



Department of Political Science

Master's Degree in International Relations

Course of Demography and Social Challenges

The Impact of Population Growth on Energy, Water, and Food Supply in Nigeria

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Academic Year 2023/2024

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LIST OF ABBREVIATIONS

FAO – Food and Agricultural Organization
UN – United Nations
STEM – Science, Technology, Engineering and Mathematics
PSB – Protective sexual behaviours
LGA – Local Government Area
WASH – Water, Sanitation, and Hygiene
NORM – National Outcome Routine Mapping
FP – Family Planning
FGON – Federal Government of Nigeria
FMOH – Federal Ministry of Health
SDGs – Sustainable Development Goals
AAFP – Association for the Advancement of Family Planning
NFPC – Nigeria Family Planning Conference
CES – Conventional Energy Sources
RES – Renewable Energy Sources
NGRI – Natural Resource Governance Institute
EU – European Union
BMZ – German Federal Ministry for Economic Cooperation and Development
NESP – Energy Support Programme
REA – Rural Electrification Agency
REF – Rural Electrification Fund
DRE – Decentralized Renewable Energy
AMP – Africa Mini – Grid Program
DRE – Distributed Renewable Energy
LPG – Liquefied Petroleum Gas
NAIC – Nigeria Agricultural Insurance Corporation
YIAP – Youth Participation in Agribusiness Programmes
FMWR – The Federal Ministry of Water Resources
RBDAs – River Basin Development Authorities

NIHSA – Nigeria Hydrological Services Agency

NIWRMC – Nigeria Integrated Water Resources Management Commission

PEWASH – Expanded Water Supply, Sanitation and Hygiene

SURWASH – Nigeria Sustainable Urban and Rural Water Supply, Sanitation and Hygiene

SEZs – Special Economic Zones

ABSTRACT

In recent years Nigeria has seen a significant rise in numbers, becoming one of the fastest growing populations in the world from around 55 million in 1970 to 232 million in 2024. This sudden surge has severely pressured the country's primary resources, threatening environmental sustainability and socioeconomic stability.

This research provides an in-depth analysis of the impact of population growth on energy, water, and food supply systems in Nigeria. The study begins by looking at the demographic situation of the country, using fundamental demographic indicators to outline population growth trends. Also, this section delves into the ethnic factors that play an important role in determining fertility rates, highlighting how ethnic affiliation and socio-cultural factors can influence fertility patterns. The thesis second part delves into how population growth affects resources by intensifying stress on water sources, escalating energy requirements and endangering food security. In the end, the last part offers an assessment of the strategies presently implemented by the government to lower birth rates, promote sustainable progress, and reap the benefits of demographic advancements. Additionally, it suggests measures that could aptly address population expansion and alleviate its strain on resources.

The research aims to make a contribution to the debate on the challenges and opportunities related to population management and resource sustainability in the Nigerian context.

LITERATURE REVIEW

As will be exposed, population growth in Nigeria has been very fast, but if well managed it will power the country to achieve major economic growth. Nigeria's high population growth rate has been a topic of expansive scholarly attention, particularly in light of its implications for resource sustainability, economic growth, and social equilibrium. Researchers have thoroughly examined the correlation between population growth and its effects on energy use, food, and water supply, highlighting the dire need for sustainable strategies to address these issues.

The population of Nigeria has experienced exponential growth from 55 million in 1970 to more than 230 million as of 2024, thereby ranking as the continent's fastest – growing population and among the biggest globally. The demographic transition theory explained by Weeks¹, Giordano² and Roser³ identifies that Nigeria is still in the early stages of transition, characterized by high fertility rates, declining mortality rates and a high proportion of young population. Empirical evidence, provided by researchers of official sources as United Nations and in particular the research conducted by Somefun and Fayehun⁴, has established religion and culture as key determinants of fertility

¹ Weeks, J. (2015). *Population: An Introduction to Concepts and Issues*. Cengage. (CH. 5)

² Giordano A., (2020), *L'impatto del calo delle nascite sul sistema economico*, in *Fondazione Onda, La salute della donna. La sfida della denatalità*. Libro Bianco 2020, Milano: Franco Angeli, pp. 69 – 78. –

Giordano, A., (2021). *Youth Bulge Dynamics in the Mediterranean Region: The Geopolitical Implications of Human Capital on Security and Stability*, in Corrao F., Redaelli R. (Eds.), *Perspectives on the New Centrality of the Mediterranean. States, Actors and Geopolitical Drivers in a Changing Region*, London: Palgrave Macmillan, pp. 107 – 127.

³ Max Roser (2023). “*Demographic transition: Why is rapid population growth a temporary phenomenon?*” Published online at OurWorldinData.org. Retrieved from: <https://ourworldindata.org/demographic-transition>

⁴ Somefun, O. D., & Fayehun, F. (2024). Ethnic affiliation and protective sexual behaviours among youth in Nigeria. *Journal of Biosocial Science*, 56(4), 767–783. <https://doi.org/10.1017/s0021932024000257>

patterns, particularly in north Nigeria, where traditional patriarchal structures limit reproductive autonomy and exposure to family planning for women.

Additionally, demographic projections and population pyramids realized by the U.S. Census Bureau⁵ indicate that by 2050, Nigeria will be the third most populous nation, further putting pressure on basic resources. Researchers such as Abbani⁶ believe that without the institution of proper family planning policies and economic reforms, this high rate of population growth will derail national development strategies.

However, this serious demographic situation has repercussions in other areas. For instance, Nigeria's energy security has been a persistent challenge because of its inadequate infrastructure, overdependence on fossil fuels, and unstable electricity supply as explained by the World Bank in 2023⁷. According to data of 2024 from Our World in Data⁸, 78% of Nigerian households continue to depend on biomass fuels, including firewood and charcoal, for cooking, which has enormous environmental degradation and severe implications for public health. While research by Boateng et al.⁹ showcases the adverse impacts associated with the use of solid fuels, especially for women and children, who experience respiratory diseases and other illnesses.

⁵ U.S. Census Bureau International Database. (2024) [Population growth projections of Nigeria over years.](#)

⁶ Abbani, A. Y., (2021, August 23). *Nigeria's demographic transition and implications on the attainment of sustainable development goals* | *Global Journal of Social Sciences*. Nigeria's Demographic Transition and Implications on the Attainment of Sustainable Development Goals | *Global Journal of Social Sciences*. <https://doi.org/10.4314/gjss.v20i1.1>

⁷ World Bank/SEforALL. (2023). *NATIONAL ENERGY COMPACT FOR NIGERIA*. <https://thedocs.worldbank.org/en/doc/2340747bcb6747a15a4ff8cba935fce-0010012025/original/M300-AES-Compact-Nigeria.pdf>

⁸ Ritchie, H., Rosado, P., and Roser, M., (2019 – revised 2024). – “Access to Energy” Published online at OurWorldinData.org, from <https://ourworldindata.org/energy-access>

⁹ Boateng, G. O., Balogun, M. R., Dada, F. O., & Armah, F. A., (2020, August). *Household energy insecurity: dimensions and consequences for women, infants and children in low – income and middle – income countries*. *Social Science & Medicine*, 258, 113068. <https://doi.org/10.1016/j.socscimed.2020.113068>

Various programmes, including the Nigeria Energy Support Programme and the Rural Electrification Fund, have been instituted to build renewable energy infrastructure and increase access to off – grid electricity. But a study by Ritchie, Rosado, and Roser¹⁰ indicates that the pace of development has been slow and unbalanced, mostly because of financial limitations, the issue of governance, and absence of private sector engagement. The 300 Africa Energy Summit of 2024 established bold objectives for expanding the share of renewable energy to 50% of the national energy mix. However, such achievements appear vulnerable if no serious investment is channeled in sustainable energy resources.

The deteriorating condition of food insecurity in Nigeria is the result of an interplay of several factors, including population growth, climate change, and ineffective agricultural production as highlighted in the study of FAO, European Union, & French Agricultural Research Centre for International Development¹¹. Research by Aiyedogbon et al.¹² reveals that the country’s food doesn’t follow with the same rhythm its growing population, resulting in higher reliance on imports. The information from FAOSTAT¹³ reveals that major food imports include wheat, rice, sugar, and milk products, which reflect an increasing trade deficit and vulnerability to changes in the international market. In addition, land degradation and urbanization have also reduced arable land, rendering local farming increasingly unsustainable. Aroyehun¹⁴ findings show that climate change

¹⁰ Ritchie, H., Rosado, P., and Roser, M., (2019 – revised 2024). – “Access to Energy” Published online at OurWorldinData.org, from <https://ourworldindata.org/energy-access>

¹¹ FAO, European Union, & French Agricultural Research Centre for International Development. (2022). *Food Systems Profile – Nigeria*. Food and Agriculture Organization of the United Nations, European Union, and French Agricultural Research Centre for International Development. <https://doi.org/10.4060/cc3380en>

¹² Aiyedogbon, J. O., Anyanwu, S. O., Isa, G. H., Petrushenko, Y., & Zhuravka, O., (2022). *Population growth and food security: Evidence from Nigeria. Problems and Perspectives in Management*, 20(2), 402–410. [https://doi.org/10.21511/ppm.20\(2\).2022.33](https://doi.org/10.21511/ppm.20(2).2022.33)

¹³ FAOSTAT (2024) Trade Database. <http://www.fao.org/faostat/en/#data>

¹⁴ Aroyehun, A., (2023). Impacts of Climate Change and Population Growth on Food Security in Nigeria. *Black Sea Journal of Agriculture*, 6(3), 232–240. <https://doi.org/10.47115/bsagriculture.1232578>

has impacted crop production negatively, particularly in northern Nigeria, as erratic rainfall and rising temperatures have heightened desertification and food insecurity.

Policy interventions, including the YIAP, have been developed to revolutionize the agricultural sector in addition to promoting youth engagement in agricultural production.¹⁵ Nonetheless, based on a study conducted by Amuda & Parveen¹⁶, constraints like inadequate finance, lack of mechanization, and tenure systems still hamper agricultural productivity.

The European Commission and UNEP GRID – Geneva Water¹⁷ inform that about 70 million Nigerians do not have access to clean drinking water, and 114 million citizens lack proper sanitation facilities. Adamu et al.¹⁸ in their study identify contaminated water sources as one of the foremost causes of high child mortality through diarrheal diseases. The Nigerian government has devised programs such as PEWASH and SURWASH with the aim of expanding access to water and sanitation services that are safe. But according to scholars such as Clement¹⁹, institutional fragmentation, under – investment, and ineffective implementation of water policies have hindered the effectiveness of these programs.

¹⁵ Amuda, Y. J., & Parveen, R. (2024). Public – Private Partnerships in driving Sustainable Agricultural Growth for Addressing Poverty and Food Insecurity in Nigeria. *Journal of Ecohumanism*, 3(4), 3228–3240. <https://doi.org/10.62754/joe.v3i4.3841>

¹⁶ Amuda, Y. J., & Parveen, R., (2024). *Public – Private Partnerships in driving Sustainable Agricultural Growth for Addressing Poverty and Food Insecurity in Nigeria*. In *Journal of Ecohumanism, Journal of Ecohumanism* (Vols. 3–4, pp. 3228–3240). <https://ecohumanism.co.uk/joe/ecohumanism>

¹⁷ European Commission and UNEP GRID – Geneva Water (2021). *Nigeria | Interactive Country fiches*. [https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20\(in%202021,year%20in%202030%20%5B1%5D](https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20(in%202021,year%20in%202030%20%5B1%5D).

¹⁸ Adamu, I., Andrade, F. C. D., & Singleton, C. R. (2022). Availability of Drinking Water Source and the Prevalence of Diarrhea among Nigerian Households. *American Journal of Tropical Medicine and Hygiene*, 107(4), 893–897. <https://doi.org/10.4269/ajtmh.21-0901>

¹⁹ Clement, E. P., (2018). *Demography in Nigeria: Problems and Prospects*. *Biostatistics and Biometrics Open Access Journal*, 5(1). <https://doi.org/10.19080/bboaj.2018.05.555654>

Notwithstanding policy interventions, Nigeria continues to grapple with significant setbacks in sustainable development. Scholarly research invariably identifies institutional weakness, underinvestment, and socio – cultural obstacles as significant hindrances to successful population management and resource sustainability. Research conducted by Cincotta & Weber²⁰ underlines the imperative of an integrated demographic strategy incorporating education, economic opportunity, and reproductive health services to reduce population growth and increase resource efficiency.

²⁰ Cincotta, R., & Weber, H., (2021, August 11). *Youthful Age Structures and the Risks of Revolutionary and Separatist Conflicts*.

https://doi.org/10.1007/978-3-030-73065-9_3

METHODOLOGY

The exposition of the central theme of my thesis is based on an in-depth analysis of data that have been selected from accredited sources.

For the collection of demographic data, all the information was collected from sources that deal specifically with demography or contain large sets of statistics. The main sources consulted in this work are:

- **PopulationPyramid:** a platform that provides graphical representations of the demographic structure of world populations.
- **Our World in Data:** academic portal offering long-term data on various demographic and socio-economic indicators.
- **U.S. Census Bureau:** a U.S. government institution that conducts censuses and provides detailed projections of global population growth.
- **World Bank:** international financial institution that publishes reliable economic and demographic statistics.

These sources have been selected for their scientific credibility, the continuous updating of information and the breadth of the time series, which make it possible to compare population trends over time and make future projections.

For the collection of data on primary resources, climate change, agriculture and land use, data were mainly extracted from studies conducted by Nigerian researchers and from official reports of both the UN and FAO.

The main sources include:

- **FAO (Food and Agriculture Organization):** main international body providing data on food security, water management and agricultural sustainability.
- **UN Reports (United Nations):** official publications analyzing climate change impacts, resource management policies and strategies for sustainable development.

- **Academic studies by Nigerian authors:** selected to offer a local perspective on issues specific to Nigeria and to complement international analyses with empirical evidence gathered directly in the national context.

Data on energy, water and food security were chosen on the basis of their scientific relevance and applicability to the Nigerian case. In particular, statistics on the use of energy sources, drinking water availability and food production challenges were compared with data from international bodies in order to assess their local implications.

For the collection of information about the current national policies and future prospective, discussed in chapter three, were used analysis of government strategies, official policy documents and scholarly research. The methodological approach used in this chapter is based on qualitative policy analysis, backed by evidence gathered from official repositories, international organizations, and academic journals. In gathering policy – relevant data, the key sources are:

- **Government reports and policy guidelines:** A review of national policy reports was conducted to examine their goals, implementation plans, and associated challenges. Between them were analyzed: the National Water Resources Policy of 2016, the Youth Participation in Agribusiness Programmes, the Renewable Energy Master Plan, the Nigeria Sustainable Urban and Rural Water Supply, Sanitation and Hygiene and the Nigeria Family Planning Blueprint (2020 – 2024),
- **Institutional and International Reports:** A review of reports produced by institutions like the World Bank, Organization of Food and Agriculture, United Nations Development Programme, United Nations Environmental Programme, and Federal Ministry of Water Resources (FMWR) was conducted to gain further insight into Nigeria’s policy environment and the nation’s participation in global activities concerning sustainable resource management.
- **Academic Literature:** Peer – reviewed academic articles, along with policy briefs and studies conducted by Nigerian and international researchers,

contributed informed opinions on the efficacy of national policies and their socio – economic outcomes.

To ensure the methodological robustness of the research, the following criteria were followed when selecting the sources:

- **Reliability of the source:** only official publications, academic articles and datasets produced by accredited institutions were used.
- **Updateness of data:** data were selected with particular attention to the year of publication, favoring the most recent ones (2020 – 2024) to ensure an up – to – date view of the analyzed dynamics.
- **Thematic relevance:** only data relevant to the theme of the thesis were included, with particular attention to their applicability to the specific case of Nigeria.
- **Comparability and consistency:** where possible, data were compared between different sources to verify the consistency of information and ensure the robustness of the conclusions drawn.

INTRODUCTION

One of the most dramatic demographic transitions being experienced in the world is that of Nigeria, which has grown from a population of about 55 million in 1970 to an estimated 232,679,477 by 2024²¹. Being the most populous nation in Africa and the seventh largest globally, Nigeria's population trend is projected to continue its upward trajectory at a fast pace, thus becoming the third largest country by the year 2050²². While rapid population growth may be economically beneficial in terms of a wider workforce, in Nigeria it has started straining the country's lifeblood resources, notably energy, water, and food, posing considerable socio – economic stability, environmental sustainability, and long – term developmental challenges.

The drivers of Nigeria's population growth are multifaceted, deeply embedded in the country's social, cultural, and religious fabric. High fertility rates are generally determined by the deeply seated cultural norms that encourage the ideal of large families, coupled with a lack of access to family planning resources, which together drive Nigeria's population explosion. The prevalence of patriarchy in Nigerian society restricts women's autonomy over reproductive decisions, further sustaining high fertility levels, particularly in rural and northern regions where cultural and religious norms have preserved traditional family structures and inhibited the adoption of contraceptive practices. Life expectancy in Nigeria has also improved markedly, from 44.2 years in 1970 to 62.2 years in 2024, due to advancements in healthcare, thus sustaining a high proportion of the population in younger, reproductive age groups²³. Combined, these factors create a demographic landscape in which the

²¹ U.S Census Bureau International Database. (2024)

²² United Nations. (2017). World population projected to reach 9.8 billion in 2050, and 11.2 billion in 2100 | United Nations. <https://www.un.org/en/desa/world-population-projected-reach-98-billion-2050-and-112-billion-2100>

²³ U.S Census Bureau International Database. (2024)

youthful age structure leads to both opportunities and risks, particularly if the needs of this large young population are unmet.

The rapid increase in population has, however, resulted in a crisis touching on the availability of resources. The energy sector in Nigeria is especially under tremendous pressure because the infrastructure to suit the needs of a growing population is woefully inadequate. Dreadful power outages, lack of access to clean energy sources, and dependence on solid fuels in rural areas have crippled economic productivity and worsened public health situation. Studies show that nearly 78% of energy in Nigeria relies on biomass and that such fossil fuels are linked to respiratory health problems and environmental hazards, thus emphasizing the need for a transition to more sustainable energy resources.²⁴ Added to this, with the “Dutch disease” in Nigeria, depending on oil revenues has further inhibited the evolution of alternative economic sectors and the resulting energy system of the country that has remained also subject to fluctuation from international oil market vagaries.²⁵

Water scarcity is already a huge challenge made worse by climate change and rapid population growth which add to the pressure on resources through the increased demand and competition for potable water. It has far – reaching effects on the economy, generally manifested in reduced food production and availability. The agriculture – based economy of Nigeria is highly dependent on the reliable supply of water resources. Nevertheless, limited access to safe and adequate water keeps agricultural production low, intensifies food insecurity, and raises the health risk, especially in rural areas. Such areas find a befuddled nutritional deficiency due to low intake of proteins and nutrients caused by lack of water available for food production and high prices of proteins being beyond the reach of many leads to carbohydrate-based diets for most people.²⁶

²⁴ Nalule, V. R. (Ed.). (2021, October 14). *Energy Transitions and the Future of the African Energy Sector: Law, Policy and Governance*. Palgrave Macmillan.

²⁵ Ibidem

²⁶ Sani, Y., & Scholz, M. (2022, April 9). Interplay of Water–Energy Security and Food Consumption Patterns towards Achieving Nutrition Security in Katsina State, North-Western Nigeria. *Sustainability*, 14(8), 4478. <https://doi.org/10.3390/su14084478>

This thesis investigates the different overlapping and interrelated issues facing Nigeria in its efforts to reconcile rapid population growth with the races on resources and search for sustainable development. The first section discusses the demographic trends in Nigeria that generate the general view of demography by means of fertility, mortality, and age distribution analysis, along with a detailed view of the factors inducing population increase. Of particular interest to this section of the discussion is an examination of the extent to which cultural and religious factors limit women's access to education and economic opportunities; in this case, rural and northern Nigeria are of particular interest, where enduringly strong patriarchal norms and traditional family systems sustain high fertility rates.

The second section evaluates the impact of population pressures on Nigeria's critical resources, particularly the energy, water, and food sectors. Within the context of Nigeria's economic structure and climate commitments, it examines the energy crisis in regard to nonrenewable – resource dependency and urgent calls for renewable solutions. Similarly, the thesis explores the effects of water scarcity and its interdependence with food security, presenting evidence of how inadequate access to these resources exacerbates poverty and malnutrition, creating cyclical challenges that further burden the population.

The concluding section analytically evaluates the current policy measures and transnational partnerships such as the Nigerian Energy Support Programme and different family planning programs developed to counteract the urgent challenges of resources and population. Based on the work, this paper analyses the net effect of interventions in place and gives a string of policy interventions with the target to enhance resilience in Nigeria. These are recommendations that involve expanded coverage of family planning services, enhanced reproductive health education, investing in renewable sources of energy, and adopting climate and demographically responsive water management strategies. With a comprehensive and multi-dimensional analysis, this research deepens Nigeria's complex demographic and resource issues analysis. It sheds light on significant considerations policy – makers must address to direct policy

initiatives into the aspirations of sustainable development, issuing promises for long – term stability, economic growth, and improved living standards for Nigeria’s rapidly expanding population. Based on these results, this research contributes value towards the formulation of well – rounded and adaptive policies that advance environmental sustainability and socio – economic growth.

Chapter One

POPULATION GROWTH

1.1 Demographic evolution: demographic transition in global perspective

Over years, human progress has had a significant impact on demographic trends globally, giving rise to a veritable demographic transition²⁷. The latter process shifts societies from high birth and death rates to lower and more stable rates, fostering fewer children, more elderly people and increased longevity, liberating women from extensive childbearing responsibilities and promoting investments in fewer but better – educated children. Although the phenomenon has brought demographic dividend²⁸, such as larger working – age populations and economic growth, it also poses challenges like population aging and increased dependency ratios.

Demographic transition can be divided into several distinct phases, each characterized by specific dynamics regarding fertility rates²⁹, mortality rates³⁰, life expectancy³¹ and population structure.

²⁷ The term “demographic transition” refers to the secular shift in fertility and mortality from high and sharply fluctuating levels to low and relatively stable ones (Lee & Reher, 2011)

²⁸ Scholars explain how not always a situation of youth bulge is negative because with the right investments it can lead to “the economic growth that can be produced by an increase in the working age population” (Giordano, 2020) This phenomenon occurs when over time, as the demographic shift progresses and, most importantly, with the appropriate investments, sizable youth populations have the potential to evolve into economically productive adults who can guarantee the welfare of its society (Giordano, 2021).

