to convert waste into biogas, reducing contamination while providing an alternative energy source for local communities.
- 3. **Project WANKE:** This will be a taskforce consisting of volunteers, especially the youths. They will be tasked with educating households on safe water and hygienic practices, monitoring water quality and responding to outbreaks. They will work closely with health workers to ensure early detection and intervention, preventing minor infections from turning into deadly epidemics.
- 4. **Project Gona:** This is basically a large-scale afforestation and drainage project to mitigate flooding. The planting of trees will slow down surface water runoff, absorb excess water and reduce soil erosion. In addition, the trees will absorb atmospheric carbon dioxide, which is the most significant greenhouse gas.

Challenges:

While these solutions offer hope, their success is not guaranteed. Several challenges threaten their implementation. Starting with is the funding and political will as this will be a large-scale project and will require significant funding. The lack of skilled man power and infrastructural deficient will also be a hindrance as well as institutional weakness in governance and corruption, which can delay project execution. Lastly, resistance to change should be anticipated and this will slow adoption.

Overcoming the Challenges:

The solutions to these challenges lie in strategic partnerships, policy reforms and community engagement. Firstly, there is a need for Public-Private partnerships, with NGOs, businesses and international agencies co-funding and implementing these projects. The Government should rise to the occasion by investing in infrastructures, especially in healthcare and promotion of research. Lastly, mass orientation on climate change and health should be carried out by involving local influencers, religious and tribal leaders.

Bangladesh, a country that once suffered frequent cholera outbreaks has been able to reduce cholera-related deaths by 90% in the last three decades through investments in clean water, sanitation and community health programs. We can learn from them.

Call to Action:

While we join the global concerted effort to reduce greenhouse gas emission and to repair our planet, we must ensure that we put a leash on cholera and diarrheal disease spikes cause by climate change in Kano. With these bold actions, innovative solutions and unwavering commitment, we can turn the tide. The time to act is now

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Harnessing Nigeria's Natural Resources for a Sustainable Energy Transition: A Path to Decentralized Energy Generation and Climate Resilience.

Has there ever been a time when Nigeria has had uninterrupted electricity supply as a nation for the entire day? Yet we hold our heads and shoulders high, the Giants of Africa we say, but our energy sector cannot hold a candle to a dwarf. The country struggles with chronic power shortages, leaving millions in darkness, crippling industries, education, and daily life, but Nigeria is a cornucopia of sustainable energy sources, which if harnessed properly can provide the entire country with uninterrupted power supply and even excess for exports but she relies heavily on petroleum reserves, natural gas, hydroelectricity, and solar. These are not even utilized properly and are also not climate friendly in terms of the petroleum reserves and natural gas generating massive CO_2 and greenhouse gas emissions which negatively affects the carbon footprint and climate conditions of the country. How can Africa's largest economy break free from this cycle of energy poverty and climate degradation? The answer lies in decentralization, renewable energy investment, and policy reform. The Just transition to sustainable sources of energy cannot be overemphasized as this will combat the problem of climate change while making energy accessible to the common man and if harnessed properly, reliable and affordable; leading Nigeria into a sustainable future.

Nigeria's Energy Crisis stems from the following key issues, Inadequate generation, Grid Instability and Inequitable access. Although approximately 45% of Nigeria's population is actively connected to the energy grid, which is concentrated in urban areas. The other 55% are not. Approximately 71% of Nigeria's population, about 140 million people, lack energy access (World Economic Forum). "The national grid has collapsed", This is a phrase that has been repeated so frequently to the ears of Nigerians that it has become normalized, but this shouldn't be so for a country of our caliber. One reason for the frequent collapse in the national grid is overloading caused by an imbalance between supply and demand, In Nigeria's case, most at times, demand outstrips supply. As of 2023, Nigeria's total installed energy generation capacity is approximately 16,000 MW. For a country which needs more than 60,000MW to cater for its increasingly growing population, this amount is very poor. Hence when demand spikes, the generators to trip off to protect the equipment causing the ever-persistent collapse. This inefficiency stifles manufacturing, foreign investment, and even education—children study by candlelight while businesses fold due to high energy costs.

How can we tackle this? The Nigerian Electricity Act 2023, signed into law on June 9, 2023 provides a breakthrough. A key feature of the Act is that the law recognizes the electricity sector lawmaking powers of federating states, allowing them to generate and distribute power locally. Simply put, Decentralizing power generation.

