Analyzing Nigeria's Journey Towards Sustainable Development Goals: A Comprehensive Review From Inception to Present

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Abstract

Rationale: This study critically examines Nigeria's journey towards the Sustainable Development Goals (SDGs) since their inception. Nigeria, a United Nations member state and a major oil producer, faces challenges like socio-economic disparities, political instability, corruption, and prevalent poverty, despite its cultural richness and natural resources. **Objectives:** The primary aim is to evaluate Nigeria's alignment with the SDGs within its national development frameworks, highlighting the significance of these goals in addressing the country's multifaceted developmental challenges. These challenges span various sectors including poverty, health, education, and environmental sustainability. **Methods:** The study conducts a detailed analysis of Nigeria's background, including its cultural diversity and developmental hurdles. It reviews national policies and initiatives, notably the Economic Recovery and Growth Plan (ERGP), and the role of the Ministry of Budget and National Planning in coordinating SDG efforts. **Results:** Findings suggest partial progress in SDG integration within Nigeria's development plans. While some strides have been made in areas like policy alignment and strategic planning, challenges persist in effective implementation and tackling systemic issues like inequality and corruption. **Conclusion:** The analysis reveals that, while Nigeria has made efforts to incorporate the SDGs into national policies, significant gaps remain in addressing key challenges. The complexity of Nigeria's socio-economic and political landscape presents both hurdles and opportunities for sustainable development. **Recommendations:** The study advocates for more robust policy implementation, enhanced stakeholder engagement, and targeted strategies to overcome specific challenges. By addressing these areas, Nigeria can accelerate its progress towards the SDGs, paving the way for comprehensive and sustainable national development.

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1. Introduction

In 2015, the United Nations Member States, in a unanimous decision, adopted the Sustainable Development Goals (SDGs). This pivotal step marked a global commitment to tackle the most pressing challenges confronting nations worldwide. These challenges span a broad spectrum, encompassing social, economic, and environmental issues. Crucially, the SDGs are not just an extension but a significant enhancement of the Millennium Development Goals (MDGs), which were established in 2000 and concluded in 2015 [1][2][3][4][5][6][7][8][9][10]. As the most populous country in Africa and a pivotal member of the United Nations, Nigeria holds a crucial position in the successful implementation of the SDGs, particularly in the West African region. This nation, renowned for its rich cultural tapestry and abundant natural resources, faces a paradox. Despite its status as a major oil producer, Nigeria grapples with profound socio-economic disparities, political instability, corruption, and pervasive poverty [1][2][11][12]. Recognizing the SDGs' comprehensive nature, Nigeria has embarked on a journey to align its national development plans with these global goals. The SDGs provide a multifaceted framework that encompasses a wide array of objectives. These include poverty eradication, hunger elimination, promotion of health and well-being, ensuring quality education, achieving gender equality, and providing clean water and sanitation. The goals also focus on affordable and clean energy, economic growth, industrial innovation, reduction of inequalities, development of sustainable cities, responsible consumption, climate action, and preservation of terrestrial and aquatic life. In essence, these goals strive to foster peace, justice, robust institutions, and global partnerships [13][14][15][16][17][18][19][20][21][22].

In its commitment to the SDGs, Nigeria has demonstrated strategic foresight by developing the National Economic Recovery and Growth Plan (ERGP). This plan resonates with the SDGs' ethos, outlining key strategies for achieving sustainable and inclusive growth. Furthermore, the establishment of the Ministry of Budget and National Planning symbolizes Nigeria's

dedication to overseeing the SDGs' implementation and coordination at a national level [11]. Analyzing Nigeria's progression towards these ambitious goals is not just critical but indispensable. It offers a lens to evaluate the effectiveness of existing policies and programs, pinpoint areas of success, and importantly, understand and address existing challenges. Such a comprehensive analysis will not only shed light on Nigeria's current achievements and gaps but also unveil potential opportunities for the nation's sustainable development journey [11]. Thus, this article aims to provide a thorough analysis of Nigeria's journey towards the SDGs since their inception. By dissecting and understanding the nuances of Nigeria's approach, this analysis hopes to contribute valuable insights into the country's ongoing efforts and potential pathways towards realizing these pivotal global objectives in the following areas namely: education, gender equality, and water and sanitation, emphasizing the importance of concerted efforts, strategic investments, and policy interventions in these critical areas.