²⁹ “The total fertility rate in a specific year is defined as the total number of children that would be born to each woman if she were to live to the end of her child – bearing years and give birth to children in alignment with the prevailing age – specific fertility rates.” (OECD)

³⁰ The pattern of death” (Weeks, 2015)

³¹ “The statistically average length of life” (Weeks, 2015)

High fertility and high death rates varied quickly based on variables like disease and drought, which characterized the first stage, the pre-industrial era. In this initial phase, births and deaths balanced each other out, maintaining a stable and youthful population. Family planning and contraception were almost unheard of, while the offspring were viewed as an integral part of the household economy and the only source of support for elderly parents. Thus, the need to procreate was unquestioned, despite high mortality rates.

The second stage of the demographic transition, which appeared in Europe with the onset of the Industrial Revolution, marked the commencement of significant changes. Fertility rates remained high, while mortality rates began to decline; the gap between births and deaths began to increase along with, consequently, a rapid population growth. The mortality decline may be attributed to several causes: an improvement in public health services, better food and water, mothers' greater socioeconomic standing and an increased access to education. These factors have contributed significantly to the considerable reduction in mortality, especially in children.

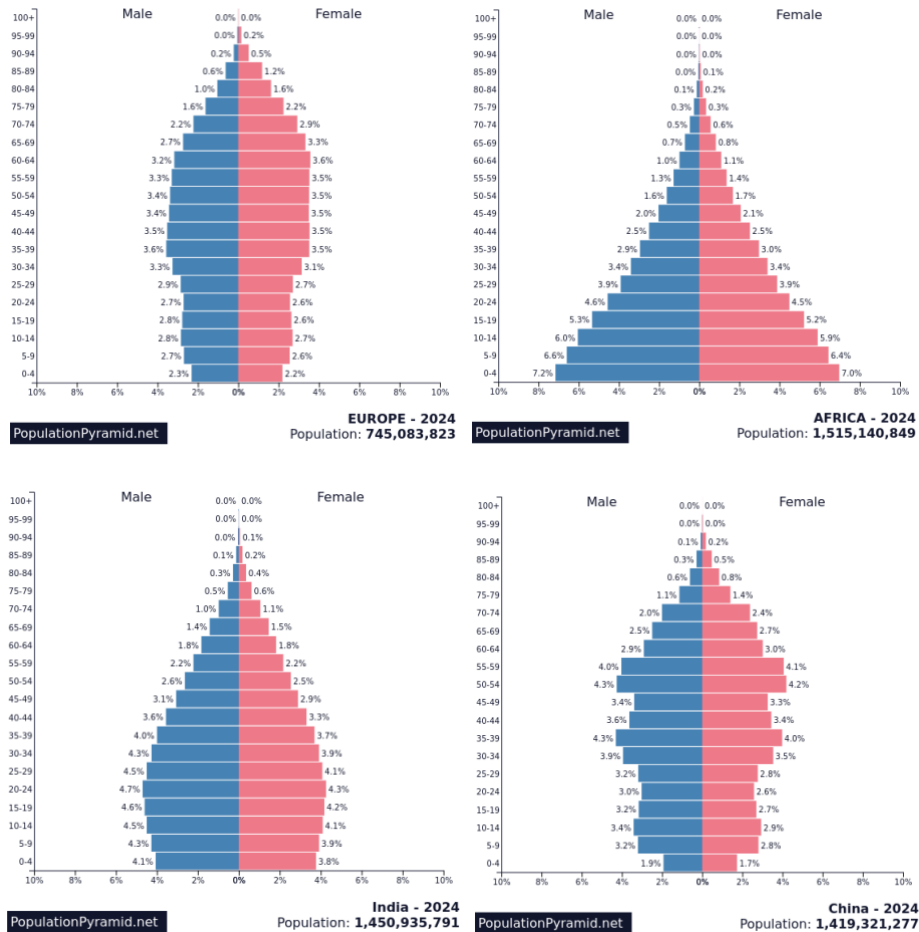
In the third stage, for the first time, occurred a slowdown in population growth due to the presence of mortality rates which remained consistently low and birth rates that began to decrease. This contraction can be attributed to several interconnected factors such as improved economic conditions, less need to have numerous children to ensure a comfortable old age or also, enhancement of the role of women. As a consequence, these changes modified the population's age distribution, with a dwindle in the dependency ratio of young people and a gradual aging trend. In fact, looking at the population pyramid corresponding to this stage, in the image below, it can be seen that its form is different with a triangular shape to one more akin to an elongated balloon.

By the fourth stage, a condition of population stability is achieved, with birth and death rates both low. This is due to a number of factors, including declining disease and

increased opportunities for choice related to motherhood due to advances in contraception and women's empowerment. At this stage, population growth comes to a halt, reaching a stable equilibrium.

However, as can be observed in the following population pyramids, only a part of the world achieved the fourth stage, such as Europe and North America, while many countries of Africa, especially in the Sub - Saharan area, are still in the second stage, marked by high birth rates and declining death rates. In addition, there are other countries such as India and Brazil, classified as emerging economies, which are in the third stage, where fertility rates are declining due to modernization and urbanization. In the meanwhile, China presents a unique case of accelerated demographic transition due to state policies, as the One Child Policy, leading to an aging population and critical gender imbalances.

Figures 1. Population pyramids of Europe, Africa, India and China.

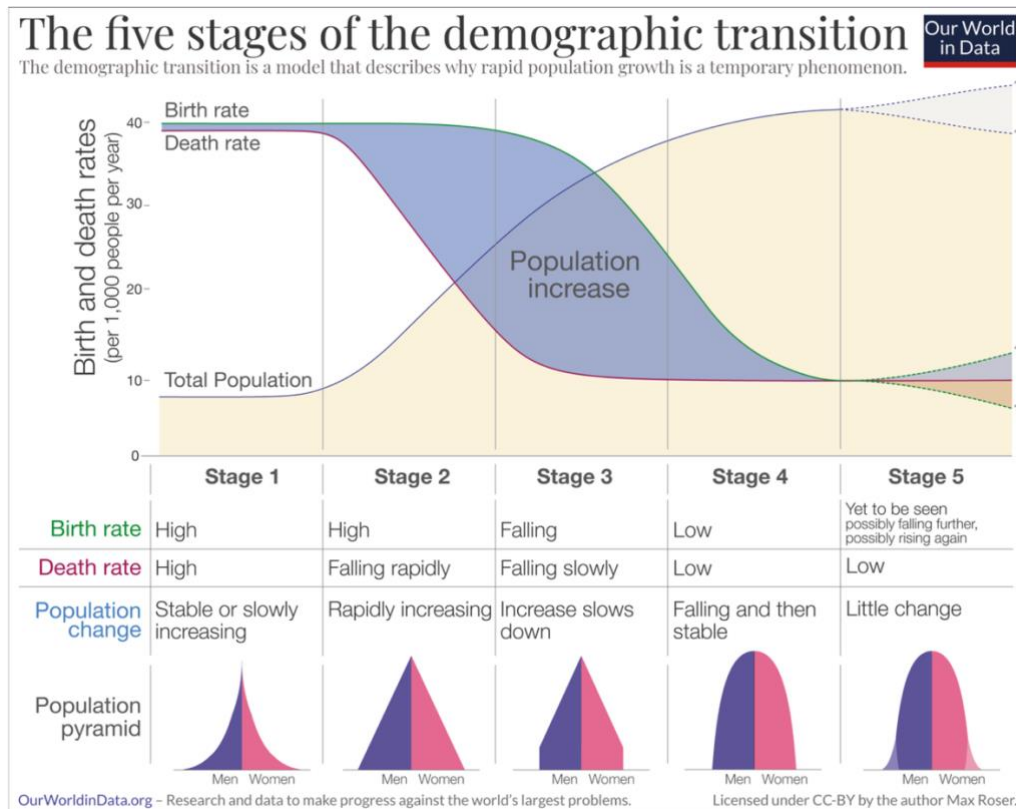


Description: these population pyramids were realized by the official site of Population pyramid.net, which explains the population structure of Europe, Africa, India and China in 2024. – Population Pyramids of the World from 1950 to 2100. (2025). PopulationPyramid.net. <https://www.populationpyramid.net/>

Furthermore, as explained by the article “Demographic transition: Why is rapid population growth a temporary phenomenon?” of Our World in Data, although the original demographic transition model consists of four stages, it was suggested by researchers the inclusion of stage five. In particular, has been theorized scenarios that simultaneously have an increase and a decrease in fertility rates. Here, there is a potential for populations to grow again, although evidence to support this idea has so far been very

limited. The posited explanation for this revival in fertility is attributed to the improved social and economic prospects, which could spur high birth rates.

Figure 2. The five stages of the demographic transition



Description: this image was made by Our World in Data site which represents the 5 stages of demographic transition and the population pyramid attributed to each stage. – Max Roser (2023) - “*Demographic transition: Why is rapid population growth a temporary phenomenon?*” Published online at OurWorldinData.org. Retrieved from: <https://ourworldindata.org/demographic-transition>

In summary, the global demographic transition represents a complex and multifaceted phenomenon, characterized by several phases that reflect the changing

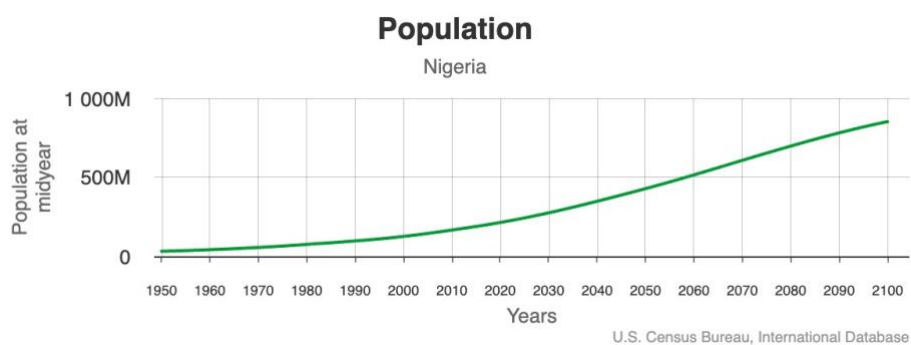
dynamics related to birth rates, mortality and population structure. This transformation is the result of multiple factors, including technological progress, urbanization, improved living conditions and women’s empowerment, which together have profoundly altered demographic patterns worldwide.

1.2 Nigerian Case: fertility fate, life expectancy, crude death rate and demographic dividend

Nigeria is a country located in West Africa and it is the most populous country of the African continent and one of the most populous nations of the world. With an estimated population of over 235 million people, the country’s demographic dynamics have important implications for its socio – economic development, political stability and, especially, environmental sustainability.

Looking at the data of the official site of the Population Pyramid it is evident how the country has been, and is characterized, by a rapid population growth in the past decades. It passed from 55.893.837 in 1970 to 232.679.477 in 2024, and this trend will continue to grow in the years to come, as we can see in the chart below from the U.S. Census Bureau.

Figure 3. Population growth projections in Nigeria.



Description: this chart was made by the U.S. Census Bureau to explain the population growth of Nigeria over Years. – *U.S Census Bureau International Database*. (2024) [Population growth projections of Nigeria over years](#).

Nigeria’s situation is the result of interaction between several factors. First and foremost, during the years there was a decline in the death rate due to improvements in various sectors, such as the medical or agricultural ones.³² According to the database of the United States Census Bureau, crude death rate declines from 20.2 in 1970 to 8.4 in 2024, while life expectancy increases from 44.2 years old in 1970 to 62.2 years old in 2024. On the other hand, the total fertility rate decreased from 7.20 in 1970 to 4.52 in 2024, “with higher fertility rates in the rural areas and in the northern regions of the country”.³³

	Fertility rate	Life expectancy	Crude death rate	Average annual growth rate
1970	7.20	44.2	20.2	2.93%
2024	4.52	62.2	8.4	2.52%

Analyzing data together with the population pyramid, it emerges that Nigeria is still in the first phase of demographic transition. In this phase, the population remains constantly stable and young, as explained in the previous section, contraception does not exist, and families do not invest in the education of their children, since they are the primary form of insurance for adults in old age and a contribution to the economy’s household. As shown in Nigeria’s Population Pyramid³⁴ there is a young age dependency

³² Iwejingi, S. F. (2011). *Population growth, environmental degradation and human health in Nigeria*. Pakistan Journal of Social Sciences, 8(4), 187 – 191.

³³ Abbani, A. Y., (2021, August 23). *Nigeria’s demographic transition and implications on the attainment of sustainable development goals* | *Global Journal of Social Sciences*. Nigeria’s Demographic Transition and Implications on the Attainment of Sustainable Development Goals | Global Journal of Social Sciences. <https://doi.org/10.4314/gjss.v20i1.1>

³⁴ Demographers use the population pyramid to analyze through a visual structure the composition of the population. Data are divided by gender and the population number are divided in each 5 years intervals (Preshoff, 2014)

ratio³⁵ since most of the population is concentrated under the age of 25 and specifically in the pre – reproductive area that goes from 0 to 15 years. It can be calculated by comparing the population aged 0 – 14 with the working age population, aged 15 – 64, multiplied by 100 and in this case, it corresponds to 71.9%. Surely, this aspect is a double-edged sword because since “the presence of a relatively large country – level youth bulge statistically explains the onset of recent non – ethnic armed conflict”³⁶, it means that when there is a young population is more difficult for governments to meet its needs. Thus, isn’t simple to cope with a growing youth bulge; which if not handled well can lead to riots and tensions within the population. In fact, supporters of this theory explain how states with a large young cohort “face upward pressures on demand for health care, education, jobs and basic infrastructure, but typically demonstrate low levels of state capacity and political stability”³⁷.

As mentioned by the United Nations Population Fund, “a country with both increasing numbers of young people and declining fertility has the potential to reap a demographic dividend”³⁸. In developing countries, looking at the composition of the population is very important because it gives us important clues about the future of the nation. One advantage that these countries have over the developed ones is the presence of a large portion of young people, although in order to improve the situation of the country, we need to focus on the age group of 15 and up. This is because the population is divided into active and passive population, in the former we can find people between

³⁵ The young – age dependency ratio is the ratio of the number of young people at an age when they are generally economically inactive, (i.e., under 15 years of age), compared to the number of people of working age (i.e., 15 – 64). In addition, this indicator can be calculated by comparing the population aged 0 – 14 with the working age population aged 15 – 64 multiplied for 100. (Eurostat Statistic Explained, 2018).

³⁶ Cincotta, R., & Weber, H., (2021, August 11). *Youthful Age Structures and the Risks of Revolutionary and Separatist Conflicts*.

https://doi.org/10.1007/978-3-030-73065-9_3

³⁷ Ibidem.

³⁸ Abbani, A. Y., (2021, August 23). *Nigeria’s demographic transition and implications on the attainment of sustainable development goals | Global Journal of Social Sciences*. Nigeria’s Demographic Transition and Implications on the Attainment of Sustainable Development Goals | Global Journal of Social Sciences.

<https://doi.org/10.4314/gjss.v20i1.1>

the ages of 15 and 64, the working age population, and in the latter the elderly and children. Clearly, distinguishing the population by age group has a very specific function: it can be used to understand their consumption needs, because as the UN Department of Economic and Social Affairs points out:

“Young people require investments in health and education while older persons no longer have labor income and consume greater amounts of healthcare services. Working-age adults produce much more than they consume and are therefore a source of financial support, either directly through private transfers, or by tax contributions to public transfer programs.”³⁹

The study of the interaction between producers and consumers with the age groups within society, gives us important information about the economic future of the country. In fact, countries that are already developed and have a large proportion of elderly people without the presence of young people to compensate, will experience economic decline. It is clear that developing countries need a clear plan to make the most out of the demographic dividend. First and foremost, the country needs to invest in education and in developing the skills that young people will need when they enter the workforce, and it is essential to promote STEM and to combine hard and soft skills. Furthermore, as technologies such as big data are very useful in identifying labor market trends and facilitating targeted training, the technological divide, lack of access to the internet and gender inequalities that limit the full exploitation of these opportunities should be reduced. In this context, it can be stated that Nigeria’s internet penetration has grown significantly during the last decade. As a result of the growing availability of mobile devices and low – cost data plans, an increasing number of Nigerians now have internet access, allowing them to participate in online activities such as social networking platforms.

³⁹ UN department of Economic and Social Affairs (2023, July 6). *Frontier Technology Issues: Harnessing the economic dividends from demographic change*
<https://www.un.org/development/desa/dpad/publication/frontier-technology-issues-harnessing-the-economic-dividends-from-demographic-change/>

However, this latter situation occurs only when there is a decreasing fertility rate which can be achieved through a radical change in Nigeria's society. Specifically, scholars explain how access to contraceptives is blocked not so much by economic resources but by cultural barriers due to the presence of more than 250 ethnic groups.⁴⁰ Furthermore, in a country like Nigeria where the majority of the population identifies itself with the Islamic religion, religious dogmas play a very important role. How is explained by the International Crisis Group in the report *Women, Patriarchy, and Islam in the Northeast*, "the region's religious and cultural norms, codified in law, have defined women's status through marriage and childbearing and largely confined them to a domestic role".⁴¹ Nigeria's women marginalization in several sectors combined with early marriages have contributed to the low level of female education and employment, mainly due to the refusal of approval in many states of the Child Rights Act which establishes the minimum age of 18 for marriage. On top of that, the presence of a terrorist group named "Boko Haram", very similar to Taliban's organization in Afghanistan and Pakistan, in northern Nigeria only worsens the situation. In particular, the latter wants to deny women access to education, it kidnaps them and very often uses them as rewards for marriage for group members. Once abducted, women are selected and divided into separate groups, very young girls and older women are used as objects for terrorist attacks, while women who are at an age conducive to conception are considered useful for procreation.⁴²

⁴⁰ Somefun, O. D., & Fayehun, F. (2024). Ethnic affiliation and protective sexual behaviours among youth in Nigeria. *Journal of Biosocial Science*, 56(4), 767–783. <https://doi.org/10.1017/s0021932024000257>

⁴¹ International Crisis Group. (2016). *Women, Patriarchy and Islam in the North East*. In *Nigeria: Women and the Boko Haram Insurgency* (p. Page 2 – Page 4). International Crisis Group. <http://www.jstor.org/stable/resrep31747.6>

⁴² International Crisis Group. (2016). *Women, Patriarchy and Islam in the North East*. In *Nigeria: Women and the Boko Haram Insurgency* (p. Page 2 – Page 4). International Crisis Group. <http://www.jstor.org/stable/resrep31747.6>

Figure 4. Map of security threats on Nigerian soil

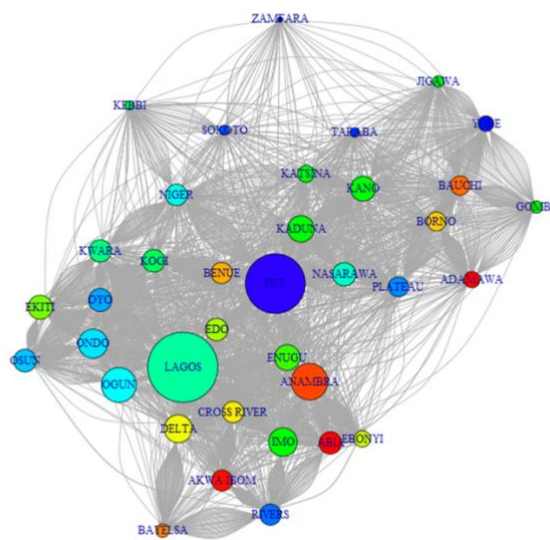


Description: this map, realized by the National Geospatial – Intelligence Agency Maritime Safety Information, reflects the geographic concentration of threats and not the magnitude of each threat. It was made on composite data from 2018 – 2021. – Duerksen, M. (2022, July 29). Nigeria’s diverse Security threats – Africa Center. Africa Center. <https://africacenter.org/spotlight/nigeria-diverse-security-threats/>

Among the factors that could hinder the achievement of the demographic dividend, beyond those already analyzed, is internal migration within the country. Over the years, Nigeria has faced not only a general increase in population but also an increase in population in urban areas. For example, in 1960 only 16 percent of the population lived

in urban areas, compared to a 49 percent in 2019⁴³. In research conducted by the United Nations in December 2023, it was shown how age influences migration. In general, migration to urban areas increases with age, but it was noted that women are more likely than men, to move from rural areas to more industrialized zones at an age between 18 and 24.⁴⁴

Figure. 5 Network analysis showing links between states for women.

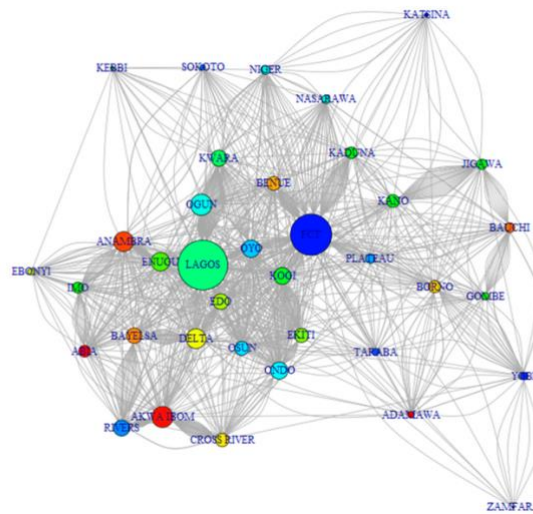


Description: this map made by the United Nations allows us to understand from what place and to what place the migration of women in Nigeria occurs. – Hamidou P., Masum Md., Nonso O., Victor L. (2023, December 7) Internal migration trends in Nigeria. United Nations. <https://nigeria.un.org/en/255132-internal-migration-trends-nigeria>

⁴³ Hamidou P., Masum Md., Nonso O., Victor L. (2023, December 7) Internal migration trends in Nigeria. United Nations. <https://nigeria.un.org/en/255132-internal-migration-trends-nigeria>

⁴⁴ Ibidem.

Figure 6. Network analysis showing links between states for men.



Description: this map made by the United Nations allows us to understand from what place and to what place the migration of men in Nigeria occurs. – Hamidou P., Masum Md., Nonso O., Victor L. (2023, December 7) Internal migration trends in Nigeria. United Nations. <https://nigeria.un.org/en/255132-internal-migration-trends-nigeria>

Nigeria’s internal migration is spurred by various reasons. For example, individuals from the Northeast have been forced out of their homes by security threats posed by Boko Haram. Others migrate in search of improved school facilities, improved public amenities, or improved employment opportunities in urban areas. One of the most striking aspects of this movement towards migration is that only the people from medium and high – income groups have the financial resources to migrate, while those in lower income groups remain behind in the rural areas. This economic disparity increases regional disparities and results in an uneven rate of development in the country. While on one hand, migration carries with it irrefutable advantages of more access to quality education, health, and overall improved standard of living.