Geopolitical zones unlike the name connotes are not just regions with similar geography or political representation, they also have similar cultures and presence of resources hence decentralized systems of power generation can be situated in geopolitical zones. States in geopolitical zones can come together, harnessing the renewable and sustainable sources of energy they possess and generate energy, establishing grids in strategic regions in these zones Instead of depending on a failing national grid.

I will give one example, In the North western region of Nigeria, two main natural sources of energy can be noted from the geographical and environmental characteristics of the states located in these regions; wind and solar energy.

The North western zone has some of the highest solar radiation levels making it ideal for solar power. Also, areas like Sokoto and Katsina have significant wind potential especially during the harmattan period. Due to the aridity of land in some parts of the north western zone, Energy farms can be set up. Energy farms are large scale installations designed to generate large amounts of clean electricity by harnessing natural energy sources. Biomass energy can also be utilized, by using the agricultural residue collected from the regions, especially those with concentrated farmlands in the rural areas, Biogas can be produced and this can serve as a more stable form of generation due to unpredictability of the weather conditions for solar and wind. Another back up for the solar and wind farms are Waste to Energy plants. Humans are always going to keep producing waste and as a country, our waste management is also very poor, what better way to kill two birds with one stone by setting up these incineration plants which will collect waste from landfills and convert it to electricity while also reducing pollution and greenhouse gas emissions. This will increase the generation capacity of regions if decentralized, further increasing the that of the country.

Decentralization ensures that these local grids reduce transmission losses, Rural communities gain employment in energy projects and the renewables cut CO₂ emissions thereby aligning with global climate goals. This is just one practical example, there remains vast reserves of untapped potential in the energy sector of Nigeria present in our very own geopolitical zones.

Even with improved generation and transmission, distribution remains a hurdle. Privatized DISCOs (distribution companies) often fail to deliver power efficiently, state or even rural community-managed systems can be employed in rural areas making clean energy accessible and affordable to the low-income households in these rural areas. The government championing just a few of these projects will show the world that she is serious about her energy sector thereby attracting private and foreign investment in infrastructure.

These in totality will ensure an appropriate transition into sustainable energy sources in a manner that is fair and inclusive and ensure energy access to the least Nigerian in the rapidly increasing population of Nigeria. Nigeria's energy crisis is solvable. By decentralizing generation, investing in renewables, and enforcing laws like the Electricity Act (2023), the country can achieve 24/7 power, economic growth, and environmental sustainability. The "Giant of Africa" must stop stumbling in the dark—it's time for our light to shine.

Strengthening Health Resilience in Nigeria Through Climate-Smart Innovations

Introduction

Nigeria, Africa's most populous nation, faces the compounded effects of climate change and public health challenges. Rising temperatures, erratic rainfall, and extreme weather events exacerbate diseases like malaria, cholera, and respiratory conditions. These disruptions overburden Nigeria's healthcare system, disproportionately affecting the poorest, particularly in rural areas. According to the World Health Organization (2020), climate change is expected to increase Nigeria's vulnerability to infectious diseases by up to 30% in the coming decades. This essay explores three climate-smart innovations—AI-driven health forecasting, decentralized health hubs, and eco-friendly healthcare practices—that could bolster Nigeria's healthcare system and enhance resilience to climate impacts.

1. AI-Driven Climate-Health Forecasting: Proactive, Data-Driven Solutions

As climate change shifts patterns of vector-borne diseases like malaria, Nigeria faces heightened risks of widespread outbreaks. Malaria transmission is influenced by temperature, rainfall, and humidity, all of which impact mosquito breeding. AI-driven health forecasting can predict and mitigate disease outbreaks by combining climate data (e.g., temperature, rainfall, pollution levels) with health data.

For instance, Kenya uses AI models to predict malaria and cholera outbreaks based on weather data, enabling early interventions such as targeted vaccination campaigns (Andigema et al., 2023). Nigeria could adapt these models by integrating local climate data and health records from the National Health Insurance Scheme (NHIS). This would allow the government to predict disease hotspots and deploy resources efficiently, reducing hospital burdens and preventing unnecessary deaths.

To scale this, public-private partnerships with tech companies and international donors could help fund and implement the solution across regions like the Niger Delta (flood-prone) and the Northeast (susceptible to drought).