2. Goal 1: No Poverty

According to recent data from the World Bank, Nigeria's efforts in diminishing poverty rates since embracing the Sustainable Development Goals (SDGs) have been modest at best. The statistics paint a stark picture: in 2015, the year the SDGs were adopted, 40.1% of Nigeria's population was living below the national poverty line [12]. Four years later, in 2019, this percentage remained unchanged, underscoring the persisting challenge of poverty in the country. Despite these discouraging figures, the Nigerian government has not been passive. Various poverty alleviation programs have been initiated, aiming to mitigate the severity of poverty and improve living conditions. These programs signify the government's commitment to tackling this pervasive issue, albeit with limited success so far [12]. At the heart of the SDGs, Goal 1 stands out with its ambitious aim: to completely eradicate poverty in all its forms and dimensions. This goal aligns directly with Nigeria's pressing need to address its poverty crisis. To provide a clearer understanding of Nigeria's journey towards this goal, Table 1 is presented below. This table offers a detailed analysis, shedding light on three critical aspects: the current status of poverty in Nigeria, the specific efforts undertaken by the government in response to this challenge, and the various obstacles that have hindered progress in alleviating poverty across the nation. By delving into these aspects, Table 1 not only highlights the strides made but also emphasizes the gaps and challenges that remain. This in-depth examination serves as a vital tool for policymakers, stakeholders, and researchers in understanding the complexities of poverty in Nigeria, evaluating the effectiveness of current strategies, and identifying areas that require more focused interventions. In summary, while Nigeria's journey towards achieving SDG Goal 1 has been fraught with challenges, the government's ongoing efforts and the comprehensive analysis provided in Table 1 underscore a continued commitment to this critical goal. Understanding and addressing the multifaceted nature of poverty in Nigeria is essential for making meaningful progress towards a more equitable and prosperous future for all its citizens.

Table 1. Goals Indicators and Targets

S/N	SDGs Indicators	Baseline 2005	Derived (2020) Benchmark	2030 Target
1.	Proportion of the Population below the international poverty lines, disaggregated by sex, age group, employment status & geographical location (Urban/Rural)	62.6	41.8	0
2.	Proportion of the population living below the national poverty line, disaggregated by sex and age	62.6	41.8	0
3.	Proportion of men, women & Children of all ages living in poverty in all its dimensions according to the national definitions	42.2	35.2	21.1
4.	Proportion of the population living in households with access to basic services (Improved sanitation)	60.3	73;6	100
5.	Proportion of the population living in households with access to basic services (Improved water sources)	69.6	79.7	100
6.	Number of deaths, missing people, injured, relocated or evacuated due to disaster per 100, 000 people. This indicators is classified into three parts, namely: 1) Deaths, 2) Missing people 3) Affected by way of injury, relocation or evacuation	5.07	2.61	0

Adapted from National Bureau of Statistics NBS[23]

Current Situation

According to comprehensive data and analysis from the World Bank, Nigeria's progress in reducing poverty rates since embracing the Sustainable Development Goals (SDGs) has been notably limited, as evidenced by various studies and reports [12][24][25][26]. When the SDGs were adopted in 2015, a pivotal year marked by global commitments to reduce poverty and inequality, Nigeria's national poverty rate was alarmingly high. Approximately 40.1% of the population, nearly half of all Nigerians, were living below the national poverty line (see figure 1a & b below). Using the 2022 National Multidimensional Poverty Index (MPI) report to evaluate poverty across health, education, living standards, and work and shocks reveals that 63% of Nigeria's population resides in poverty. This alarming statistic implies that a substantial 6 out of every 10 Nigerians experience multidimensional poverty, highlighting a significant distance from attaining Goal 1 of the SDGs. This statistic was a stark indicator of the widespread economic challenges and disparities faced by a significant portion of the country's population. Despite ongoing efforts and initiatives aimed at poverty reduction, the situation remained largely unchanged as of 2019. The poverty rate, steadfast at 40.1%, highlighted a concerning stagnation in economic improvement for the most vulnerable segments of Nigerian society. This stagnation is particularly noteworthy given the period's global and national emphasis on poverty reduction as a key objective of the SDGs.