However, simultaneously, it places immense pressure on city infrastructure, which is not designed to cope with such rapid population growth. Therefore, urbanization

takes place in a handful of major cities while the rest of the nation remains underdeveloped with congested housing, transportation, and public amenities. To respond to these issues, there is a need to adopt policies that balance the gains of migration while promoting fair development in all regions, avoiding undue pressure on cities and promoting inclusive economic growth.

“For example, Aliyu and Amadu (2017) argue that urbanization is a major public health challenge in the 21st century, given that urban populations are rapidly increasing while basic infrastructures are insufficient, and social and economic inequalities in urban areas have resulted in significant health inequalities.”⁴⁵

To conclude, at the heart of the dividend is the concept that, following the reduction in the birth rate, people wish to have fewer children, allowing parents to invest their economic resources in the education and health of their children. This step is crucial because it is a real investment that will generate future human capital enriched with skills. Once children become adults, they contribute to the enlargement of the working-age population, contributing to the growth of the economy: “Families with large numbers of children tend to be poorer and vice-versa (NBS, 2006). Similarly, countries with high fertility rates often tend to be poorer.”⁴⁶

Thus, population growth is only successful if it is fully absorbed into productive activities, resulting in a rise in per capita income. If this does not happen, there will be no demographic dividend, but rather a demographic bomb, with major repercussions such as political and social instability. The government’s participation is critical at this point

⁴⁵ Ogadinma I. (2025, February 1). *View of Internal Migration and Urbanization in Nigeria: Implications for Socio – Economic Development*. Bluemark publishers

<https://bluemarkpublishers.com/index.php/ISSEJ/article/view/197/167>

⁴⁶ Omoju, O. E., & Abraham, T. W. (2014, March 24). *Youth bulge and demographic dividend in Nigeria*. *African Population Studies*, 27(2), 352. <https://doi.org/10.11564/27-2-480>

Studies, T. A. C. F. S. (2021, September 13). #EndSARS Demands Nigerian Police Reform – Africa Center. Africa Center for Strategic Studies. <https://africacenter.org/spotlight/endsars-demands-nigerian-police-reform/>

because it must invest in programs that boost job, health, and education opportunities for young people.

1.3 Ethnic affiliation behind high fertility rates and the role of women

As demonstrated in the precedent paragraphs, with a huge population Nigeria has serious demographic challenges that persist, such as high fertility rates. The latter are deeply linked to various socio-cultural, religious, and economic influences, most of which are determined by ethnic norms.

With more than 250 distinct ethnic groups, the three major ones – Hausa⁴⁷, Igbo⁴⁸, and Yoruba⁴⁹ – show the importance of cultural diversity in relation to reproductive health practices among young people transitioning into adulthood. This intersection of ethnicity with reproductive health practices becomes important for understanding the persisting

⁴⁷ Hausa, people found chiefly in northwestern Nigeria and adjacent southern Niger. They constitute the largest ethnic group in the area, which also contains another large group, the Fulani, perhaps one – half of whom are settled among the Hausa as a ruling class, having adopted the Hausa language and culture. The language belongs to the Chadic group of the Afro – Asiatic (formerly Hamito – Semitic) family and is infused with many Arabic words as a result of Islamic influence. (Britannica, 2024)

⁴⁸ Igbo, people living chiefly in southeastern Nigeria who speak Igbo, a language of the Benue – Congo branch of the Niger – Congo language family. The Igbo may be grouped into the following main cultural divisions: northern, southern, western, eastern or Cross River, and northeastern. Traditional Igbo religion includes belief in a creator god (Chukwu or Chineke), an earth goddess (Ala), and numerous other deities and spirits as well as a belief in ancestors who protect their living descendants. Revelation of the will of the deities is sought by divination and oracles. Many Igbo are now Christians, some practicing a syncretic version of Christianity intermingled with indigenous beliefs. (Britannica, 2024)

⁴⁹ Yoruba, is one of the three largest ethnic groups of Nigeria, concentrated in the southwestern part of that country. Much smaller, scattered groups live in Benin and northern Togo. The Yoruba numbered more than 20 million at the turn of the 21st century. Many Yoruba are now Christians or Muslims, but aspects of their traditional religion survive. The traditional Yoruba religion has an elaborate hierarchy of deities, including a supreme creator and some 400 lesser gods and spirits, most of whom are associated with their own cults and priests. The Yoruba language has an extensive literature of poetry, short stories, myths, and proverbs. (Britannica, 2024)

high fertility rates, as the attitudes and behaviors of youth are major determinants of future demographic trends.

Figure 7. Distribution of ethnic groups in the Nigerian territory

Overlapping Ethnic Groups in Nigeria



Description: this map realized by the Council on Foreign Relations shows the distribution of the 3 major ethnic groups and the remaining ones on the Nigerian territory – Council on Foreign Relations (2022). *Modern History: Sub-Saharan Africa* | <https://education.cfr.org/learn/learning-journey/sub-saharan-africa-essentials/modern-history-sub-saharan-africa>

In this regard, the two researchers Somefun and Fayehun conducted a survey on the sexual practices of young Nigerians, interviewing 1393 people between the ages of 16 and 24. The study revealed how ethnic differences affect sexual habits: Hausa teens had the highest abstinence rate, at 80 percent, and the lowest condom use, at 56 percent, compared to their Igbo and Yoruba counterparts.

The Hausa people are predominantly Muslim and embedded in a more conservative cultural framework that discourages premarital sex and encourages child marriage. Early marriage among Hausa females, which is often legitimized by Islamic teachings, results in sexual initiation within marital contexts, bypassing the protective effects of abstinence and contraceptive use. Contrastingly, the other two ethnic groups are more urbanized and educated. Not surprisingly, the study showed high condom use among Yoruba and Igbo, 81 percent, and 80 percent respectively, demonstrating that education and access to reproductive health resources overcome some of the cultural barriers related to contraception.

The nexus between ethnic affiliation and protective sexual behaviours appears to be further mediated by educational attainment, family structure, and access to information. In the context of ethnicity, education seems to act like a two-edged sword. For instance, increased formal education among Hausa youth now correlates with higher abstinence in the Islamic faith, thus confirming exposure to formal schooling as a factor that strengthens conservative norms by delaying marriage as well as sexual initiation. Higher education among Yoruba youth does not characterize one's status as having greater abstinence; rather, it indicates a new ethnic orientation, and more likely than not, it had been under the influence of urbanization and exposure to Western ideals. These contrasts highlight the complex mode of interaction between education and its ethnic norms to determine fertility – related behaviours.

Additionally, the presence of both parents in the household greatly increases the possibility of abstaining from sexual activity for all ethnic communities, since stable homes have protective roles in this regard. Yet, it was noted that there were ethnic

differences as to the extent of communication parents had with their children regarding sexual health, as Yoruba or Igbo parents would do while Hausa would be constrained by cultural conservative habits. Those dynamics influence not only individual behaviours but also broader trends in fertility. Youth, who do not have sufficient guidance from parents or lack sexual health information, will be more prone to risk sexual behaviours, hence the prospect of unplanned pregnancies and early parenthood.

One very important aspect that emerged from the study is that while Yoruba women are more emancipated in the context of reproductive activity, “young Hausa women are not empowered enough to negotiate condom use due to the Islamic value system of *purdah*”.⁵⁰ These cultural norms not only continue to maintain high fertility rates but also hinder the use of modern contraceptive methods, especially in northern Nigeria. In addressing these inequalities, it becomes imperative to institute culturally sensitive interventions respecting ethnic norms while at the same time increasing reproductive freedom and access to contraception.

There is a deep policy implication of these findings. Programs to fertility reduction need to consider cultural ethnicity context for effectiveness and permanence. For instance, programs for abstinence could take root with Hausa youth whereas condom promotion and education programs would work better in Yoruba and Igbo youth. PSB⁵¹ education could further be cascaded into curriculum content schools and community outreach initiatives to provide equality in educational content access around sexual health in poorly reached areas. Such efforts could be amplified using culturally appropriate media campaigns as highlighted in the study that will inform the youth about contraception and hazards of engaging in unprotected sex. It should involve parents and community leaders in intergenerational transmission, mostly of cultural norms that feed the high fertility culture.

⁵⁰ Somefun, O. D., & Fayehun, F. (2024). Ethnic affiliation and protective sexual behaviours among youth in Nigeria. *Journal of Biosocial Science*, 56(4), 767–783. <https://doi.org/10.1017/s0021932024000257>

⁵¹ protective sexual behaviours

To sum up, the association of ethnic identity, PSB and fertility in Nigeria shows the need for an integrated approach to reproductive health policy. While ethnicity shapes the cultural lens through which sexual behaviours are understood and practiced, structural factors such as education, health access, and economic opportunities are equally important. Tackling high fertility rates in Nigeria entails addressing these intersecting influences, aware that varied Nigerian youth experiences demand context-sensitive and tailored solutions.

Chapter two

THE IMPACT OF POPULATION GROWTH ON PRIMARY RESOURCES

2.1 Energy: increasing energy demand, energy crisis, available sources, environmental and social impacts

Energy is a cornerstone of development at both societal and economic levels, since it forms the basis on which to decrease poverty, increase the level of the economy, and improve standards of living.⁵²

Currently, the whole world is suffering the negative effects of the energy crisis. It is motivated primarily by the increase in the world population, which is estimated to reach 10 billion people by 2050. So, supply is starting to become scarce in the face of increasing demand. Energy security plays a central role in the functioning of the economy. The moment energy costs rise due to a crisis caused by, for example, a shortage of gas or oil, the cost of producing goods and services also rises. All this leads to higher inflation, consumers have less purchasing power, and economic growth slows down.

Since 1960 Nigeria's protracted energy crisis has exacted a hard and long – term impact on its economy, traversing a range of sectors from the production in manufacturing to employment and foreign investment. Nigeria has had unstable power supply for decades, which has prompted industries and consumers to employ costly and environmentally unfriendly alternative means of power such as diesel generators.⁵³

⁵² Ritchie, H., Rosado, P., and Roser, M., (2019). – “*Access to Energy*” Published online at OurWorldinData.org, from <https://ourworldindata.org/energy-access>

⁵³ Akpan, D. A., & Nde, E. (2011). Energy Crisis in Nigeria: A Golden Way for Building Other African Economies with Particular Reference to Ghana in the 21st Century. *Lwati a Journal of Contemporary Research*, 8(1). <https://www.ajol.info/index.php/lwati/article/view/79731>

Despite possessing gigantic energy resources, in the shape of massive natural gas reserves, among others, the country has failed to capitalize on its potential for a stable and efficient power supply system. The energy crisis is now a serious impediment to economic growth, leading many industries to close down, increasing the cost of production, and inducing capital flight. The majority of the multinational companies, including Guinness, Coca – Cola, PZ, Nestlé, and Michelin, have moved their production bases to Ghana, a neighboring nation with a better power supply and conducive business environment.⁵⁴ This phenomenon has seriously weakened Nigeria’s manufacturing base, which contributed only 4.03% to the Gross Domestic Product in 2007, while agriculture and oil dominated the economy. The lack of electricity not only increases the production cost but also decreases Nigeria’s global competitiveness, as it becomes difficult for locally produced products to compete in the international market. The government of Nigeria, in the wake of the energy crisis, has implemented numerous measures, including the Electric Power Sector Reform Act of 2005⁵⁵, aimed at decentralizing power generation, transmission, and distribution. Despite the magnitude of these measures, corruption, poor governance, and special interests – most notably those importing generators – have gone ahead to undermine progress in the energy sector.

Nigeria remains Africa’s largest user of diesel generators and the country spends more than \$152 million importing generators annually, making power generation its own industry rather than a closed national infrastructure matter.⁵⁶ The inefficiencies in the power sector have also brought mass unemployment, and an estimated three million jobs lost due to factory closures. More unemployment has consequently driven social unrest, adding further fuel to the number of armed robberies, kidnappings, and other crimes, making Nigeria a more insecure place for businesses and citizens alike. In addition, the energy crisis repels foreign direct investment because potential investors view Nigeria as a high – risk and unstable business environment. On the other hand, Ghana has capitalized

⁵⁴ Akpan, D. A., & Nde, E. (2011). Energy Crisis in Nigeria: A Golden Way for Building Other African Economies with Particular Reference to Ghana in the 21st Century. *Lwati a Journal of Contemporary Research*, 8(1). <https://www.ajol.info/index.php/lwati/article/view/79731>

⁵⁵ Ibidem.

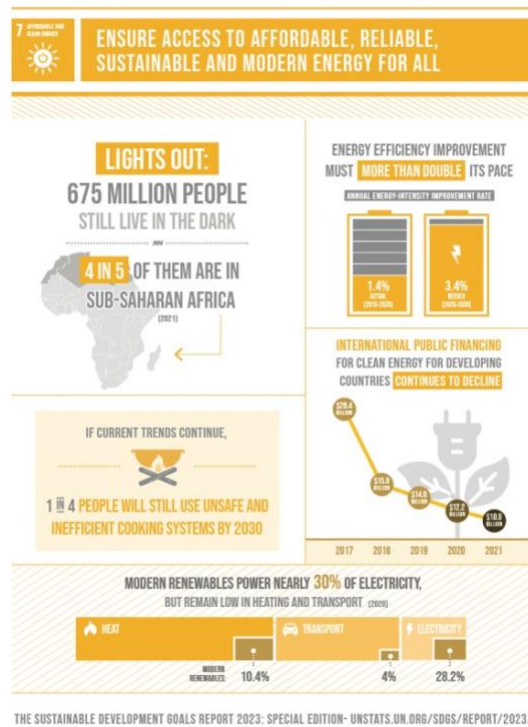
⁵⁶ Ibidem.

on Nigeria's shortcomings and lured local and international investors with its stable power supply, hospitable tax regimes, and improved business environment. The economic boost Ghana is reaping at Nigeria's expense highlights the need for energy infrastructure in the country's development. While nations such as Malaysia and Singapore, which obtained independence at a similar time as Nigeria, were able to industrialize, Nigeria remains behind through poor leadership and mismanagement of its resources. The inability to invest in alternate sources of power such as solar, nuclear, and biomass serves to further accelerate Nigeria's reliance on an inefficient and archaic power grid. The lack of political will on the part of the government to implement long-term policies has prevented it from breaking this vicious cycle of energy shortfalls. The high cost of maintaining generator-driven businesses has resulted in the price of goods and services increasing, exacerbating inflation and weakening purchasing power for consumers. This situation perpetuates poverty because households invest a substantial percentage of their income in energy costs, with little left for economic development. While Nigeria's aspiration of being among the top 20 economies by 2020 still remains, Ghana is developing its industrial sector and continues to attract firms and skilled professionals who previously worked from Nigeria. The relocation of industries to Ghana has opened up new job opportunities for Ghanaians while worsening Nigeria's economic woes. The Nigerian government should, therefore, focus on energy sector reforms by ending corruption, investing in new infrastructure, and diversifying sources of energy to stabilize power supply. Without timely action, the energy crisis will persist to debase economic advancement, stifle industrial development, and fuel social unrest, further eroding Nigeria's position as an economic giant in Africa.

As shown in the figure below, the UN stated that today there are 675 million people without access to energy and most of them are in Sub – Saharan Africa. Thus, it is no coincidence that the United Nations has included energy issues in the Sustainable Development Goals of the 2030 Agenda, at point 7 with “Ensure access to affordable, reliable, sustainable and modern energy for all”.⁵⁷

⁵⁷ United Nations. (2023). *Goal 7: Ensure access to affordable, reliable, sustainable and modern energy*. United Nations Sustainable Development Goals. Retrieved December 11, 2024, from <https://sdgs.un.org/goals/goal7>

Figure 8. Infographic of UN on Sustainable Development Goal 7



Description: this infographic was made by the United Nations to explain Sustainable Development Goal 7 – United Nations. (2023). *Goal 7: Ensure access to affordable, reliable, sustainable and modern energy.* United Nations Sustainable Development Goals. Retrieved December 11, 2024, from <https://sdgs.un.org/goals/goal7>

There is a positive relation between energy and population growth since as the first one grows, so does the demand for electricity and other forms of energy. This increased demand puts a strain on the existing energy infrastructure, which may not be able to keep up. Power outages and energy shortages can have negative consequences on economic growth, industrial productivity, and the everyday lives of Nigerian citizens. The advancement of society, the economy and the sustainability of the environment, are all intimately related: all human activity depends on having access to energy. “The lack of

reliable power is a significant constraint for many communities in terms of socio-economic progress, resulting in an annual economic loss estimated at USD 26.2 billion (NGN 10.1 trillion), which is equivalent to about 2% of the GDP.”⁵⁸

Research conducted by the Nigerian Context Analysis team has revealed that most households in Nigeria depend on lighting sources such as battery – operated torchlights, rechargeable products, or solar – based alternatives. In the north, about 65% of displaced and host community households use battery – powered torchlights, while 35% use rechargeable products. In addition, those connected to the national electricity grid are mostly dissatisfied with irregular power supply and high electricity bills.⁵⁹ These data not only highlighted how difficult the access to electricity is but also how the health of Nigerians and the ecosystem are at risk because of the inappropriate disposal of batteries, which are a common source of energy for off – grid lighting. Chemicals leached from disposed of batteries pollute soil and water resources, causing ecological damage and public health concerns which exacerbates the vulnerabilities of already marginalized communities.

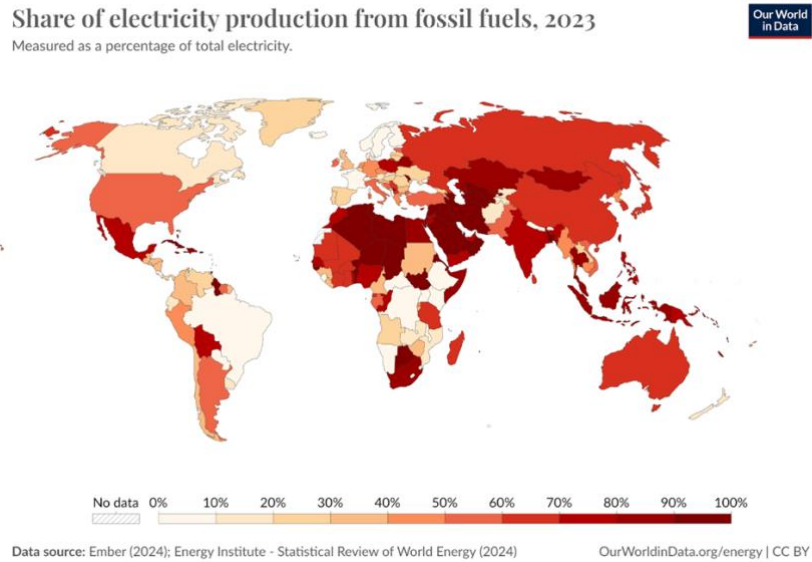
Another aspect that must not be underestimated is the cooking energy access. As shown in the images below, Nigeria still produces electricity from fossil fuels with 176,83 millions of people without access to clean fuels for cooking.⁶⁰

⁵⁸ Sani, Y., & Scholz, M. (2022, April 9). Interplay of Water–Energy Security and Food Consumption Patterns towards Achieving Nutrition Security in Katsina State, North – Western Nigeria. *Sustainability*, 14(8), 4478. <https://doi.org/10.3390/su14084478>

⁵⁹ Field team Ncat. (2024, March 20). *Access to Lighting and Cooking Energy Among Vulnerable Populations in Northern Nigeria – March 2024 – Nigeria Context Analysis Team.* <https://nigeriaanalysisunit.org/access-to-lighting-and-cooking-energy-among-vulnerable-populations-in-northern-nigeria-march-2024/>

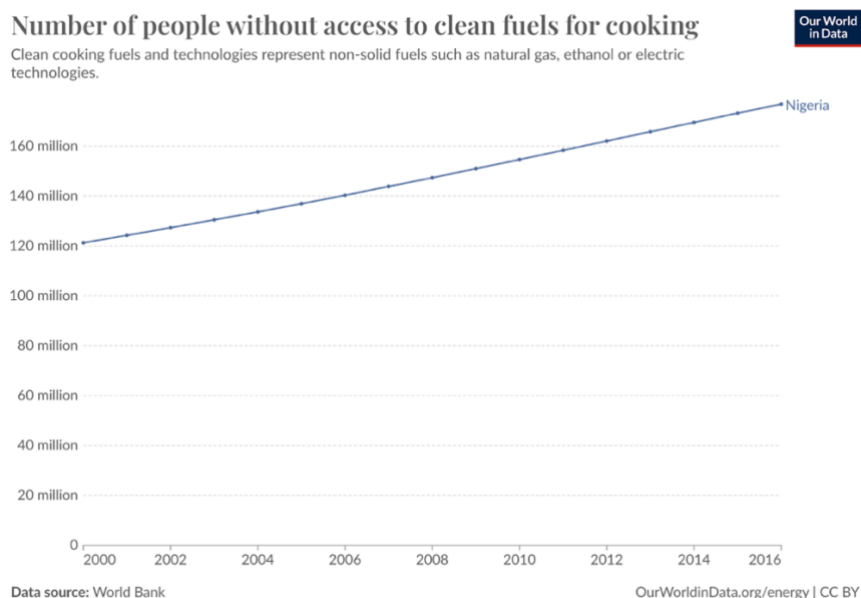
⁶⁰ Ritchie, H., Rosado, P., and Roser, M., (2019). – “Access to Energy” Published online at OurWorldinData.org, from <https://ourworldindata.org/energy-access>

Figure 9. Share of electricity production from fossil fuels in 2023



Description: This map was realized by Our World in Data to illustrate the electricity production from fossil fuels in the world in the year 2023. – Ritchie, H., Rosado, P., and Roser, M., (2019 – revised 2024). – “Access to Energy” Published online at OurWorldinData.org, from <https://ourworldindata.org/energy-access>

Figure 10. Number of people without access to clean fuels for cooking in Nigeria (data until 2016)

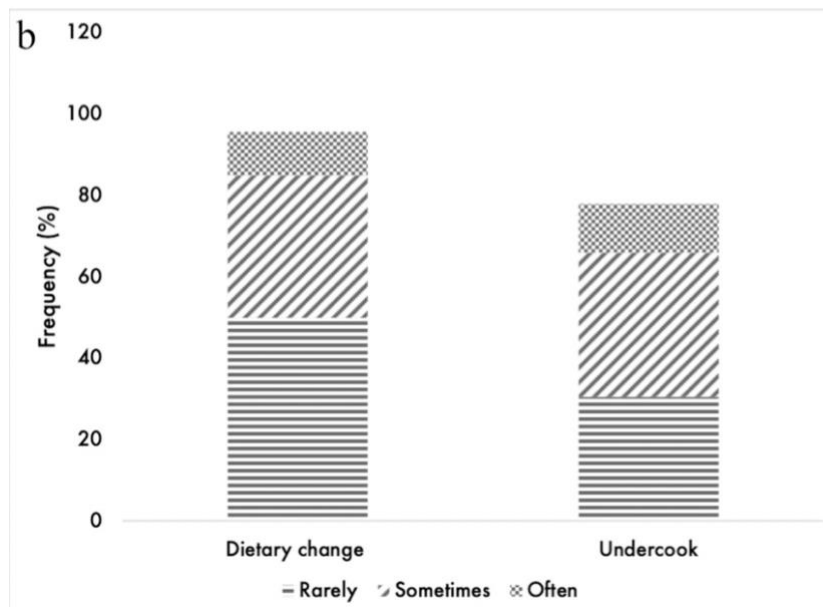


Description: The graph was realized by Our World in Data to show the number of people without access to clean fuels for cooking in Nigeria, data until 2016. – Ritchie, H., Rosado, P., and Roser, M., (2019 – revised 2024). – “Access to Energy” Published online at OurWorldinData.org, from <https://ourworldindata.org/energy-access>

Nigerian’s primary cooking fuels are Firewood and charcoal used by 65% and 55% of households, together with agricultural residues and animal dung that are used more among displaced households, especially in Jibia (Katsina State) and Ngala (Borno State). Instead, cooking gas and kerosene are less common due to the high costs.⁶¹ As a consequence, the population predominantly cook outdoors with safety concerns during the rainy season due to fire risks and smoke inhalation.