2. Climate-Resilient Health Hubs: Decentralized Healthcare for Vulnerable Communities

Nigeria's healthcare system struggles with disparities, especially in rural areas where climate disruptions often limit access to essential services. Building Climate-Resilient Health Hubs (CRHHs) in vulnerable regions could address this gap. These decentralized, sustainable hubs would provide healthcare during extreme weather events. Powered by renewable energy sources such as solar and wind, these hubs would ensure operational continuity even during power outages from storms or droughts.

A successful model already exists in Kenya, where solar-powered clinics in flood-prone rural areas provide essential services like immunizations and treatment for waterborne diseases

(Andigema et al., 2023). Nigeria could replicate this model in regions like Bayelsa (flood-prone) or Borno (drought-stricken). Solar-powered clinics, mobile health units, and telemedicine platforms would enable essential health services during extreme weather.

Furthermore, mobile health technologies could bridge the access gap in remote areas. Apps could track disease outbreaks, provide health education, and enable telemedicine consultations, reducing the need for travel to distant urban hospitals. Nigeria's NHIS could make these services more accessible and affordable.

These hubs would alleviate pressure on urban hospitals, lower healthcare costs, and align with Nigeria's National Adaptation Strategy on Climate Change (NASPA-CC), ensuring no one is left behind in climate-induced health emergencies.

3. Eco-Friendly Healthcare Practices: Building a Sustainable Health System

Nigeria's healthcare system contributes to environmental degradation, from waste generation to excessive energy consumption. By adopting eco-friendly practices, Nigeria can reduce its carbon footprint while improving health outcomes. Hospitals could implement waste management systems focused on recycling, composting, and safe disposal of hazardous materials. Reducing plastic waste and transitioning to reusable medical supplies would lower costs and minimize environmental impact.

For example, Morroco has embraced sustainable healthcare practices by reducing plastic waste and promoting recycling, contributing to healthier environments and improved public health (UNIDO, 2024). Nigeria could begin with pilot programs in hospitals like National Hospital Abuja or Lagos University Teaching Hospital. These programs could include solar panels, rainwater harvesting systems, and plastic recycling initiatives.

Energy-efficient technologies—such as solar power, wind energy, and smart grids, would also reduce operational costs, freeing up funds for critical services like immunization and maternal care. Reducing pollution through sustainable practices would improve public health, especially in urban areas suffering from air and water pollution. This strategy aligns with global sustainability efforts and Nigeria's commitment to SDGs 3 (Good Health and Well-being) and 13 (Climate Action).

4. Feasibility & Impact: Realizing Climate-Smart Healthcare

The proposed climate-smart solutions are both feasible and impactful. Nigeria has already made strides in renewable energy, with solar projects in rural areas. There is also growing interest in digital health technologies and AI-driven solutions. However, scaling these innovations to reach vulnerable communities remains a challenge.

Pilot projects in the most vulnerable regions, such as the Niger Delta or Northeast Nigeria, could be the first step in implementing decentralized health hubs and AI forecasting. Partnerships with tech companies, NGOs, and global health organizations could secure the necessary funding and

expertise. Public-private partnerships could overcome barriers related to funding, infrastructure, and training.

In the long term, these solutions could transform Nigeria's healthcare system, making it more resilient to climate-induced health risks, improving health outcomes, and reducing the economic burden of health crises. By integrating AI forecasting, decentralized health hubs, and eco-friendly healthcare practices, Nigeria would be positioned to lead Africa in building climate-resilient health systems.

Conclusion: Urgent Action for a Healthier and More Resilient Future

Nigeria's healthcare system urgently needs to adapt to the growing challenges of climate change. The proposed climate-smart innovations—AI-driven health forecasting, decentralized health hubs, and eco-friendly healthcare practices—offer practical, scalable solutions to strengthen the nation's healthcare resilience.

However, the window for action is closing rapidly. Without swift implementation, the health impacts of climate change will overwhelm Nigeria's already fragile healthcare system. Nigeria must prioritize these climate-smart healthcare solutions—not only for the health of its citizens but for its economic future.

Through innovation, collaboration, and sustainability, Nigeria can create a healthcare system capable of withstanding the impacts of climate change. By acting with urgency, Nigeria can safeguard its population's health and set a global example for climate-health adaptation.

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