The persistence of this high poverty rate raises several critical questions about the effectiveness of the strategies employed by Nigeria in addressing this issue. It underscores the complexity of poverty in Nigeria, which is exacerbated by factors such as regional disparities, economic volatility, and socio-political challenges. These factors contribute to the difficulty in significantly reducing poverty levels, despite the country's abundant natural resources and potential for economic growth. Moreover, this unchanging poverty statistic reflects broader systemic issues within the country, including income inequality, lack of access to quality education and healthcare, and insufficient social safety nets. These challenges are compounded by external factors such as fluctuating oil prices and global economic trends, which have a direct impact on Nigeria's economy [24][25][26].

In light of these findings, it becomes clear that tackling poverty in Nigeria requires a multi-faceted approach. This approach should not only focus on immediate economic relief but also on long-term sustainable development strategies that address the root causes of poverty. Efforts need to be intensified in areas such as education, healthcare, infrastructure development, and economic diversification to create a more inclusive and equitable society. In conclusion, while Nigeria's commitment to the SDGs represents a positive step towards addressing poverty, the unchanging poverty rates indicate a need for a more effective and

holistic approach. By addressing the underlying causes and implementing comprehensive strategies, Nigeria can make significant strides towards reducing poverty and achieving the broader goals set forth in the SDGs.
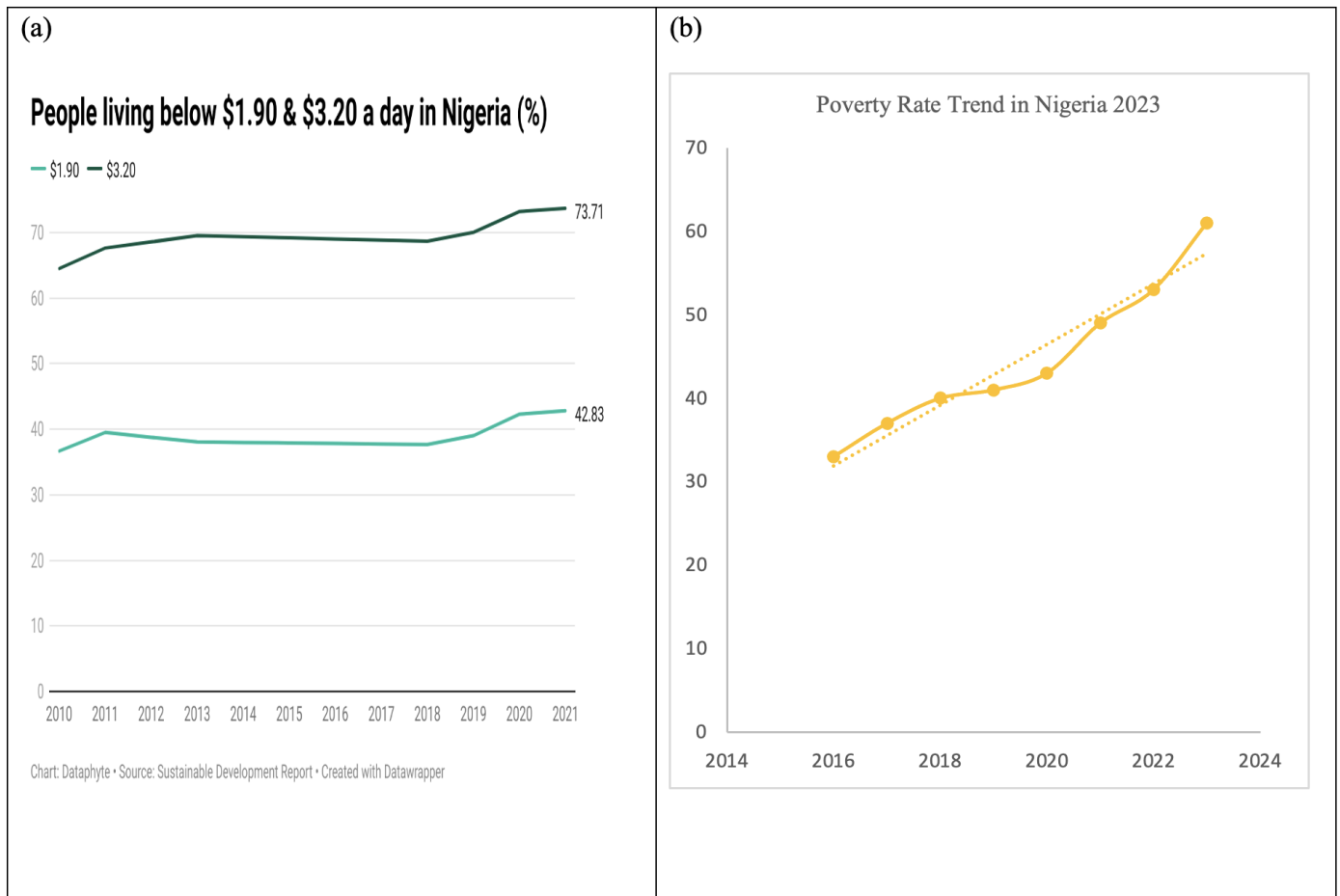