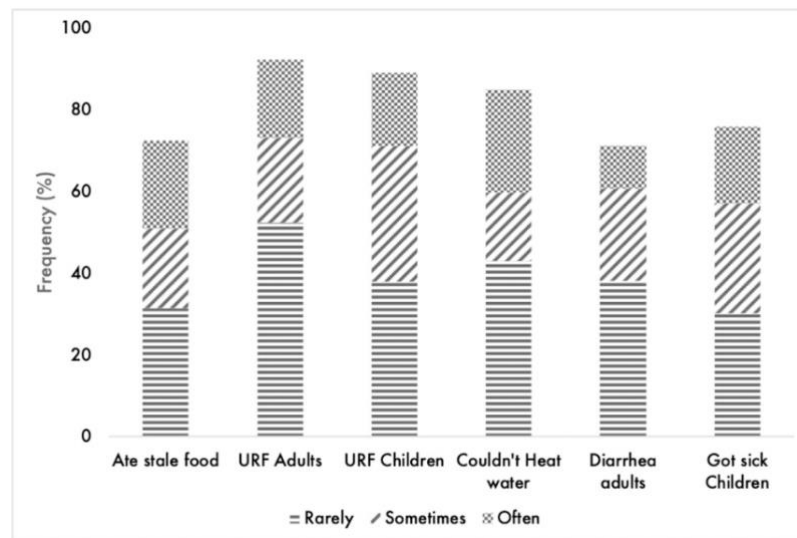
⁶¹ Field team Ncat. (2024, March 20). *Access to Lighting and Cooking Energy Among Vulnerable Populations in Northern Nigeria* – March 2024 – Nigeria Context Analysis Team. <https://nigeriaanalysisunit.org/access-to-lighting-and-cooking-energy-among-vulnerable-populations-in-northern-nigeria-march-2024/>

Figure 11. Nutritional consequences



Description: A stacked bar chart showing the frequency distribution of the nutritional consequences of energy insecurity in Nigeria. – Boateng, G. O., Balogun, M. R., Dada, F. O., & Armah, F. A., (2020, August). *Household energy insecurity: dimensions and consequences for women, infants and children in low – income and middle – income countries*. *Social Science & Medicine*, 258, 113068. <https://doi.org/10.1016/j.socscimed.2020.113068>

Figure 12. Disease consequences



Description: A stacked bar chart showing the frequency distribution of the disease consequences of energy insecurity in Nigeria (URF=unable to refrigerate food). Boateng, G. O., Balogun, M. R., Dada, F. O., & Armah, F. A., (2020, August). *Household energy insecurity: dimensions and consequences for women, infants and children in low – income and middle – income countries*. *Social Science & Medicine*, 258, 113068. <https://doi.org/10.1016/j.socscimed.2020.113068>

According to research carried out on 420 Nigeria's respondents and realized by Boateng, Balogun, Dada, Armah for *Elsevier medicine journal*, consequences of energy crisis can be collected in: psychosocial, nutritional and disease consequence. Analyzing the stacked bar charts on the paper made by the authors, it emerges how the most frequent phycological disease is that people, who experience energy issues in their homes, may feel stigmatized or ostracized. Secondly, the most frequent nutritional consequence is dietary change – (Figure 7). In addition, another most common disease is URF adults, which means inability to refrigerate food – (Figure 8). Nigeria's energy crisis leads

citizens to use solid fuels to meet their essential needs, but their use represents a danger for public health, given that it involves domestic pollution and different types of disease.⁶²

As it is demonstrated in the researchers conducted by DR. Desalu, the majority of the Nigerian population uses solid fuels due to its affordability, and the type of fuel varies from area to area. In addition, he specified how there were discrepancies between urban and rural areas:

“In the rural areas, the use of solid fuel like wood, agric waste, dung and charcoal was higher in the poor families. In the urban areas, the use of solid fuel was also higher in the poor families and the use of gas and electricity were higher in rich families”.⁶³

Through the use of *Spearman coefficient of correlation*, he explained also that:

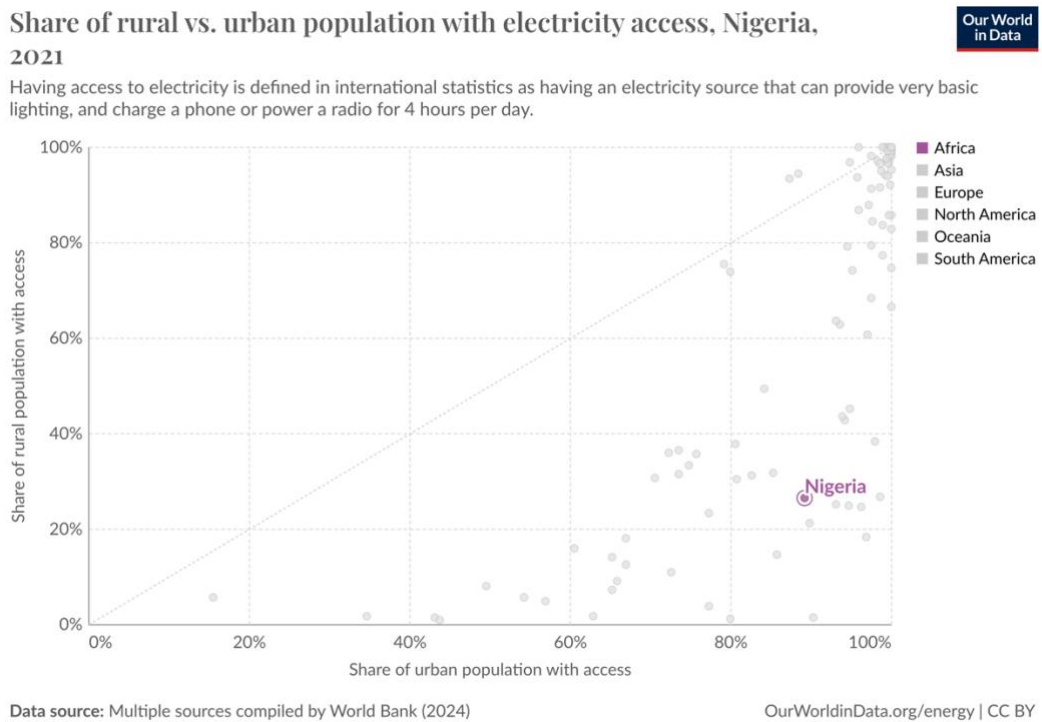
“The choice of solid fuel as source of cooking energy in urban areas were significantly associated with low level of education, lack of ownership of dwelling, large household size, residing in traditional houses, availability of water and awareness of adverse effect of wood smoke on the lung. In the rural household the solid fuel use was associated lower level of wealth, lower level of education, residing in traditional houses and availability of solid fuel”.⁶⁴

⁶² Boateng, G. O., Balogun, M. R., Dada, F. O., & Armah, F. A., (2020, August). *Household energy insecurity: dimensions and consequences for women, infants and children in low- and middle-income countries*. *Social Science & Medicine*, 258, 113068. <https://doi.org/10.1016/j.socscimed.2020.113068>

⁶³ Desalu, O. O., Ojo, O. O., Ariyibi, E. K., Kolawole, T. F., & Ogunleye, A. I., (2012). *A community survey of the pattern and determinants of household sources of energy for cooking in rural and urban southwestern, Nigeria*. *The Pan African medical journal*, 12, 2.

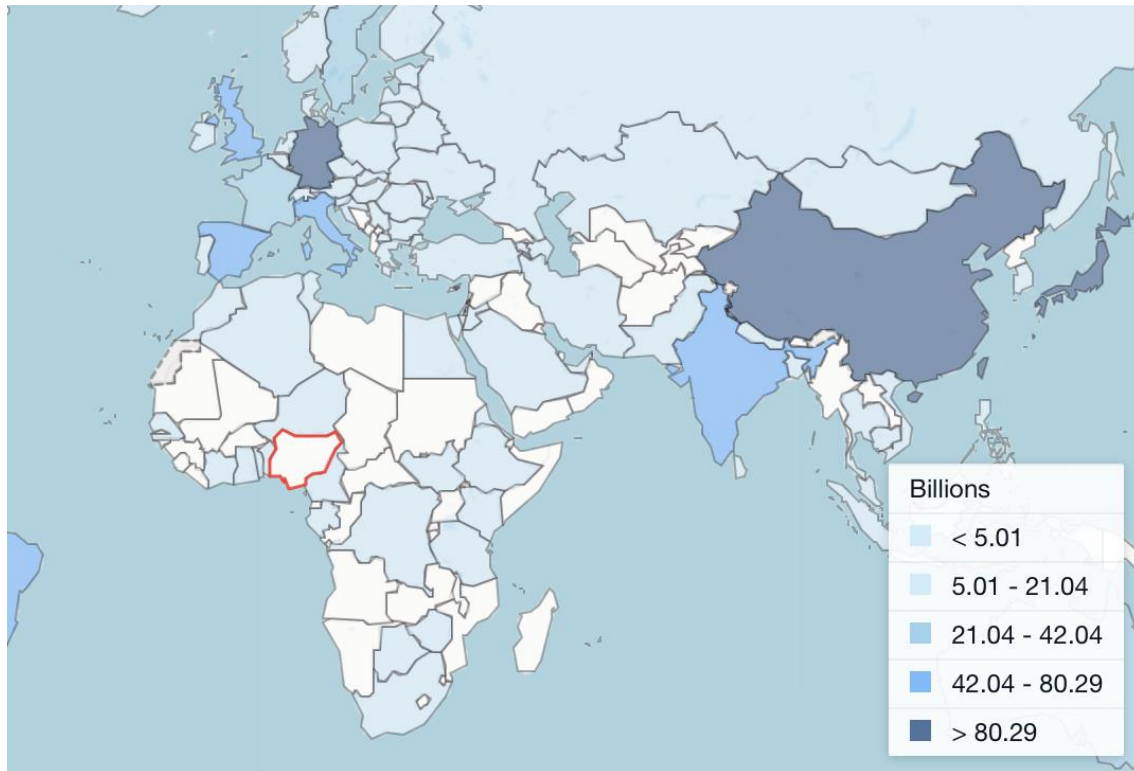
⁶⁴ Ibidem

Figure 13. Rural vs Urban population with electricity access in Nigeria



Description: this graph was made by Our World in Data in order to show the position of Nigeria in the world classification regarding the theme Rural vs Urban population with electricity access in Nigeria in 2021. – Ritchie, H., Rosado, P., and Roser, M., (2019, revised 2024). – “Access to Energy”. Published online at OurWorldinData.org, from <https://ourworldindata.org/energy-access>

Figure 14. Electricity production from renewable sources, excluding hydroelectric (kWh) in Africa until 2015



Description: this map realized by the world bank show the production of. Electricity using renewable sources and Nigeria is between the country with the lowest rate in Africa and in the world – World Bank. (2015). *Electricity production from renewable sources, excluding hydroelectric (kWh)* – World Bank Open Data.

<https://data.worldbank.org/indicator/EG.ELC.RNWX.KH?end=2015&locations=NG&start=2015&view=map>

Inaccessibility to sustainable energy disproportionately affects women and girls, who bear greatest responsibility for household energy. The duty for cooking falls to women, who go long distances in search of firewood, exposing them to the risk of sexual and gender – based violence. Moreover, gender dynamics in energy use decisions often result in men and boys helping to buy fuel, usually based on safety concerns. The energy crisis has exposed critical vulnerabilities in displaced and host communities in northern

Nigeria and the cost of a clay stove and wood fire has skyrocketed to NGN 350 per session of cooking, making this option unsustainable for most households.⁶⁵

In particular, research conducted by Ezeh in 2014 explains how the use of solid fuels poses a real threat to children in Nigeria, but above all it is emphasized how “solid fuels increased the risk of death for post – neonates by 92%, compared with a 63% increased risk for children between 12 and 59 months.”⁶⁶ Also, in this latest research, it is pointed out that there are substantial differences between rural and urban areas, explaining that due to less favorable economic situations, the use of solid fuels in rural areas is higher and therefore, this leads to an increased risk of disease among children in these zones.

2.2 Food insecurity: pressures on agricultural production, food crisis, land degradation and land grabbing

Nigeria possesses significant natural and human resources. However, food production hasn't kept pace with rapid population growth. Food insecurity is a top concern and is intricately linked to the country's demographic problems since the latter poses an immense pressure on finite resources, the food supply, arable land, and basic infrastructure. This connection is a complex dynamic and specific interventions should be targeted to match the rising demand with supply.

Food Security and Nutrition Situation in Jere Lga, Borno State, January 2024 is research conducted by the Nigeria Context Analysis Team that analysis the population in food insecurity. The data shows an increase 18.6 million people in 2023 to an estimated 26.5 million at the height of the lean season in 2024. Areas like Borno State, particularly

⁶⁵ Field team Ncat. (2024, March 20). *Access to Lighting and Cooking Energy Among Vulnerable Populations in Northern Nigeria – March 2024* – Nigeria Context Analysis Team.

<https://nigeriaanalysisunit.org/access-to-lighting-and-cooking-energy-among-vulnerable-populations-in-northern-nigeria-march-2024/>

⁶⁶ Ezeh, O. K., Agho, K. E., Dibley, M. J., Hall, J. J., & Page, A. N. (2014, December). *The effect of solid fuel use on childhood mortality in Nigeria: evidence from the 2013 cross-sectional household survey*.

Environmental Health, 13(1). <https://doi.org/10.1186/1476-069x-13-113>

the Jere Local Government Area (LGA), show the magnitude of this crisis; it's estimated that over 88% of households were suffering from food insecurity in 2023⁶⁷. Not by chance the European Union Agency for Asylum already in 2019 stated that:

“It should be noted that the states of Borno, Adamawa and Yobe are expected to reach emergency status in terms of food security. Education and health care are also severely affected, including by violence directly targeting schools and healthcare facilities, with more than 1.400 school destroyed and more than 40 % of the healthcare facilities destroyed or badly damaged.”⁶⁸

Going into specifics, the sector that places the greatest burden on food production is agriculture and, as depicted by the study *Food Systems Profile – Nigeria* of FAO, the European Union, and Cirad. The research has revealed that the sector employs more than a third of the population and contributes close to 23% of GDP. However, this branch of the economy is predominantly characterized by smallholder farmers who heavily practice rain – fed agriculture. This dependence, when coupled with a large deficit in local agricultural production and national consumption, makes the country heavily reliant on imports to meet its nutritional needs.⁶⁹

The country has about 70.8 million hectares of arable land, of which only 34 million hectares are under cultivation. More than 80% of Nigerian farmers are smallholders, accounting for 90% of the country's agricultural production and its principal crops include maize, cassava, beans, millet, groundnuts, pepper, sorghum, and paddy rice.⁷⁰ Although the agricultural sector is of paramount importance to the economy

⁶⁷ Field team Ncat. (2024, January). *Food Security and Nutrition Situation In Jere Lga, Borno State – Nigeria Context Analysis Team*.

⁶⁸ European Union Agency for Asylum (2019). *Indiscriminate violence in the Northeast Zone*. <https://euaa.europa.eu/country-guidance-nigeria/indiscriminate-violence-north-east-zone>

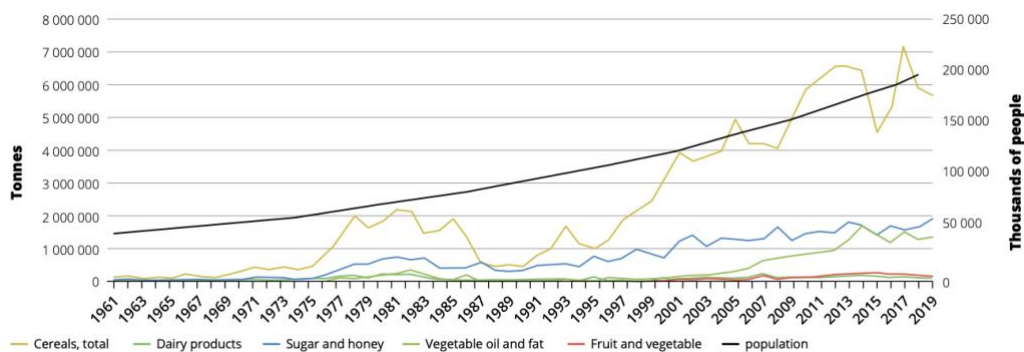
⁶⁹ FAO, European Union, & French Agricultural Research Centre for International Development. (2022). *Food Systems Profile - Nigeria*. Food and Agriculture Organization of the United Nations, European Union, and French Agricultural Research Centre for International Development. <https://doi.org/10.4060/cc3380en>

⁷⁰ FAO (2022). *Nigeria at a glance*. FAO in Nigeria, Cited 4 February 2022. <https://www.fao.org/nigeria/fao-in-nigeria/nigeria-at-a-glance/en/>

and food security, the share of Nigerian agricultural exports is meager when compared with oil exports. For example, oil made up 76.5% of Nigeria’s total exports in the year 2019, while agriculture accounted for less than 2%. This economic reliance on oil is more troubling as the country has recently transformed into a net food importer. The agricultural trade deficit in 2019 was NGN 689.7 billion (\$1.63 billion) from NGN 549.3 billion (\$1.3 billion) in 2018.⁷¹

Nigeria’s major agricultural imports are wheat, sugar, fish, and milk are, and its main exports include sesame seeds, cashew nuts, cocoa beans, ginger, frozen shrimp, and cotton. However, Nigeria is highly dependent on imports to satisfy its food requirements, as the chart below clearly shows. The country also fails to realize the potential of national agriculture. This shows the need for structural reforms in the sector. A decline in agricultural production would have devastating consequences for a country already facing food insecurity and demographic challenges. Therefore, targeted interventions that will improve productivity and reduce import dependence must be a top priority.

Figure 15. Main imported products in volumes, with population



Description: This chart created by FAO aims to show Nigeria’s growing dependence on food imports relative to its population. – FAOSTAT Trade Database (2024). <http://www.fao.org/faostat/en/#data>

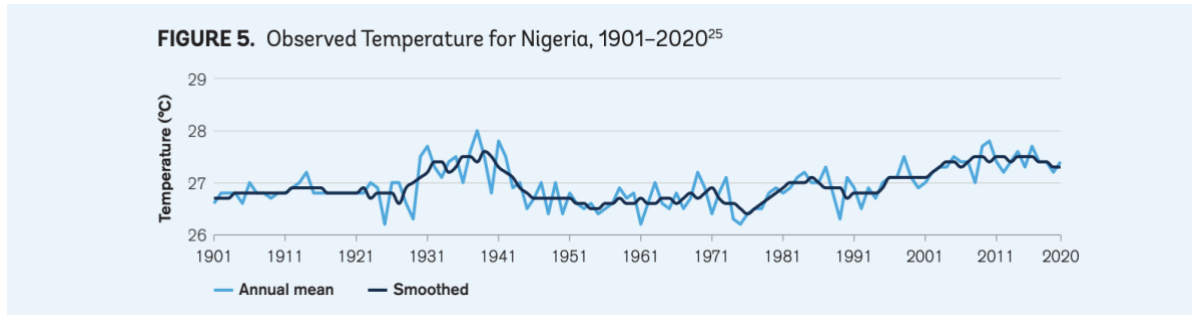
⁷¹ FAO (2022). *Nigeria at a glance*. FAO in Nigeria, Cited 4 February 2022. <https://www.fao.org/nigeria/fao-in-nigeria/nigeria-at-a-glance/en/>

In this critical context, the environmental aspect should also not be overlooked since there has been an increase in climate variability, with changing rainfalls, floods, and droughts which combined are causing a decline agricultural production. These environmental stresses undermine efforts at increasing food security since the agricultural producers are subjected to unpredictable and often very destructive weather conditions. This positive correlation was also confirmed in the study conducted by Aroyehun in his work *Impacts of Climate Change and Population Growth On Food Safety In Nigeria* of 2023 in which is explained that the climatic factors and population dynamics are negatively influencing food security. The effects of both the rainfall⁷² and temperature⁷³ were significantly negative in the long run, depicting the increasing unpredictability and severity of weather patterns. Similarly, more rapid population growth and less efficient use of agricultural land heightened food insecurity.

⁷² Short – term impacts of altered rainfall are apparently favorable; however, the long – term record indicates an adverse impact on agriculture due to erratically occurring rains and more floods. The authors relate these findings to the unpredictable nature of wet and dry seasons, which impede normal agricultural cycles. – Aroyehun, A., (2023). *Impacts of Climate Change and Population Growth on Food Security in Nigeria*. Black Sea Journal of Agriculture, 6(3), 232–240. <https://doi.org/10.47115/bsagriculture.1232578>

⁷³ Increased temperatures make crops produce less, make them lose more water, and increase the difficulty level of farming. High temperatures have been shown to lower the long-term productivity of farmland. – Aroyehun, A., (2023). *Impacts of Climate Change and Population Growth on Food Security in Nigeria*. Black Sea Journal of Agriculture, 6(3), 232–240. <https://doi.org/10.47115/bsagriculture.1232578>

Figure 16. Annual average temperature trends in the period between 1901 and 2020



Description: this graph created by the world bank aims to show how the average annual temperature has increased with the years – World Bank Group, Dove, M., Johnston, J., & Lang, Y. (2021). Climate risk country profile: Nigeria. In V. Morin & A. E. Bucher, *Climate Risk Country Profile*. World Bank Group. https://climateknowledgeportal.worldbank.org/sites/default/files/2021-07/15918-WB_Nigeria%20Country%20Profile-WEB.pdf

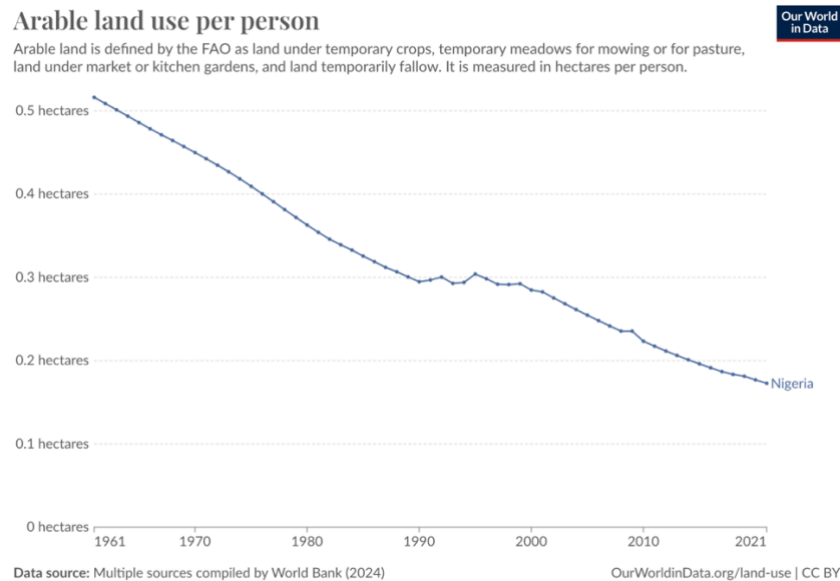
Also, urbanization plays an important role since the urban physical development encroaches on farmlands, reducing their size and further marginalizing already vulnerable rural farming communities. In fact, in Jere LGA, about 90% of farming households lease their farmlands at exorbitant costs, ranging from NGN 8,000 to NGN 26,000 per hectare.⁷⁴ These financial barriers inhibit many low – income households from farming, further worsening food insecurity. In rural areas like Jere LGA, agricultural practices remain largely at the level of subsistence, characterized by low productivity and very limited adoption of technology.⁷⁵ Most of the farming households in these areas lack access to land, inputs like fertilizers and seeds, or modern farming equipment on affordable terms. Thus, leasing farmland is out of reach for many; only the wealthiest or most resourceful farmers can keep their operations going. This unequal access to

⁷⁴ Field team Ncat. (2024, January). *Food Security and Nutrition Situation In Jere Lga, Borno State. – January 2024* – Nigeria Context Analysis Team.

⁷⁵ Field team Ncat. (2024, January). *Food Security and Nutrition Situation In Jere Lga, Borno State. – January 2024* – Nigeria Context Analysis Team.

agricultural resources sustains the prevailing cycles of poverty and food insecurity, forcing low – income families into subsistence farming or other livelihood strategies often less sustainable.

Figure 17. Arable land use per person



Description: this chart realized by Our World in Data tries to demonstrate how the availability of arable land is increasingly shrinking in Nigeria. – *Arable land use per person.* (2024, May 20). Our World in Data. <https://ourworldindata.org/grapher/arable-land-use-per-person?tab=chart&country=~NGA>

Moreover, the phenomenon of *land grabbing* does not contribute to improving the agricultural sector. Land grabbing refers to a contentious worldwide trend of large – scale foreign government, multinational corporation, and private investor acquisition of land in mostly the developing world for agricultural, industrial, or infrastructural development. Economic profit is the main driving force for land grabbing, where investors aim to secure fertile land for food crops, biofuels, or real estate development.

States vulnerable to food insecurity, like China, South Korea, and India, and transnational agribusiness corporations undertake land grabbing activities for securing food sources or improving economic investments.⁷⁶ Host governments rationalize these deals by highlighting their prospective advantages, which encompass the creation of employment opportunities, development of infrastructure, and enhancement of agricultural output. Yet, such large – scale land acquisition is taking place without sufficient consultation and fair compensation to the affected local communities, causing serious social and economic disruption. The most vulnerable to the negative effects are the smallholder farmers, indigenous peoples, and rural communities as they get dispossessed of their ancestral lands, thereby losing access to essential resources for survival. In most instances, the shift from subsistence agriculture to commercial farming increases food insecurity instead of reducing it, as export production is prioritized over domestic nutritional demands. Further, land tenure systems in most developing countries are marred by a lack of transparency that enables influential interests to take advantage of loopholes in the law to further disenfranchise vulnerable communities. Social and environmental impacts of land grabbing are severe, such as deforestation, degradation of land, loss of customary agricultural practices and biodiversity, corruption and human rights violations, or also, food insecurity which portend negative long – term sustainability.

In Nigeria, for instance, land grabbing through the Land Use Act of 1978⁷⁷ has disproportionately marginalized rural communities as government and private investors transformed farmland into urbanization, hence undermining food security and economic

⁷⁶ Emenyonu C., Nwosu A., Eriogun H., Osuji M., Ejike O., Agbaeze C. (2017) *Analysis of Land Grabbing and Implications for Sustainable Livelihood: A Case Study of Local Government Areas in Nigeria*, *Journal of Economics and Sustainable Development*
https://www.researchgate.net/publication/325251209_Analysis_of_Land_Grabbing_and_Implications_for_Sustainable_Livelihood_A_Case_Study_of_Local_Government_Areas_in_Nigeria

⁷⁷ The Land Use Act of 1978 transfers ownership of all lands in the country to the state governments and by this act, state governments under the “public interest” pretense, take away acres of communal and family lands and share this among themselves and their foreign collaborators. – Okezie K. (2022, September 7) *Land Grabbing and Its Impacts and Forest Resources in Nigeria*
<https://lupinepublishers.com/agriculture-journal/pdf/CIACR.MS.ID.000333.pdf>

stability. In research conducted by Emenyonu et Al.⁷⁸, it was shown that in Owerri Municipal and Owerri West LGA those who were most affected were 76% male landowners, with an average age of 54. Most of them worked in the lands full time and have a family with an average of 5 people. So, taking land away from these individuals means depriving them of an important livelihood that allows the family to survive. Moreover, this phenomenon leads to increased deforestation from which Nigeria especially suffers. According to the FAO, Nigeria has the highest rate of deforestation: between 2000 and 2010, the country 31% of its forests.⁷⁹

In spite of the heightened global recognition of these challenges, existing regulatory frameworks are still weak, and local resistance movements are frequently confronted with political and legal obstacles. The solution to the problems of land grabbing involves empowering the land governance mechanisms, enhancing transparency in land deals, and enabling the local communities to protect their rights and access to natural resources.

The critical conditions in which the agricultural sector finds itself has caused a precipitous decline in the attractiveness of the agricultural field for young people. The latter poses a significant challenge to food security in a country where more than half the population is below the age of 25. The perception of farming as unprofitable, coupled with the risk of kidnapping and violence in rural areas, has driven many young Nigerians to seek alternative means of livelihood, such as petty trading, transportation, and urban labor. This transition represents a significant loss to the agricultural sector, as the exodus of young people erodes the labor force and innovative potential needed to sustain food

⁷⁸ Emenyonu C., Nwosu A., Eriogun H., Osuji M., Ejike O., Agbaeze C. (2017) *Analysis of Land Grabbing and Implications for Sustainable Livelihood: A Case Study of Local Government Areas in Nigeria*, *Journal of Economics and Sustainable Development*
https://www.researchgate.net/publication/325251209_Analysis_of_Land_Grabbing_and_Implications_for_Sustainable_Livelihood_A_Case_Study_of_Local_Government_Areas_in_Nigeria

⁷⁹ Okezie K. (2022, September 7) *Land Grabbing and Its Impacts and Forest Resources in Nigeria*
<https://lupinepublishers.com/agriculture-journal/pdf/CIACR.MS.ID.000333.pdf>

production in the face of rising demand. The agricultural situation in Nigeria is, thus, complex and urgent.

2.3 Water Resources: a current status, availability and, socio – environmental implications

Just as food production and each person's diet depend on the country's energy infrastructure, the availability of water is crucial to the supply of food, other resources and everyday life actions. Water is used in different contexts such as industry, agriculture and households and thus, water resources are fundamental to the functioning of daily life. Nigeria has enormous water resources, which are estimated at 215 billion cubic meters of surface water and 87 billion cubic meters of groundwater. However, there are wide spatial variations across the country. Most of the country's rivers are sourced from four major hydrological basins: the North Central Plateau, the Western Highlands, the Eastern Highlands, and the Uri Plateau.⁸⁰ In particular, the Niger River, which is the most important hydrological basin in the country, drains almost two – thirds of the territory, contributing 60% of the total runoff.

The third largest in the world, endowed with vast mangrove morphology and biodiversity, probably the richest in the world, is the Niger Delta. Such ecological type is not deprived of severe threats from human activities and oil exploitation in particular. As a matter of fact, over 13 million barrels of crude oil have been spilled into the environment; and now it is polluting both surface water and ground water. The consequence has been the loss of wetlands, the destruction of farmlands, and the lessening capability to support its diversified biological life.

The North – South divide in Nigeria spreads to hydrological conditions: northern Nigeria suffers acute water stress, aggravated by rising municipal demands, irrigation

⁸⁰ European Commission and UNEP GRID – Geneva Water (2021). *Nigeria | Interactive Country fiches*. [https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20\(in%202021,year%20in%202030%20%5B1%5D](https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20(in%202021,year%20in%202030%20%5B1%5D).

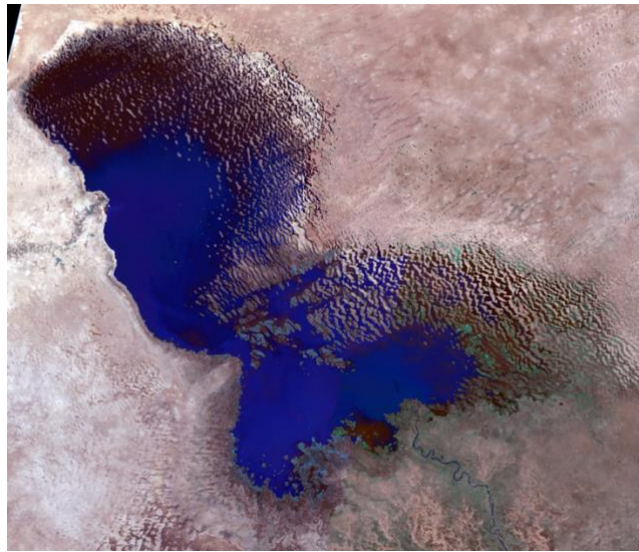
needs, and shrinking lake surfaces. For example, the Lake Chad⁸¹, which used to aggregate an area of 25,000 km² during the 1960s, under Sahelian droughts, shrunk by over 90 %. Subsequently, the lake has since partially recovered to around 14,000 km², but its shallow depths render it highly sensitive to changes in rainfall. This dynamic ecosystem is essential for grazing, agriculture, and, to some extent, fishing. However, it is still sensitive to climatic variability, therefore affecting the lives of many communities found in the northeast where 70 % of livestock is concentrated.⁸² On the other hand, southern Nigeria still experiences flooding⁸³, mostly as a result of inadequate infrastructure and poor means of livelihood.

⁸¹ The Uncertain future of the lake is tied to its geological characteristic and in particular, its shallow depth. The latter makes its coverage extremely dependent on precipitation patterns with significant implications for agriculture, grazing and fishing. Furthermore, the reduction in surface area of the lake has brought increasing strain on the livelihoods based on resources from the lake, hence exacerbating wider societal problems in the region.

⁸² USAID's Sustainable Water Partnership activity (2017). *Nigeria Water Resources Profile Overview*https://winrock.org/wp-content/uploads/2021/08/Nigeria_Country_Profile_Final.pdf

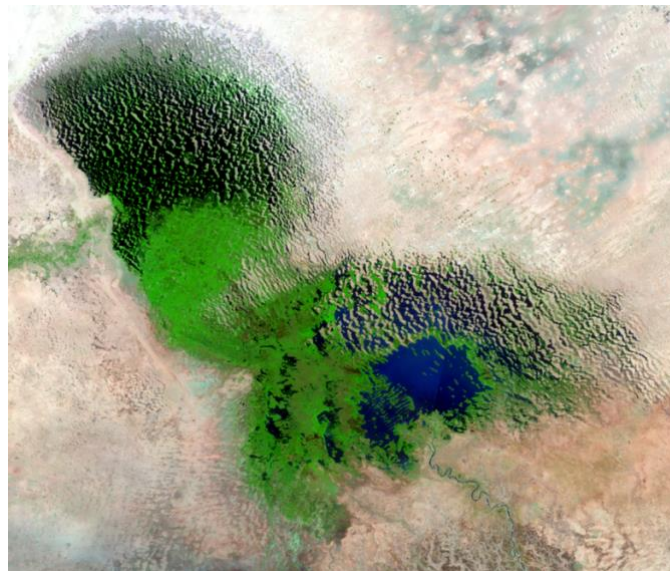
⁸³ Flood has displaced many people and caused economic losses, leading to a clarion call for better flood management systems.

Figure 18. Lake Chad amplitude in 1973



Description: An image of lake Chad in 1973 captured from Landstat 1 Satellite and published on the official website of USGS – <https://eros.usgs.gov/earthshots/lake-chad-west-africa>

Figure 19. Lake Chad amplitude 2024



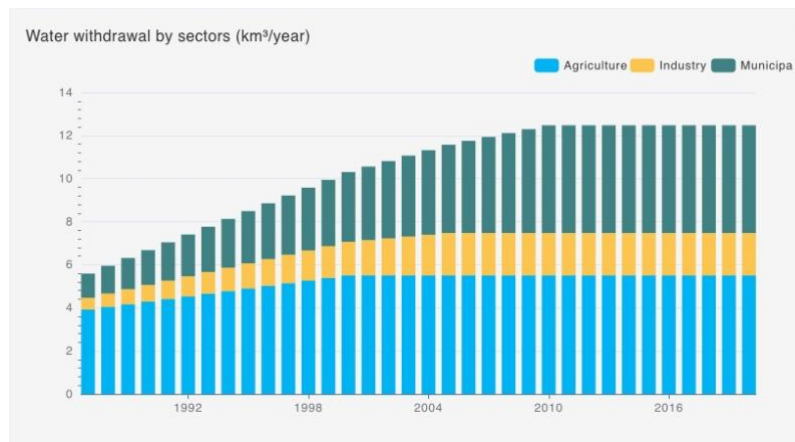
Description: An image of lake Chad in 1973 captured from Landstat 8 – 9 Satellite and published on the official website of USGS – <https://eros.usgs.gov/earthshots/lake-chad-west-africa>

	1963	2021
Lake surface (km²)	26,000 km ²	1,500 km ²
Population within the basin (million)	47,973,574	218,529,286

Description: this table was realized thanks to population data provided by the population pyramid site while the lake width data were taken from the 2022 report – Adelphi, WB, Le Monde, UNHCR, OCHA, IFRC, IOM, EC, IPCC, & WMO. (2022). *Impact of extreme weather and climate events on livelihoods and food security*.

Water requirements in Nigeria are attributable to numerous sectors, with the agricultural sector being the most significant. It accounts for 44% of the demand for water from surface sources. The domestic and municipal sectors account for 40%, and the industrial sector accounts for 16%. The remaining 41% of the total freshwater consumption is drawn from surface water sources. This constitutes the primary source for over fifty percent of water withdrawal, yet it is subject to mounting pressures stemming from excessive abstractions, inadequate recharge, and the consequences of urbanization and deteriorating wetland quality.

Figure 20. Water withdrawal by sectors



Description: this chart made by the European Commission and UNEP GRID – Geneva Water represents the water demand from 1987 until 2020. (2021) – *Interactive Country fiches.*
[https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20\(in%202021,ye%20in%202030%20%5B1%5D](https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20(in%202021,ye%20in%202030%20%5B1%5D).

“In 2021 approximately 70 million Nigerians had no access to basic drinking water services and 114 million were without basic sanitation facilities.”⁸⁴ This clearly has a very strong impact on the well – being of the population since to date, only a small portion of the population has access to hygiene services. In a study published in the *American Journal of Tropical medicine and Hygiene*, one of the most serious impacts of the latter problem on people is diarrhea. In fact, it was identified as a significant public health issue, particularly among children under five years old, where it accounts for 16 % of deaths and represents a major contributor to the national disease burden. Studies, using data from the 2018 WASH – NORM survey, show that households relying on unimproved water sources are found to have higher incidence rates of diarrhea compared to households with improved sources of water: piped water and protected wells. Usually,

⁸⁴ World Bank and Global Water Security & Sanitation Partnership (2022). *GWSP 2022 ANNUAL REPORT*
<https://documents1.worldbank.org/curated/en/099102211102224772/pdf/IDU0a8831b08028b604d070aa0104893aa4ceda2.pdf>

contaminated water is a concomitant result of improper sanitation and hygiene practices, thus increasing susceptibility to waterborne disease. The results show a clear association between water quality and health – elated outcomes, emphasizing the need for investment WASH infrastructure to reduce the incidence of diarrhea. ⁸⁵

This critical challenge that public health and environmental sustainability face in Nigeria is water contamination. One of the important resources, groundwater, is affected by heavy metals such as lead, cadmium, arsenic, and selenium, mostly in an urban city like Ibadan. The most common contaminant detected is antimony, from both natural and anthropogenic sources. Also, high concentrations of fluoride have been found in 30% of the groundwater sources, which exceed the WHO guidelines and are a threat to public health. ⁸⁶ Water contamination that is caused mainly by petroleum extraction which is getting worsened due to the use of artificial fertilizers, to reach population growth and agricultural demand:

“Such inorganic fertilizers are washed down by rain into stagnant ponds and pools of water on the plain and also into storage reservoirs. The sudden increase in nutrients in the water generates excessive growth of phytoplankton. Such blooms could be both advantageous and disadvantageous to the fishery, in the sense that if the water contains fish that feed on algae (e.g. tilapia, Labeo , etc.), the algae would be exploited to the benefit of the fishery. Excessive blooms of algae, however, lead to high biological oxygen demands thus resulting in aquatic pollution as a result of drastic oxygen depletion of the water, causing much stress to the great majority of fish species, which gradually die off.”⁸⁷

⁸⁵ Adamu, I., Andrade, F. C. D., & Singleton, C. R. (2022). Availability of Drinking Water Source and the Prevalence of Diarrhea among Nigerian Households. *American Journal of Tropical Medicine and Hygiene*, 107(4), 893–897. <https://doi.org/10.4269/ajtmh.21-0901>

⁸⁶ USAID’s Sustainable Water Partnership activity (2017). *Nigeria Water Resources Profile Overview* https://winrock.org/wp-content/uploads/2021/08/Nigeria_Country_Profile_Final.pdf

⁸⁷ European Commission and UNEP GRID – Geneva Water (2021). *Nigeria | Interactive Country fiches*. [https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20\(in%202021,year%20in%202030%20%5B1%5D](https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20(in%202021,year%20in%202030%20%5B1%5D).

Presently, Nigeria is facing an increase in water and grazing land conflicts, where nomadic Fulani herdsmen and cultivated farmers are involved, primarily against each other. The conflicts have been most inhuman in the Middle Belt region, which has seen intense rivalry for fast – reducing resources leading to murderous confrontations. This “eco – violence” phenomenon best explains these conflicts, as they are instigated by shortages of environmental resources driven by climate change, desertification, and population growth. This situation seems to be the perfect representation of the Homer – Dixon model that:

“Predicts that scarcity of environmental resources and socio – political processes – such as population growth – lead to political instability and the formation of authoritarian political structures. This in turn leads to changes in the distribution of opportunities and thereby to increased violent conflict.”⁸⁸

In the north of Nigeria, decreasing rainfall and rising temperatures have encouraged desertification, reducing grazing land and water supplies. Fulani herders have been driven south into the Middle Belt in search of these, encroaching on land that has been farmed for generations by majority Christian communities. The resulting competition for land has intensified, leading to clashes that in 2016 killed more people than the Boko Haram uprising. In fact, in Nigeria’s Benue state: “92 people were killed in ten different incidents between March and June of 2022.”⁸⁹

Nigeria’s scenario is that of supply – induced scarcity as environmental degradation reduces the level of resources. There is also demand – induced scarcity as Nigeria's growing population puts pressure on available resources. Structural scarcity is a consequence of unevenly distributed resources and poor governance, exacerbating tensions. Inefficient management of water resources occurs primarily due to poor

⁸⁸ Olumba, E. E. (2022). *Nigeria’s deadly conflicts over water and grazing pasture are escalating – here’s why*. The Conversation. <https://theconversation.com/nigerias-deadly-conflicts-over-water-and-grazing-pasture-are-escalating-heres-why-193249>

⁸⁹ Ibidem.

governance and lack of infrastructure, which lead to economic water scarcity, water availability, but no access for financial or technical reasons.

In the article *Water Stress, Instability and Violent Extremism in Nigeria* written by Marcus King & Chelsea Spangler⁹⁰, the phenomenon of instability among religious groups due to inefficient water supply was addressed. Specifically, the authors focused on 3 different geographical areas: northern Nigeria, the Middle Belt, and the Niger Delta highlighting how water – related challenges in each area exacerbate existing tensions.

The Northern part of Nigeria, and the vast and ecologically fragile Sahel region in particular, has been experiencing severe and escalating environmental degradation over the past several decades. This includes large – scale desertification, where once fertile land is progressively being transformed into arid, barren wasteland due to a synergy of climate change, deforestation, and unsustainable land use. As a direct consequence of these environmental stresses, Fulani herders, who are traditionally transhumant pastoralists, are being forced to abandon their traditional grazing routes in search of new grazing and water points for their cattle. This necessity has driven them southward into Nigeria’s Middle Belt and other agriculturally fertile regions, bringing them into conflict with sedentary farming communities that also had been experiencing shortages of resources. Increasing competition over limited land and water resources has led to frequent disputes, which more often than not escalate into violent conflicts. Such conflicts have increased dramatically in recent years, fueled by ethnic and religious tensions, economic adversity, and the absence of effective conflict resolution mechanisms.

Scarcity of water in the Niger Delta is not caused by desertification but by industrial pollution from huge oil and gas exploitation. Oil spills and gas flaring have toxified rivers and lakes, destroyed fish, and rendered agricultural lands useless. This has fueled anger among residents and led to the rise of militant groups like the Niger Delta Avengers, who attack oil infrastructure and demand greater control of regional resources.

⁹⁰ King, M. & Spangler C. (2017). *Water stress, instability and violent extremism in Nigeria*. New Security Beat. <https://www.newsecuritybeat.org/2017/08/water-stress-instability-violent-extremism-nigeria/>

The authors argue that the region's conflict is not simply an economic issue but an environmental justice struggle, where marginalized communities struggle against environmental destruction caused by multinational firms and bad governance.

Chapter three

ANALYSIS OF CURRENT POLICIES AND FUTURE PROSPECTS FOR SUSTAINABILITY

3.1 Current national policies for birth control

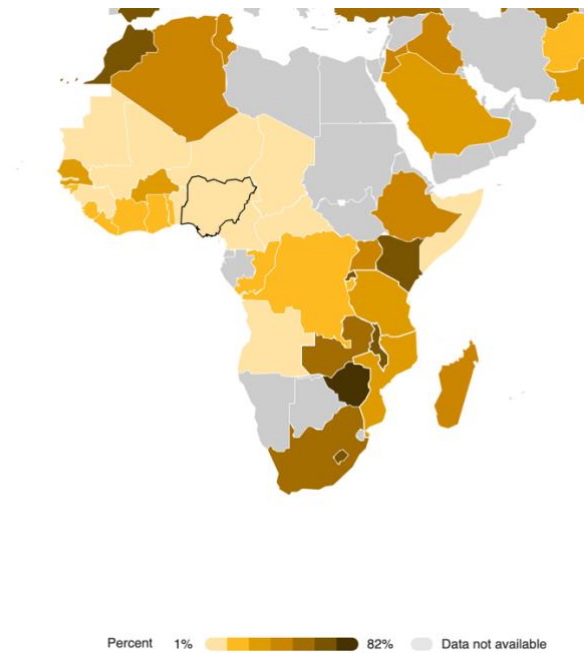
Family planning forms an integral part of Nigeria’s public health program, whose objective is to address population – related challenges, infant and maternal health, and socioeconomic development. Policies and programs designed to promote contraceptive use, expand reproductive care, and enhance access to family planning (FP) service have been developed and implemented through a coordinated collaboration between the Federal Government of Nigeria (FGON) and the Federal Ministry of Health (FMOH). One important guiding framework for such interventions is Nigeria’s Family Planning Blueprint (2020–2024), whose strategic objectives seek to expand contraceptive use and maintain a sustained delivery of FP service in the country.

The development of Nigeria’s family planning policies has been placed in a broader national and international development environment, with consideration for Sustainable Development Goals (SDGs) and family planning pledges under FP2020.⁹¹ Government acknowledges family planning as an efficient and cost – effective intervention that reduces infant and maternal deaths, averts unintended pregnancies, and empowers women through access to enhanced reproductive care options.

⁹¹ “Family Planning 2020 (FP2020) generated global commitments to make high-quality, voluntary family planning services, information, and supplies more available, acceptable, and affordable for an additional 120 million women and girls in the world's poorest countries by 2020” Health Policy Project. (2020). *FP2020*. – [https://www.healthpolicyproject.com/index.cfm?ID=topics-FP2020#:~:text=Family%20Planning%202020%20\(FP2020\)%20generated,world's%20poorest%20countries%20by%202020](https://www.healthpolicyproject.com/index.cfm?ID=topics-FP2020#:~:text=Family%20Planning%202020%20(FP2020)%20generated,world's%20poorest%20countries%20by%202020).

Before the four – year term 2020 – 2024, the Nigerian government had already provided an investment of 4 million of dollars for contraceptives in order to guarantee them to the “over 3.8 million married and sexually active adolescents (15 – 19) of whom 19 per cent have an unmet need for contraception”⁹². But looking at the figure 16, in 2018 Nigeria still had a very low contraceptive prevalence among women aged 15 – 49.

Figure 21. Contraceptive prevalence (% of women ages 15 – 49)



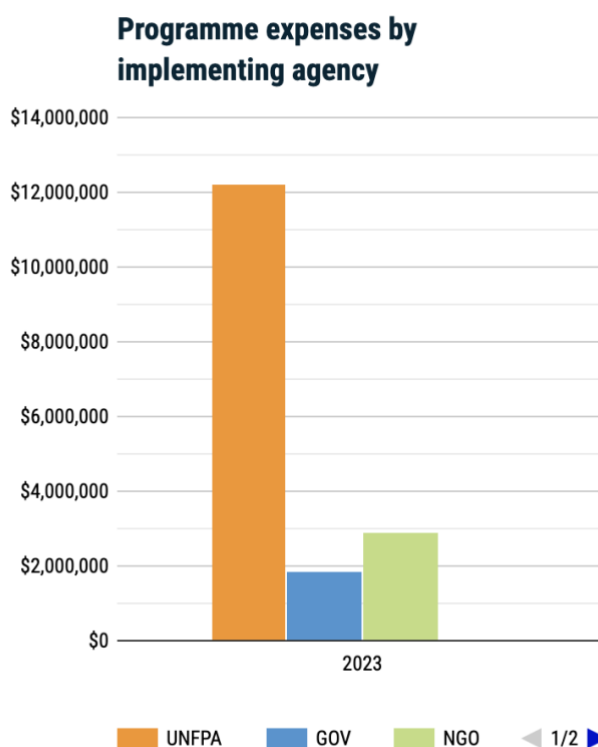
Description: this map realized by the World Bank represents with colors from yellow (1%) to brown (82%) the contraceptive prevalence, in percentage, of women ages 15 – 49. Nigeria is one of the African countries with the lowest contraceptive prevalence rate with 12%. – | World Bank. (2018) *Contraceptive prevalence (% of women ages 15 – 49)*. World Bank Gender Data Portal. <https://genderdata.worldbank.org/en/indicator/sp-dyn-zs>

Probably this, has occurred since the funds allocated were not enough and also there have been continued to be cultural barriers that prevent the correct family planning.

⁹² Vanguard (2017), FAMILY PLANNING: Nigeria allocates \$4m annually for contraceptives. <https://www.vanguardngr.com/2017/07/family-planning-nigeria-allocates-4m-annually-contraceptives/>

In this regard, the United Nation Population Fund⁹³ plays an important role since most of the funding for policy implementation comes from it, as can be seen in the chart below.

Figure 22. Program expenses by implementing agency.



Description: this chart realized by the UNPF shows from who comes the different funding to support family planning in Nigeria. – UNFPA Nigeria. (2023). UNFPA Nigeria | United Nations Population Fund. <https://www.unfpa.org/data/transparency-portal/unfpa-nigeria>

The Nigeria Family Planning Blueprint 2020 – 2024, already cited, is the strategic plan to improve access and delivery of family planning in Nigeria. This national program

⁹³ The United Nation Population Fund is an agency for sexual and reproductive health and its main aim is to ensure greater sexual education, especially in developing countries, and eliminate all gender differences and discrimination.

has been drawn on the erstwhile national work, particularly the 2014 – 2018 blueprint, as well as in – country commitments at the London Family Planning Summit⁹⁴ and the FP2020 initiative. It came to address the challenges brought about by rapid population growth, high maternal mortality, and limited access to contraceptives. It also acknowledges that efforts in family planning have been bound by cultural norms, inadequate funding, and disparities in service provision. The plan thus focuses on demand generation, service delivery expansion, supply chain efficiency, and policy and financing reforms.

A number of strategies are outlined to realize its objectives. These interventions include developing and implementing national multipurpose communication campaigns to raise awareness about modern contraceptive methods, engaging religious and community leaders to promote FP acceptability, and using digital platforms for the young. In service delivery, the blueprint ensures the training of healthcare workers, expanding FP services in most rural and underserved areas, and integrating FP into maternal and child health programs. Strengthening supply chain management is also a critical component, ensuring that contraceptive stock – outs are minimized through improved procurement and distribution systems. Additionally, the plan advocates for increased domestic financing and public – private partnerships to reduce reliance on donor funding.

The ambitious nature of the blueprint also means it is fraught with big challenges: deep – seated cultural and religious obstacles persist in certain areas. While resistance against the use of contraceptives persists; there are still considerable financial hurdles to overcome, since FP programs rely highly on external donors; a shortage of trained health care and generally weak data systems complicate service delivery and monitoring efforts . In the light of these shortfalls, the blueprint proposes deeper engagement with community and religious leaders, increased financial investment by the government, more

⁹⁴ In the London Family Planning Summit participated thirty-seven country governments, 16 private companies and 11 partner organizations with the aim to expanding access to modern forms of contraception to an additional 120 million women, with a special focus on the most marginalized and vulnerable. – United Nations Population Fund, (2017). *Family Planning* <https://www.unfpa.org/HerFuture>

health provider training, and improved monitoring of data.⁹⁵ Thus, the Nigeria Family Planning Blueprint 2020 – 2024, if well implemented, can be very instrumental in achieving improved reproductive health, gender equality, and supporting sustainable development through universal access to quality FP services.

Moreover, in this context, one of the institutions working hardest in Nigeria to face population growth is the Association for the Advancement of Family Planning (AAFP) that created the Nigeria Family Planning Conference (NFPC), a biennial meeting where experts discuss progress and possible policies to be implemented to improve the Nigerian situation. In the last conference, held in December 2024, underscored the critical role of private sector engagement in advancing Nigeria’s FP2030 commitments. Under the guidance of Dr. Abigail Msemburi, talks emphasized continued financial gaps in the country, projecting a deficit of USD 60 million for 2024. Despite having USD 40 million in FP commodities at its disposal, contraceptive use continues to have a low prevalence, between 12% and 15%.⁹⁶ According to Joachim Chijide of UNFPA, one of the biggest concerns is with regard to sustainability, citing that less than 1% of Nigeria’s general budget for health is for FP commodities, and alternative financing strategies must therefore be developed.⁹⁷

Against such financial constraints, experts have mooted increased private sector contribution. Hackathon and policy programs, for instance, are driving innovation, and domestic companies such as Fidson Healthcare and Emzor Pharmaceuticals are researching in – country production as a way to break down overreliance on imports. Dr. Ann Adah Ogoh of PSHAN underlined private sector commitment, citing a \$2.8 million investment for five million FP beneficiaries. In addition, financial inclusion programs,

⁹⁵ Federal Ministry of Health. (2020). *NIGERIA FAMILY PLANNING BLUEPRINT, 2020 –2024*.

<https://wordpress.fp2030.org/wp-content/uploads/2023/08/Final-2020-Blueprint.pdf>

⁹⁶ Matassa, M. (2024, December 6). *Moving forward: The Path to Sustainable Family Planning Solutions — FPNN: a SRHR media network*. FPNN: A SRHR Media Network.

<https://www.familyplanningnewsnetwork.org/the-fpnn-community-report/moving-forward-the-path-to-sustainable-family-planning-solutions>

⁹⁷ Ibidem.

such as WEMA Bank’s “SARA by WEMA” and “SoSo Care,” are extending access to FP for women and economically disadvantaged groups.⁹⁸

3.2 Current national policies for energy resources management and green transition

About energy crisis, despite the fact that a large part of the population does not have access to energy, it doesn’t mean that in the country there is absence of “conventional energy sources (CES) or renewable energy sources (RES).⁹⁹ Nigeria is a country heavily dependent on gas and oil for energy production because it is endowed with substantial hydrocarbon reserves, making it the largest oil producer in Africa and one of the top global producers. Consequently, when a country’s currency strengthens due to large inflows of foreign currency, non – oil exports become more expensive and less competitive. As a result, other sectors of the Nigerian economy have struggled to grow, further increasing dependence on oil. Thus, efforts have been made to diversify the Nigerian economy and reduce its dependence on the oil, between these them, investments on alternative energy sources are included.

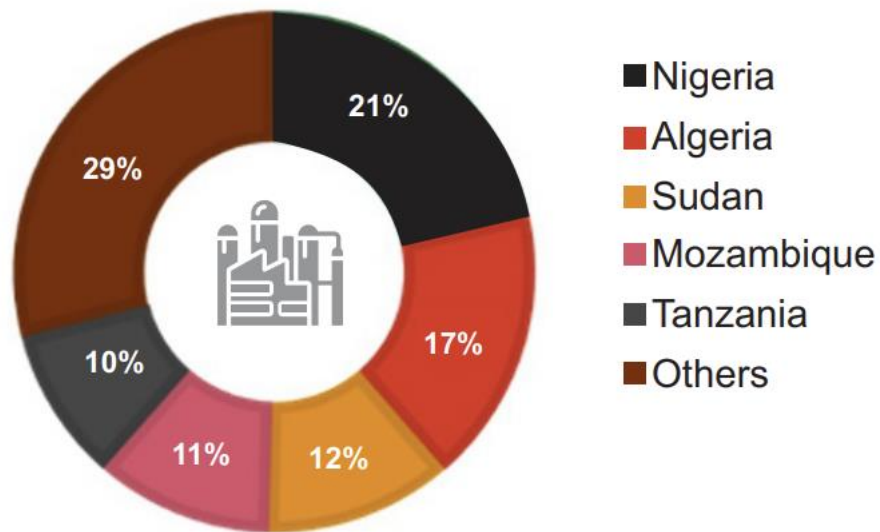
In reaction to the globe’s shift to renewable energy, the Nigerian government has embarked on leveraging its abundant gas reserves as a bridging fuel to the diversification of the nation’s energy. However, investments in long – term gas extraction projects can delay the transition to sustainability, locking the country into continued fossil fuel dependence.

⁹⁸ Matassa, M. (2024, December 6). *Moving forward: The Path to Sustainable Family Planning Solutions* — FPNN: SRHR media network. FPNN: A SRHR Media Network.

<https://www.familyplanningnewsnetwork.org/the-fpnn-community-report/moving-forward-the-path-to-sustainable-family-planning-solutions>

⁹⁹ Nalule, V. R. (Ed.). (2021, October 14). *Energy Transitions and the Future of the African Energy Sector: Law, Policy and Governance*. Palgrave Macmillan.

Figure 23. Natural gas reserves in Africa



Description: this pie chart, realized by PricewaterhouseCoopers, show in percentages the African countries with the greatest presence of natural gas. Among them Nigeria possesses the 21% of natural gas resources of the entire continent. Omontuemhen P., Akingbade A., Odunlami A., Omosomi O., Umweni K., Amazigo C. (2020). *Evaluating Nigeria's gas value chain*. In www.pwc.com/ng. <https://www.pwc.com/ng/en/assets/pdf/evaluating-nigeria-gas-value-chain.pdf>

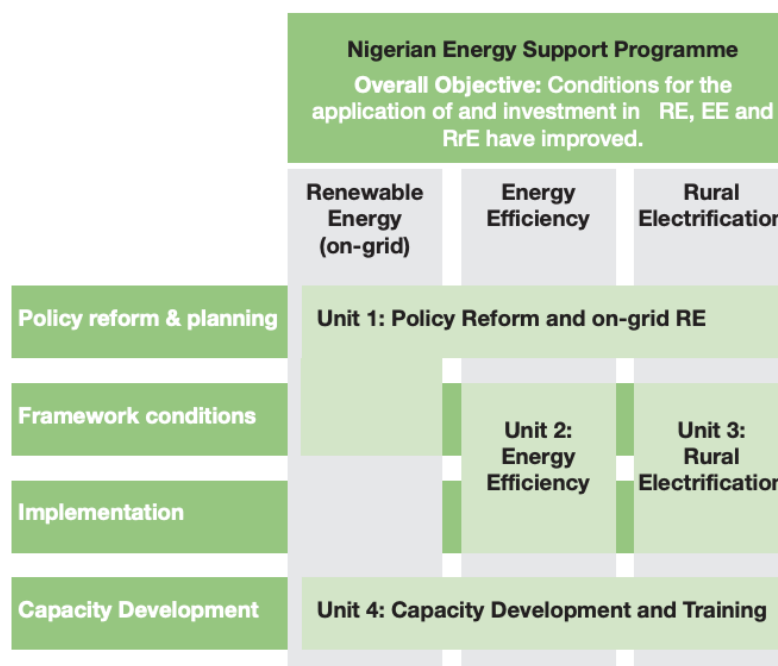
The Natural Resource Governance Institute (NRGI) plays an important part in sensitizing policymakers, civil society, and marginalized communities on the impacts of energy transition, encouraging transparency, equitable decision – making, and accountability in resource governance. In collaboration with Policy Alert and BudGIT Foundation, NRGI hosted a regional dialogue in Uyo, Akwa Ibom State, to address the fiscal vulnerabilities of oil – producing states in the Niger Delta and explore possibilities for economic diversification¹⁰⁰. The discussions underscored the imperative need for states to rein in public debt, strengthen fiscal resilience, and develop non – oil revenue

¹⁰⁰ Whistler. (2024, November 25). Diversify revenue sources, reduce debts, Oil-Rich States urged. The Whistler Newspaper. <https://thewhistler.ng/diversify-revenue-sources-reduce-debts-oil-rich-states-urged/>

sources to buffer the socioeconomic risks of the transition. Community representatives highlighted youth unemployment, poverty, ill health, and exclusion from decision – making as central concerns linked to the decline of the oil sector. The event was concluded with the launch of a policy guide to educate Niger Delta states on how to navigate the energy transition in a manner that supports inclusive economic growth.

For instance, “As part of international supports, the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development (BMZ) co – financed *Nigerian Energy Support Programme* (NESP), launched in 2013 to support renewable energy investments.”¹⁰¹

Figure 24. Nigerian Energy Support Programme infographic



Description: this infographic realized by Deutsche Gesellschaft für

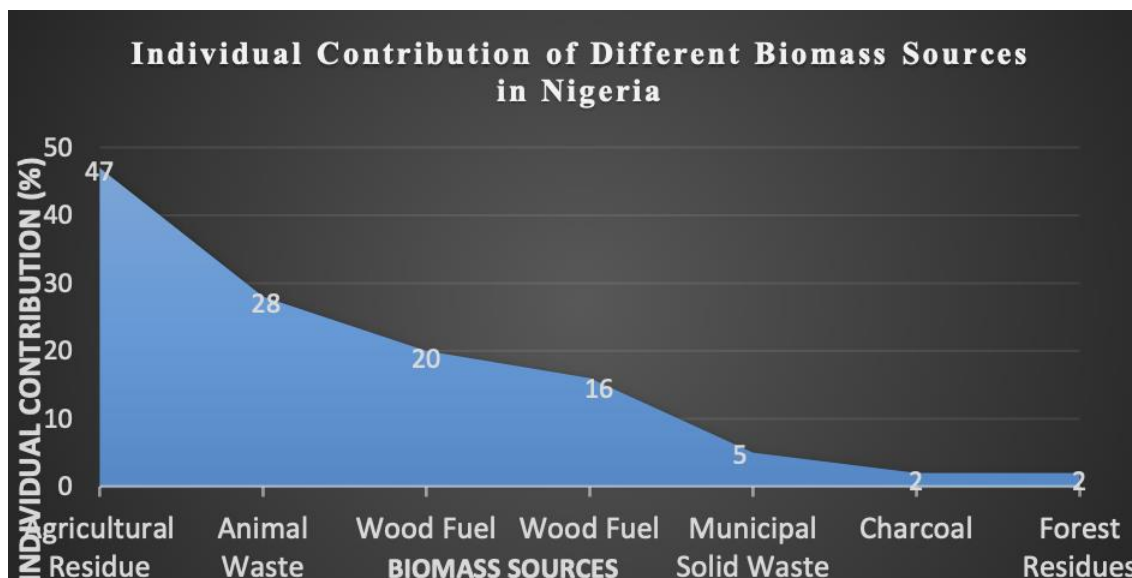
¹⁰¹ Whistler. (2024, November 25). Diversify revenue sources, reduce debts, Oil-Rich States urged. The Whistler Newspaper. <https://thewhistler.ng/diversify-revenue-sources-reduce-debts-oil-rich-states-urged/>

Internationale Zusammenarbeit shows in a summary and concise manner the structure and objectives. – Nigerian Energy Support Programme (NESP). (2015). Promoting clean energy investments in Nigeria. <https://www.giz.de/de/downloads/giz2016-en-promoting-clean-energy-investments-in-nigeria.pdf>

Therefore, to achieve energy security one of the first steps should be to invest in programs that help the country to achieve energy transition, it means a shift from a system based on fossil fuels to a system based on renewable energy sources in which carbon emissions are limited. Among the renewable energies that Nigeria has at its disposal to a great extent biomass is one of them. According to the *National Geographic* Biomass is an organic energy source made of material from living organisms, such as plants and animals and the most common biomass materials used for energy are plants, wood, and waste. It contains energy first derived from the sun, which can be transformed into usable energy through direct and indirect means. Biomass can be burned to create heat, converted into electricity, or processed into biofuel. In particular, it is considered a very advantageous source of energy as it provides very low carbon emissions and in Nigeria there is a large presence of it. In fact: “The daily biomass production in Nigeria is around 227,500 tons, which could possibly make up 6.8 million m³ of biogas. But in a more general perspective, it contributes roughly 78% to national energy consumption as primary energy”.¹⁰²

¹⁰² Nalule, V. R. (Ed.). (2021, October 14). *Energy Transitions and the Future of the African Energy Sector: Law, Policy and Governance*. Palgrave Macmillan.

Figure 25. Individual Contribution of different Biomass Sources in Nigeria

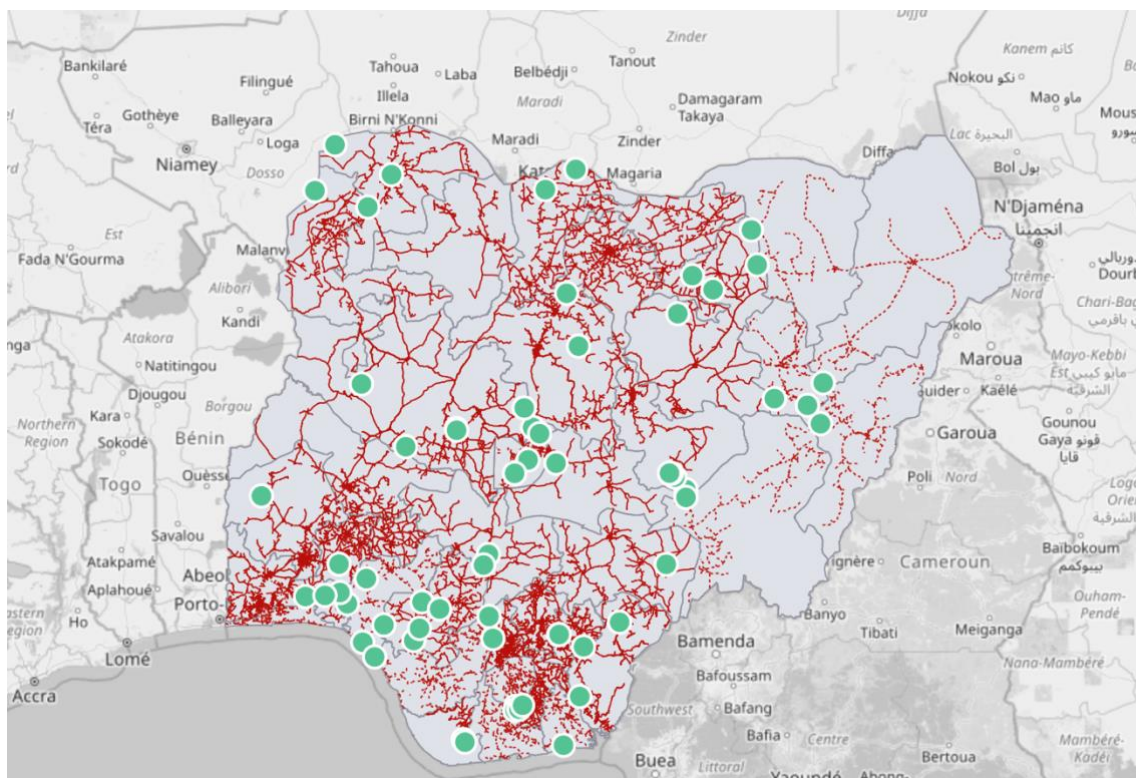


Description: This chart shows the percentage of biomass use in Nigeria in different sectors and in the present day, it is mostly the rural dwellers utilize biomass to meet their energy needs in Nigeria. – Ugwu, C. O., Ozor, P. A., Ozoegwu, C. G., Ndukwe, A., Mbohwa, C., (2022). *Biomass resources in Nigeria and the conversion pathways*. In Proceedings of the International Conference on Industrial Engineering and Operations Management <https://ieomsociety.org/proceedings/2022nigeria/142.pdf>

Nigeria has also mobilized to extend energy access to remote and rural areas, where many households experience energy insecurity. In this regard, the Rural Electrification Agency (REA) and *Rural Electrification Fund* (REF) play a pivotal role. Basically, the REF, created by the Electric Power Sector Reform Act of 2005, is a funding mechanism that fosters an interest in the balanced access to electricity among regions of Nigeria for which the subsidy in electrification would be optimized toward economic, social, and environmental benefits. It supports both on – grid and off – grid electrification, with the aim of expanding the national grid while fostering the development of decentralized renewable energy (DRE) solutions. As an implementation agency, the

REA was to ensure that efforts were being made to narrow the energy gap in Nigeria through the deployment of affordable electrification programs. Valuable initiative within the purview: AMP (Africa Mini – Grid Program), as a clean energy infrastructure project inaugurated with joint collaboration with Global Environment Facility – G.E.F and United Nations Development Programme – UNDP.

Figure 26. Electricity Grids in Nigeria



Description: This map realized by Nigeria SE4ALL shows the electricity grids in Nigeria, in which the green dots represent the mini – grid installations. – Se4all, N. (2024). SE4ALL Webmaps. https://apps.nigeriase4all.gov.ng/minigrid-offgrid?buildings_max=2000&buildings_min=100&grid_dist_max=40&grid_dist_min=5

During the last days of January was held, in Dar es Salaam, *The Mission 300 Africa Energy Summit* in which twelve African countries, including Nigeria, presented

their National Energy Compacts, with the aim to accelerate the access to energy. The country affirmed that this project aligns with the UN SDG7 and will raise electricity access from 4% to 9% per annum and clean cooking access from 22% to 25% per annum and achieve universal access to energy by 2030. The nation also plans to raise the proportion of renewable energy in its energy mix from 22% to 50%.¹⁰³ A critical part of this transformation involves the \$23.2 billion financing for last – mile electrification, with \$15.5 billion being mobilized through private sector financing. In order to realize these ambitions, Nigeria has established a strategic action plan around five areas that are critical: power generation and infrastructure development, financial viability of utilities, incentivizing private sector investment, deployment of distributed renewable energy (DRE) solutions, and increased regional integration of energy.¹⁰⁴

Recognizing the important function of clean cooking technology, the Compact also prioritizes policy actions to speed up the use of liquefied petroleum gas (LPG) and electric cooking options, particularly among women and marginalized communities. Furthermore, the Government of Nigeria is leveraging international cooperation and financing arrangements to mobilize energy infrastructure investments at an accelerated rate. The effective execution of this Compact is anticipated to speed up socio – economic growth, lessen reliance on fossil fuel, and boost environmental sustainability.

3.2 Current national policies for food security and agricultural management

In chapter two, it was explained how the governance of the agricultural sector in Nigeria a key strategic priority of the government is, owing to its central position in poverty alleviation, food security, and economic growth.

¹⁰³ World Bank/SEforALL. (2023). *NATIONAL ENERGY COMPACT FOR NIGERIA*.

<https://thedocs.worldbank.org/en/doc/2340747bcba6747a15a4ff8cba935fce-0010012025/original/M300-AES-Compact-Nigeria.pdf>

¹⁰⁴ Ibidem.

Nigeria enjoys comparative advantage in terms of climate and fertility of land, which provides good conditions for the cultivation of a broad range of crops across various ecological zones. Nevertheless, agricultural productivity is very low, as a result of numerous factors: weak agricultural mechanization, weak adoption of modern technologies, and poor access to finance.

In this regard, the government of Nigeria has instituted the Nigeria Agricultural Insurance Corporation (NAIC), which aims to mitigate the risks involved in farming through insurance programs that cushion against natural disaster occurrences and market volatility¹⁰⁵. The other driving underlying factor for government intervention is encouraging partnership between the private and public sector. The latter led to the Agriculture Promotion Policy, where the government aims at encouraging private entry into the market and its collaborations with international organizations to promote innovation and investment in agriculture.¹⁰⁶ Despite these governmental interventions, long – standing structural weaknesses, including land ownership issues, underdeveloped infrastructure, an open agricultural market, and a vulnerable judicial system, continue to hamper the growth of agribusiness in the nation.¹⁰⁷

One of the very notable programs within agricultural modernization and youth employment is the *Youth Participation in Agribusiness Programmes* (YIAP). The program is designed to involve the youth in the agribusiness sector by providing them with technical skills training, accessibility to credit facilities, and networking with businessmen. The scheme seeks to lower the commanding position of elderly farmers in the industry by promoting the entry of future generations, who possess contemporary

¹⁰⁵ Nigerian Agricultural Insurance Corporation. (2024, August 9). *history - NAIC*. NAIC - Ploughing You Back to Sustainability. <https://naic.gov.ng/history/>

¹⁰⁶ Africa, N. (2024, October 5). *Public-Private partnerships in Nigeria's agricultural development*. <https://www.linkedin.com/pulse/public-private-partnerships-nigerias-agricultural-development-nkgff/>

¹⁰⁷ Ikuemonisan, E. S. (2024). Challenges and strategies in Nigerian agribusiness entrepreneurship for sustainable development. *CABI Agriculture and Bioscience*, 5(1). <https://doi.org/10.1186/s43170-024-00303-5>

attitudes toward sustainable and innovative farming approaches.¹⁰⁸ Engagement in YIAP initiatives has demonstrated poverty alleviation among young people and improved food security nationally, with a call for enhanced policy interventions.

The program's effectiveness is built upon four key pillars:

- Entrepreneurial and agribusiness management training, which prepares participants for greater competitiveness in the labor market.
- Access to financial means and productive assets, which prepares youth for launching successful agricultural enterprises.
- Creation of professional networks and social protection systems, which strengthen investment and employment opportunities.
- Reduction of dependency on low – paid informal employment.

Additionally, the program accelerates the transition to better farming practice through the encouragement of mechanization and the absorption of innovative technologies, which are key pillars to boosting Nigeria's agricultural sector competitiveness. Research evidence indicates that empowering public – private partnerships, coupled with targeted investment in agriculture, is a viable strategy toward stimulating sustainable economic growth and eradicating socio – economic vulnerability of the youth population.¹⁰⁹

In addition, the REA program mentioned in the previous paragraph is also ensuring sustainable agricultural development. For example, the AMP does so by focusing on enhancing agricultural productivity, grain processing, and cold storage infrastructure to enable smallholder farmers to improve energy efficiency and reduce post – harvest losses.

¹⁰⁸ Amuda, Y. J., & Parveen, R. (2024). Public – Private Partnerships in driving Sustainable Agricultural Growth for Addressing Poverty and Food Insecurity in Nigeria. *Journal of Ecohumanism*, 3(4), 3228–3240. <https://doi.org/10.62754/joe.v3i4.3841>

¹⁰⁹ Ibidem.

3.3 Current national policies for water management

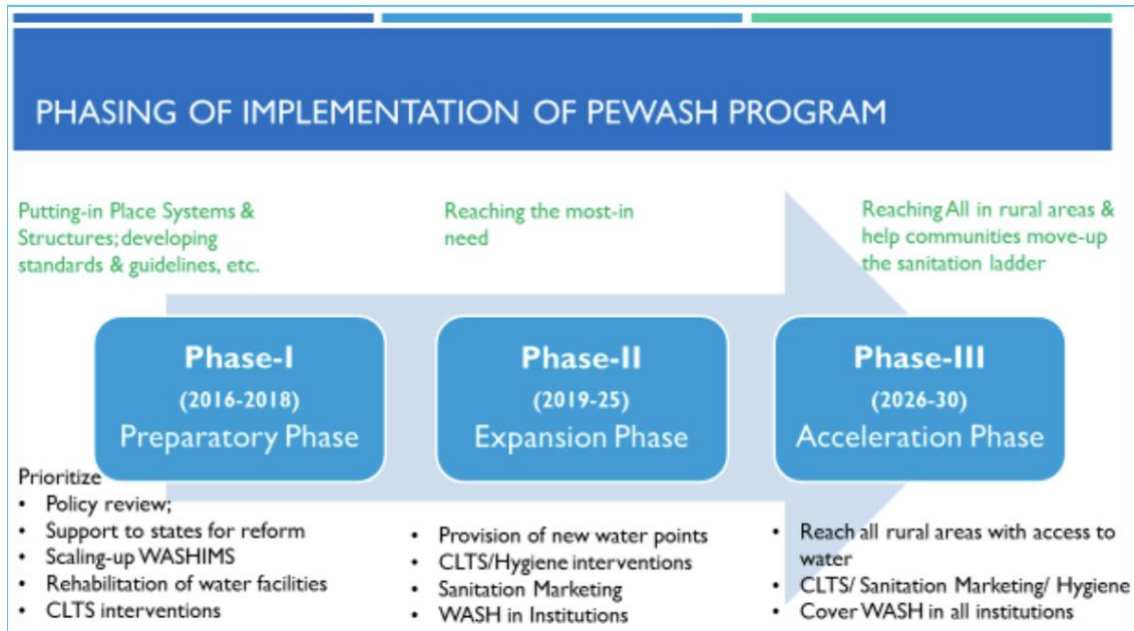
The Nigeria water resources management system is controlled by a federal structure which allocates roles at the national, state and local levels. The Federal Ministry of Water Resources (FMWR) is positioned strategically in policy making, activity monitoring, and the development of the water resources sector and has oversight function over major agencies like the River Basin Development Authorities (RBDAs), the Nigeria Hydrological Services Agency (NIHSA), and the Nigeria Integrated Water Resources Management Commission (NIWRMC).¹¹⁰ Its management is founded on major regulatory frameworks, such as the *National Water Resources Policy* (2016), the *Water Resources Master Plan* (2013), the *Water Resources Act* (1993), and the *River Basins development* (1990), that encourage an integrated water resources management strategy.

To enhance access to WASH services, the government of Nigeria has adopted a number of strategies, such as the *Partnership for Expanded Water Supply, Sanitation and Hygiene* (PEWASH), the primary strategic framework for the expansion of access to drinking water and sanitation in rural communities. It aims to achieve 100 percent rural water coverage by the year 2030 and eliminate open defecation by the year 2025, through a three – stage process of institutional strengthening, increased investment and promotion of sustainable management models.¹¹¹

¹¹⁰ European Commission and UNEP GRID – Geneva Water (2021). *Nigeria | Interactive Country fiches*. [https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20\(in%202021,year%20in%202030%20%5B1%5D](https://dicf.unepgrid.ch/nigeria/water#:~:text=It%20is%20estimated%20(in%202021,year%20in%202030%20%5B1%5D).

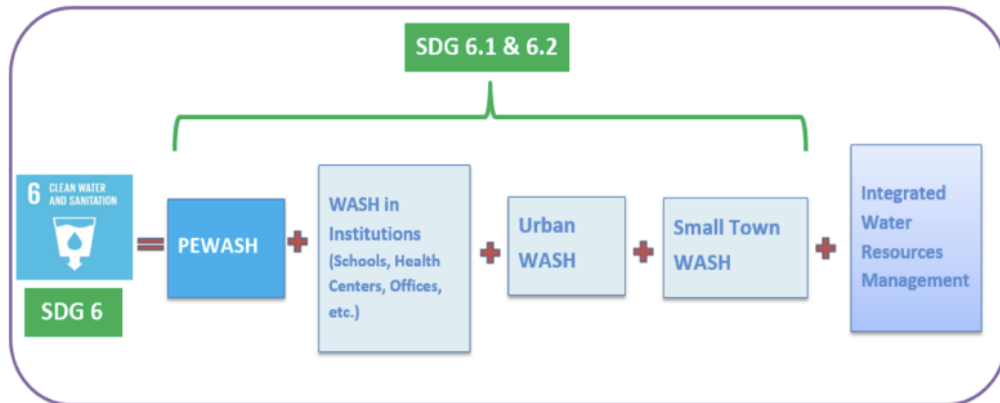
¹¹¹ Federal Ministry of Water Resources (2016). *Partnership for Expanded Water Supply, Sanitation and Hygiene*. file:///Users/utente/Downloads/PEWASH-Strategy-2016-2030-Final-Printed_1661899536.pdf

Figure 27. The three phases of PEWASH



Description: This image developed by the Federal Government of Nigeria shows the three – phase articulation of PEWASH, explaining what the goals will be for each phase. – Federal Ministry of Water Resources (2016). *Partnership for Expanded Water Supply, Sanitation and Hygiene.* file:///Users/utente/Downloads/PEWASH-Strategy-2016-2030-Final-Printed_1661899536.pdf

Figure 28. PEWASH within SDG – 6 Framework



Description: this infographic realized by the Federal Government of Nigeria explains how the PEWASH program contributes to the implementation of the sustainable development goals 6. Specifically, it contributes to the implementation of item 6.1¹¹² and 6.2¹¹³ – Federal Ministry of Water Resources (2016). *Partnership for Expanded Water Supply, Sanitation and Hygiene*. file:///Users/utente/Downloads/PEWASH-Strategy-2016-2030-Final-Printed_1661899536.pdf

From the urban point of view, the National Urban Water Sector Reform Programme, aided by the World Bank, with over 2,300 water points constructed in the urban areas and more than 6,546 sanitation facilities, and approximately 12,000 direct jobs and over 24,000 indirect jobs from these initiatives.¹¹⁴ Besides that, the program declared 33 local

¹¹² By 2030, achieve universal and equitable access to safe and affordable drinking water for all – Federal Ministry of Water Resources (2016). *Partnership for Expanded Water Supply, Sanitation and Hygiene*. file:///Users/utente/Downloads/PEWASH-Strategy-2016-2030-Final-Printed_1661899536.pdf

¹¹³ By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations - Federal Ministry of Water Resources (2016). *Partnership for Expanded Water Supply, Sanitation and Hygiene*. file:///Users/utente/Downloads/PEWASH-Strategy-2016-2030-Final-Printed_1661899536.pdf

¹¹⁴ World Bank (2021, May 26). *Nigeria: Ensuring Water, Sanitation and Hygiene for All*. <https://www.worldbank.org/en/news/feature/2021/05/26/nigeria-ensuring-water-sanitation-and-hygiene-for-all>

government areas open defecation – free across nine states. The parallel *Nigeria Sustainable Urban and Rural Water Supply, Sanitation and Hygiene* (SURWASH) is aimed at ensuring basic water services for 6 million citizens, increasing access to sanitation for 1.4 million people, and developing WASH infrastructure in 2,000 schools and health facilities.

While progress has been made, structural challenges remain these involve poor coordination from institutions, inadequate investment, and limited technical capacity and would require the strengthening of the governance system and improved financial resources to ensure effectiveness and sustainability of the initiatives.

3.4 China as an example for African countries and Nigeria

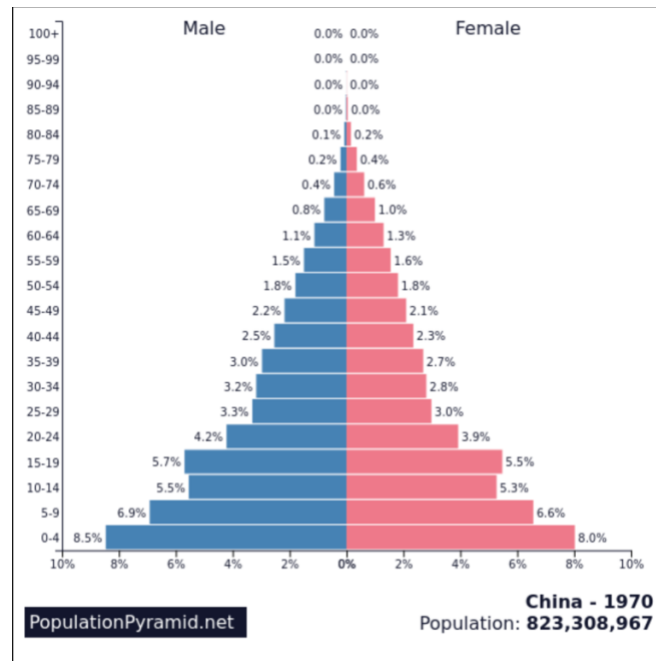
As evident from reading this paper, demography plays a crucial role in a country's economic and social development. Although China and Nigeria are two profoundly different nations in terms of culture, governance and above all, economy, they share common demographic paths that have characterized and characterize their development trajectory. Moreover, what binds the African continent and China are economic interests. As China is experiencing the aging of its population and this:

“As China is Africa's largest external economic partner, China's preparation for this period of population ageing and how it responds to demographic change going forward will be significant for the continent. If population ageing leads to diminished fiscal resources, decreased national savings, and a stagnation of China's economic trajectory, there may be a drop in demand for African exports.”¹¹⁵

As was already explained in the first chapter, Europe experienced its demographic transition much earlier than the Asian and African continents. China's demographic transition dates back to the 1970s and was the result of a reduction in mortality and fertility rates, which added to an increase in life expectancy, promoted an increase in the working – age population.

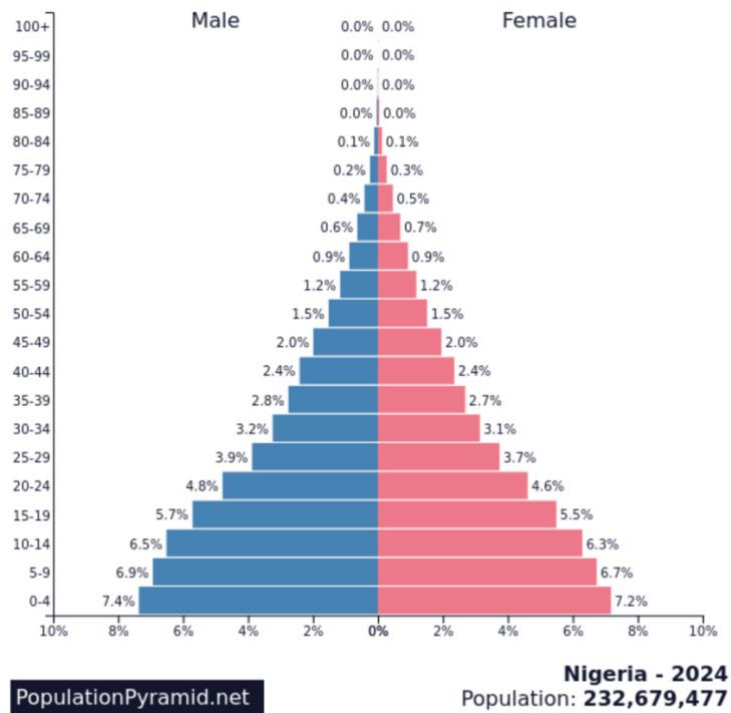
¹¹⁵ South African Institute of International Affairs. (2024b, February 1). China's Demographic Peak: Lessons and Prospects for Africa - SAIIA. SAIIA. <https://saiia.org.za/research/chinas-demographic-peak-lessons-and-prospects-for-africa/>

Figure 29. China's population pyramid in 1970



Description: this pyramid is useful for understanding the composition of China's population. It becomes clear that the country in 1970 was in a transition phase between the first and second moments of the demographic transition. – Population Pyramids of the World from 1950 to 2100. (2025). PopulationPyramid.net. <https://www.populationpyramid.net/>

Figure 30. Nigeria’s population pyramid in 2024



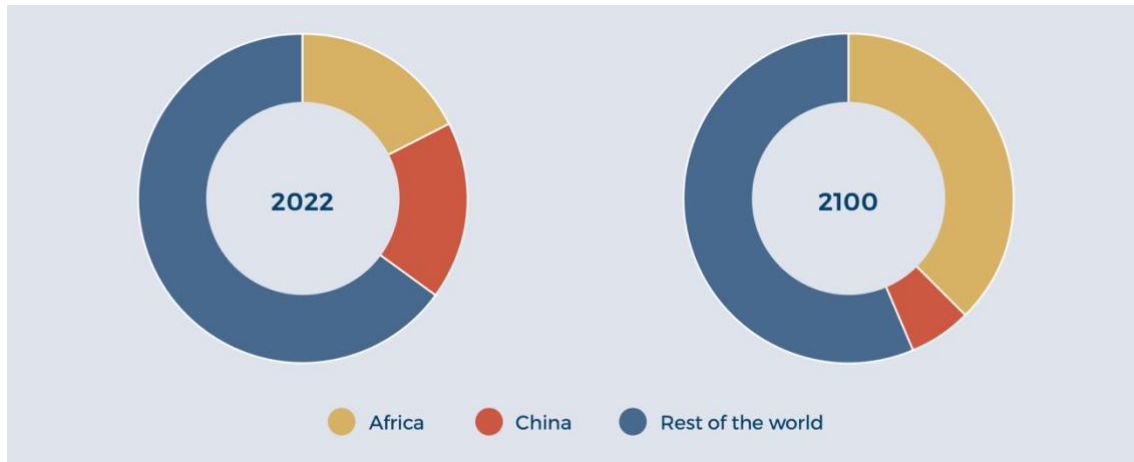
Description: this pyramid shows the structure of the Nigerian population in 2024 – Population Pyramids of the World from 1950 to 2100. (2025). PopulationPyramid.net. <https://www.populationpyramid.net/>

Currently, both China and Africa continent:

“Comprise around 17% of the world’s population – with a population of some 1.4bn each – by 2100 Africa’s population may comprise almost 38% of the world’s population and China little more than 7%. While Africa’s population will grow and remain relatively young, China’s will

decline to less than 800 million with a dramatic increase in the share of the population of those aged 65 and over”¹¹⁶

Figure 31. Regional distribution of world population, 2022 and 2100.



Description: these two pie charts show the change in population concentration percentages among three different areas: Africa, China and the rest of the world. In particular, are compared two specific years 2022 and the forecasts that have been made by the United Nations for the year 2100. – UN Department of Economic and Social Affairs, World Population Prospects 2022, <https://www.un.org/development/desa/pd/content/World-Population-Prospects-2022>

It is clear, then, that in the 1970s China was experiencing what is happening in Nigeria today: high population growth with a large youth population. And because, like the African continent today, the population far outstripped the available primary resources, China decided a decade later to adopt a drastic policy of birth control and control: the One Child Policy. This policy was the result of what happened between the 1950s and 1960s in which growth was exceptionally rapid and eventually contributed to

¹¹⁶ South African Institute of International Affairs. (2024b, February 1). *China's Demographic Peak:*

Lessons and Prospects for Africa - SAIIA. SAIIA. <https://saiia.org.za/research/chinas-demographic-peak-lessons-and-prospects-for-africa/>

serious political disorder and tragic famine.¹¹⁷ The policy, which promoted the formation of families at an older age on fairly small households, nevertheless had major repercussions on China's demography and economy. The program led to a rapid decline in the fertility rate and an increase in the working – age population¹¹⁸. What happened in China during this period is very important because it could serve as an example for Africa and especially for Nigeria, as is evident from the next two images.

Only since 2015 has the Chinese government allowed families to have more than one child. But while this revolutionary policy has had some positive effects, there have been no shortage of negative consequences. In 2024 China experienced 10.93 million deaths and 9.54 million births, leading to a net population loss of 1.39 million on the previous year. This is the third year running in terms of population reduction, following a marginal boost in births in 2023 when they were 9.02 million.¹¹⁹ The government of China is extremely concerned with the trend since it fears that in the next few decades, there will not be a sufficient labor force to drive the economy and that the already fragile pension system will just keep disintegrating. Despite all the countless attempts, including invasive ones, implemented by the Chinese Communist Party to promote births, the hoped-for results are scarce.

Presently, 22 percent are above the age of 60 years, and up to 2035, over 30 percent will be over 60 years old, like Italy. Comparing to other countries, there is low immigration in China, further contributing to the population dilemma¹²⁰. Yet a few of the measures have been extremely intrusive: in some cases, local governments have given nutritional supplements to brides and grooms to boost fertility and, in extreme

¹¹⁷ South African Institute of International Affairs. (2024b, February 1). *China's Demographic Peak: Lessons and Prospects for Africa - SAIIA*. SAIIA. <https://saiia.org.za/research/chinas-demographic-peak-lessons-and-prospects-for-africa/>

¹¹⁸ Ibidem.

¹¹⁹ Il Post. (2025, January 17). *La popolazione in Cina continua a calare* <https://www.ilpost.it/2025/01/17/popolazione-cina-calare/>

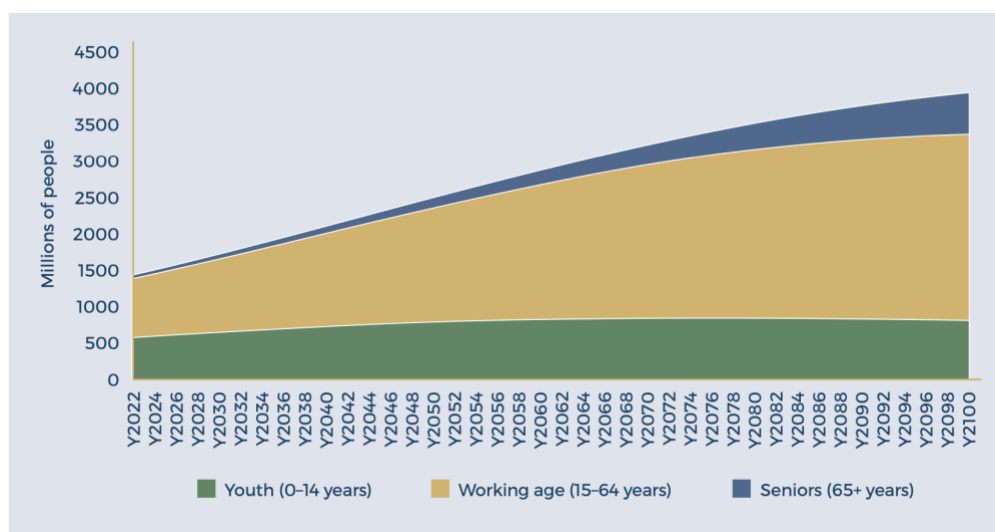
¹²⁰ Ibidem.

cases, have phoned young women up and inquired about their menstrual cycle and baby plans¹²¹.

Even with these measures, policies until now have not managed to stem the trend of declining population. For the first time since the 1950s, in 2024 China has determined to step up the retirement age gradually from 60 to 63 for men and add increases for women as well, in a bid to relieve the burden on the pension system as well as combat the challenges of an aging population.

To counter this trend, the government has adopted several strategies. In 2023, President Xi Jinping stressed promoting a "culture of marriage and pregnancy." Families with two or more children were given incentives and tax breaks, and state propaganda began to publish photos of large families. Local governments established apps and forums in some provinces to organize dating for young bachelors.

Figure 32. Population structure of Africa in the period between 2022 – 2100

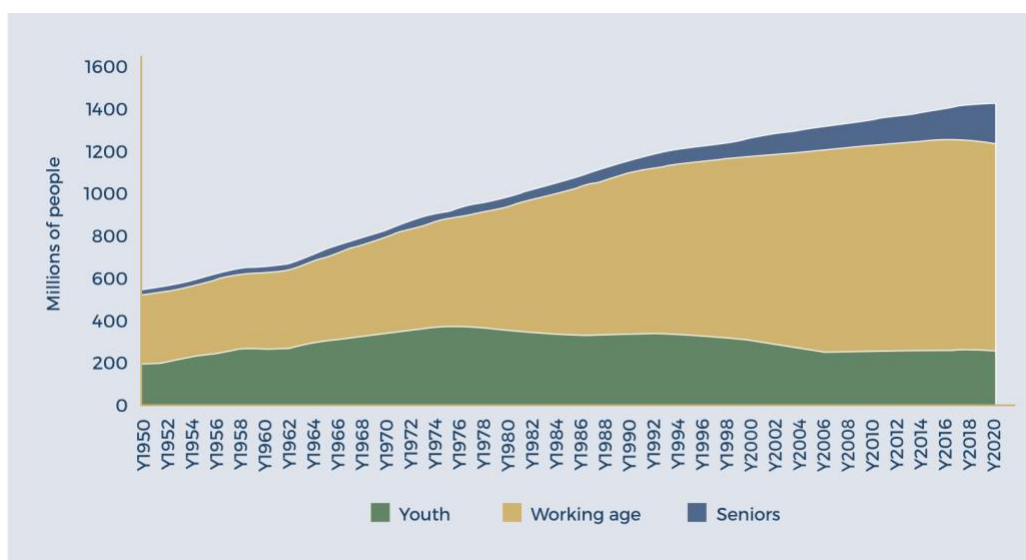


Description: this graph shows the composition of the African population over a period from 2022 to 2100 based on projections made by the United Nations. – UN

¹²¹ Il Post. (2025, January 17). La popolazione in Cina continua a calare <https://www.ilpost.it/2025/01/17/popolazione-cina-calo/>

Department of Economic and Social Affairs, World Population Prospects 2022, <https://www.un.org/development/desa/pd/content/World-Population-Prospects-2022>

Figure 33. Population structure of China in the period between 1950 – 2021



Description: this graph shows the composition of the African population over a period from 2022 to 2100 based on projections made by the United Nations. – UN Department of Economic and Social Affairs, World Population Prospects 2022, <https://www.un.org/development/desa/pd/content/World-Population-Prospects-2022>

As has already been explained, exploiting the demographic dividend is not something that happens spontaneously but as a result of the right investments, and China has known how to do this well. China’s strategy to control population growth and exploit the demographic dividend was based on a two – tiered approach. The first tier aimed to exploit the favorable demographic window by ensuring economic expansion through policies to open up and attract foreign investment, such as the establishment of Special Economic Zones (SEZs) establishing trade and modernization hubs in Shenzhen, Zhuhai, Shantou, and Xiame since 1980. In parallel, China implemented strict birth control through the one – child policy, aimed at slowing population growth and improving the

quality of the labor force. The second level has provided long – term policies to deal with the aging population, including investment in education and social security.

Figure 34. Overview of China’s economic demography transition strategy

1980–1990s	Capture demographic dividend (labour-intensive investment incentives)
	Better educate the next (smaller) cohort to ensure later elevated productivity potential
	Create population ageing commission to lead the instigation of a population ageing-preparedness agenda
2000s	Focus on preparations for elevated human welfare and elevated population dependents, such as a rising numbers of pensioners (eg, health, social security, and pensions)
	Scale up investment in science and technological capacity (to support more capital-intensive over labour-intensive growth)
2010s	Promote capital-intensive investment and investment in universities, science, and technology
	Develop active ageing-industries strategy and incentivisation (eg, equipment and services needed by the elderly; pension and wealth management industry incentives)
2020s	Push for social and economic ageing-related tech and industry innovation; push up technology value chain; and foster economic drivers to shift from labour- to capital-related factor advantages
2030s	Ensure each cohort is progressively richer and more educated than last (ie, a constant if not rising effective labour supply) to accommodate older population’s needs without derailing national development

Description: this map is useful for understanding the essential moments of China’s strategy to control births and foster the country's economic development. – South African Institute of International Affairs. (2024, February 1). *China’s Demographic Peak: Lessons and Prospects for Africa* - SAIIA. SAIIA. <https://saiia.org.za/research/chinas-demographic-peak-lessons-and-prospects-for-africa/>

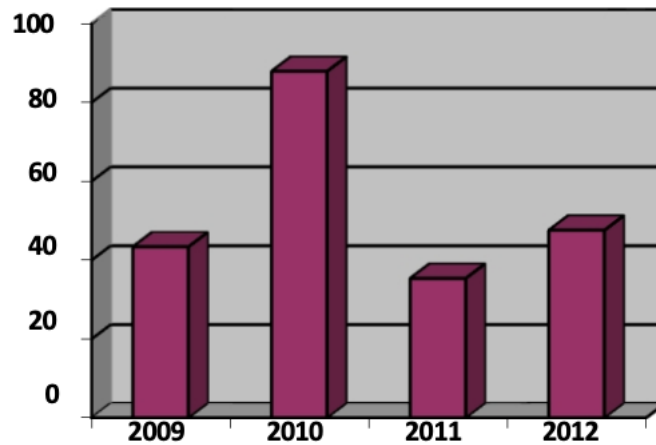
African nations, now experiencing China's 1980 youth boom, must adopt a comprehensive economic – demographic transition strategy. Unlike China, which implemented draconian family planning policies, African nations are experiencing rising life expectancy naturally. To sustain economic growth amidst future demographic shifts, they must invest in education, human capital, and technological advancement. Without it, a declining working – age population may lead to stagnation, lower living standards, and more elderly poverty.

Among the sectors that have enabled China's economic development and exploitation of this large working – age population is education. In the analysis made by Ejemezu Charles Ikechukwu in his work titled *Towards a Pragmatic System Of Education: A Comparative Study Of Nigeria 6 – 3 – 3 – 4 And Chinese 9 – 3 – 4 System*, a comparison was made between the two systems to see how the school systems differ, how much money has been allocated to foster quality education, and which one appears to be functioning better by looking at the numbers.

First, looking at the systems from a purely organizational point of view, China's education system has remained highly stable with a structure (9 – 3 – 4) that has remained unchanged since 1985. Indeed, the aim is to strengthen it over the course of years. In contrast, Nigeria has made several modifications to its educational system by changing its organization several times: from 6 – 5 – 4 to 6 – 3 – 3 – 4 to 9 – 3 – 4 and now 1 – 6 – 3 – 4. Moreover, what is evident by gazing at the graphs below is that China has invested more in education than Nigeria. “Adedayo (1988) argued that although enrolment is increasing at the primary, secondary and tertiary levels of Nigerian educational system, government's expenditure is decreasing proportionately.”¹²²

¹²² Ejemezu, C. I. & Afe Babalola University. (2015). TOWARDS a PRAGMATIC SYSTEM OF EDUCATION: a COMPARATIVE STUDY OF NIGERIA 6-3-3-4 AND CHINESE 9-3-4 SYSTEM. International Journal for Innovation Education and Research, 79–81.
https://www.researchgate.net/publication/355187890_TOWARDS_A_PRAGMATIC_SYSTEM_OF_EDUCATION_A_COMPARATIVE_STUDY_OF_NIGERIA_6-3-3-4_AND_CHINESE_9-3-4_SYSTEM

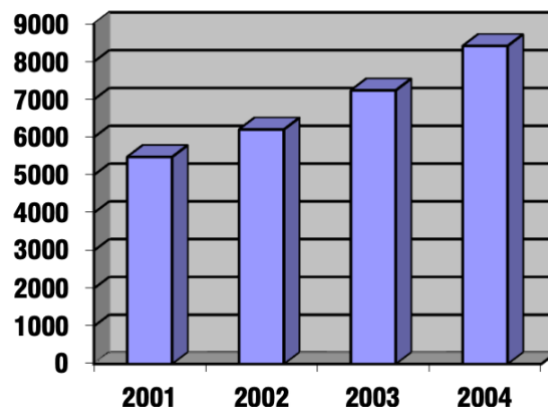
Figure 35. Federal government of Nigeria capital expenditure on education from 2009 – 2012 in billions.



Description: this graph made by the central bank of Nigeria, in the annual report of 2012, shows the investments made in education by Nigeria from 2009 until 2012. – Ejemezu, C. I. & Afe Babalola University. (2015). *Towards A Pragmatic System Of Education: A Comparative Study Of Nigeria 6 – 3 – 3 – 4 And Chinese 9 – 3 – 4 System*. International Journal for Innovation Education and Research, 79–81.

https://www.researchgate.net/publication/355187890_TOWARDS_A_PRAGMATIC_SYSTEM_OF_EDUCATION_A_COMPARATIVE_STUDY_OF_NIGERIA_6-3-3-4_AND_CHINESE_9-3-4_SYSTEM

Figure 36. Federal government of China capital expenditure on education from 2009 – 2012 (units 100 million yuan)



Description: this graph made by China Intercontinental Press, in the annual report of 2007, shows the investments made in education by China from 2009 until 2012. – Ejemezu, C. I. & Afe Babalola University. (2015). TOWARDS a PRAGMATIC SYSTEM OF EDUCATION: a COMPARATIVE STUDY OF NIGERIA 6 – 3 – 3 – 4 AND CHINESE 9 – 3 – 4 SYSTEM. International Journal for Innovation Education and Research, 79 – 81. https://www.researchgate.net/publication/355187890_TOWARDS_A_PRAGMATIC_SYSTEM_OF_EDUCATION_A_COMPARATIVE_STUDY_OF_NIGERIA_6-3-3-4_AND_CHINESE_9-3-4_SYSTEM

Not surprisingly, not much progress has been made over the years, and infrastructure still remains severely inadequate. For example, the goal in secondary school was to develop technical skills but, in many schools, there were not the proper equipment to carry out a subject such as technology¹²³. So, while education was made compulsory and free of charge on the other hand, the lack of investment continued to leave behind both students and teachers, who are not well paid and thus, motivated.

¹²³ Ejemezu, C. I. & Afe Babalola University. (2015). TOWARDS a PRAGMATIC SYSTEM OF EDUCATION: a COMPARATIVE STUDY OF NIGERIA 6-3-3-4 AND CHINESE 9-3-4 SYSTEM. International Journal for Innovation Education and Research, 79–81. https://www.researchgate.net/publication/355187890_TOWARDS_A_PRAGMATIC_SYSTEM_OF_EDUCATION_A_COMPARATIVE_STUDY_OF_NIGERIA_6-3-3-4_AND_CHINESE_9-3-4_SYSTEM

While Nigeria has been fluctuating in its investment in schools, China has increased funding for education with great results: “To further improve school enrollment, China adopts a shared – cost mechanism, charging tuition at a certain percentage of the cost according to the location/economic strength of that region. Meanwhile, to ensure that students from low – s income families have access to higher education, the government has initiated effective ways of assistance, with policies and measures as scholarships, work – study programs, subsidies for students with special economic difficulties, tuition reduction or exemption and state stipends.”¹²⁴

Thus, China has spent so much on education and vocational training to build highly skilled human capital to propel industrial growth. Africa, and Nigeria in particular, should do no less:

- Improve technical education and vocational training to meet industrialization demands.
- Focus on STEM (Science, Technology, Engineering, and Mathematics) education for the purposes of building innovation – driven economies.
- Encouraging government – industry collaboration to prepare graduates for the job market.

China has developed a human resource base with specialized technical skills, enabling its manufacturing and technological sectors to thrive. Africa, having a huge youth population, can equip its human resource base with technical fields that can drive industrial growth.

To sum up, one of the main reasons for China’s economic success has been to implement a long – term development strategy consistent with its demographic developments. This is not the case in many African countries, where policies are often short – term and subject to political change. China has maintained decades – long

¹²⁴ Ejemezu, C. I. & Afe Babalola University. (2015). TOWARDS a PRAGMATIC SYSTEM OF EDUCATION: a COMPARATIVE STUDY OF NIGERIA 6-3-3-4 AND CHINESE 9-3-4 SYSTEM. International Journal for Innovation Education and Research, 79–81.
https://www.researchgate.net/publication/355187890_TOWARDS_A_PRAGMATIC_SYSTEM_OF_EDUCATION_A_COMPARATIVE_STUDY_OF_NIGERIA_6-3-3-4_AND_CHINESE_9-3-4_SYSTEM

development plans focused on industrialization, infrastructure, education, and economic extrapolation. African countries, including Nigeria, should develop more complex and comprehensive policies, fostering economic, technological, and social development.

CONCLUSION

The research carried out in this thesis brought out the far – reaching effects of population growth on Nigeria’s primary resources’ sustainability. This population swelling, from approximately 55 million in 1970 to over 230 million in 2024, has subjected energy, water, and food to unprecedented stress, compromising the nation’s socioeconomic and environmental stability.

With a population set to grow to nearly 400 million by 2050, Nigeria has the potential to realize its demographic dividend through economic development. However, the demographic dividend of an economic boom that occurs when a nation transitions from a high – fertility age structure to a predominantly working – class age structure currently remains out of reach due to a number of structural, social and environmental obstacles. A successful demographic transition can transform Nigeria into an emerging economic superpower, like China in the late 20th century. However, the country lags behind in some crucial investments in education, industrialization and infrastructure to take advantage of its young population. In contrast, China, through its push for education, workforce training and economic reforms, has turned the population explosion into an asset. Nigeria’s underinvestment in education, particularly in STEM education, greatly limits its potential to possess an educated workforce, preventing it from achieving the productivity levels needed for sustainable development.

Despite some reduction in fertility rates, deep – seated cultural and religious values sustain high birth rates, particularly in the northern states. Patriarchal values limit women’s agency in reproductive decision-making, access to contraception, and education. Ethnic identities, particularly among Hausa groups, discourage family planning, and early marriage and polygamy remain prevalent. Women's empowerment, education, and access to reproductive health services are priority policy areas that require urgent attention.

Nigeria’s chronic electricity shortages and overreliance on fossil fuels crippled its industrial base, prompting businesses to relocate to countries like Ghana with more stable

energy access. Corruption, vested interests, and mismanagement of generator imports continue to undermine energy sector reforms. Unlike China, which aggressively built out renewable energy and industrial power infrastructure, Nigeria continues to utilize outdated energy grids, limiting its industrialization potential. A significant majority of Nigerians, particularly those in rural communities, still depend on environmentally damaging energy sources like wood and coal, with serious consequences for public health and the environment. Energy transition programs like the NESP and the REF are crucial steps towards increased sustainability. These initiatives, nevertheless, need to be properly funded, have improved institutional coordination, and improved infrastructure in order to achieve concrete outcomes.

Population pressures, land degradation, and climate change have all taken a toll on Nigeria's agricultural productivity significantly. Foreign multinational companies' land grabbing, coupled with ineffective rural development policies, resulted in local farmers' displacement, further adding to food shortages. The trend mirrors China's aggressive approach to land acquisition, with Chinese enterprises occupying vast farmlands abroad as they monopolized food sources for domestic use. Nigeria, on the other hand, is faced with increasing dependency on food imports, which makes it vulnerable to market trends globally.

Water shortage has emerged as a leading source of conflict in Nigeria, particularly in the Middle Belt, where Fulani pastoralists and settled farmers compete for dwindling grazing land and water. Climate change has exacerbated droughts in the north while flooding ruins livelihoods in the south, generating a complex humanitarian emergency. The shrinkage of Lake Chad, which was once a lifeline for millions of individuals, is a physical representation of a water crisis that jeopardizes the nation's food security and social stability.

The third chapter of this thesis critically analyzes Nigeria's policy responses to these crises in depth. However, amid the sequence of government efforts at birth control, energy conservation, food security, and water management, policy

implementation is poor, largely due to corruption, bureaucratic ineptness, and political instability.

The government's mitigation measures, including PEWASH and SURWASH, are intended to provide universal access to safe water and sanitation by 2030. Nonetheless, the success of these initiatives will be determined by whether institutions can surmount existing structural weaknesses and the political will to adopt meaningful water management reforms.

The other important dimension that came out of this study relates to the relationship between population growth and sustainable development. The high fertility in Nigeria, driven by cultural and religious factors, has made it challenging to have successful family planning policies. While some advances have been achieved with the launch of the FP Blueprint 2020 – 2024, low rates of contraceptive use and cultural opposition remain major challenges. Education access, especially for women, and encouraging awareness initiatives are some of the most significant factors in discouraging high birth rates and supporting more equitable population growth.

Nigeria's future prosperity hinges on whether it can capitalize on its demographic potential while tackling urgent environmental and economic issues. While China tapped its demographic boom through education, industrialization, and infrastructure, Nigeria is stuck in a cycle of population increase without proper management of resources.

With timely policy intervention, Nigeria can be confronted with a demographic advantage rather than a demographic disaster. Distrust of provision of employment opportunities, education, and basic public services will encourage more economic emigration, greater social conflict, and expanding environmental degradation. But deliberate enhancement of the governance system, investing in people, and conserving the natural resources for the current and future are bound to allow Nigeria to realize the demographic challenge to attain prosperity and social transformation.

In conclusion, Nigeria stands at a crossroads: to remain on the trajectory of the existing unsustainable model of development, with the attendant danger of resource exhaustion, or to take an avenue of balanced and sustainable development that can guarantee prosperity for generations to come.

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