Figure 1. (a, b) People living below $1.90 & 3.20 a day in Nigeria as well as poverty rate trends in Nigeria.

Source: Adapted and modified from World bank [12][27], Dataphyte [28]

Efforts by the Nigerian Government

In a proactive response to the dire poverty situation, the Nigerian government has launched several initiatives under the umbrella of poverty alleviation programs, designed to ameliorate the living conditions of its citizens. A key component of these efforts is the National Social Investment Program (NSIP), which has been formulated with multiple facets, each targeting different aspects of poverty and striving for greater social inclusion [12][24][25][26]. One critical element of the NSIP is the Conditional Cash Transfer program. This initiative directly targets vulnerable households, providing them with cash transfers intended to ease their immediate financial burdens. The overarching objective of this program is twofold: firstly, to offer a lifeline to those in dire economic straits, and secondly, to establish a foundation for long-term social protection for society's most at-risk individuals [12]. Another significant arm of the NSIP is the National Home-Grown School Feeding program. This innovative program is not just about combating poverty; it also addresses malnutrition by offering free meals to primary school children. The dual focus of this initiative is strategic – while alleviating immediate hunger, it simultaneously seeks to enhance educational outcomes for children from low-income families. By doing so, the program aims to create a virtuous cycle where improved nutrition leads to better educational performance, which in turn can be a key factor in breaking the cycle of poverty [12].

However, despite the well-intended design and objectives of these programs, their implementation has faced significant challenges. Reports and critiques have pointed out that the National Home-Grown School Feeding program, in particular, has not lived up to its expectations. Far from achieving its goals of poverty alleviation and nutritional support, the program has been mired in issues of inefficiency and mismanagement. There have been indications that the resources allocated for this noble cause have been diverted, with the implementers of the program allegedly redirecting the funds and resources for personal gain, rather than for the benefit of the intended recipients. This misdirection of resources and efforts highlights a crucial gap in the execution of these well-meaning programs. It underscores the need for stringent oversight, transparency, and accountability in the administration of government-led initiatives. The effectiveness of poverty alleviation programs is not just in their design but in their delivery. Ensuring that these programs reach their intended beneficiaries without diversion or dilution is essential for making a tangible impact on poverty and social inequality in Nigeria. In summary, while the Nigerian government has recognized the importance of addressing poverty through initiatives like the NSIP, the challenges in implementation, particularly in ensuring effective delivery and preventing misappropriation of funds, remain significant barriers. Addressing these issues is crucial for the success of these programs and for making meaningful strides towards poverty reduction and social inclusion in Nigeria.

Challenges and Constraints

Despite the Nigerian government's concerted efforts towards poverty reduction, the journey towards achieving Goal 1 of the Sustainable Development Goals (SDGs) - the eradication of poverty - is fraught with substantial challenges and constraints. These impediments significantly hinder the country's progress and necessitate a closer examination. A primary challenge lies in Nigeria's demographic dynamics. The country is experiencing one of the highest population growth rates globally. This rapid increase in population size is outstripping the pace of poverty reduction efforts. Consequently, even if poverty rates were to stabilize, the absolute number of individuals living in poverty is projected to rise continuously. This demographic pressure underscores the urgency for more effective poverty alleviation strategies that can keep pace with, or ideally surpass, population growth rates [12][24][25][26]. Moreover, the issue of poverty in Nigeria is exacerbated by the stark inequality in the distribution of resources and opportunities. This disparity is particularly pronounced when comparing urban and rural areas. In rural regions, poverty is more acute due to limited access to essential services such as quality education, healthcare, and viable employment opportunities. The rural population, therefore, remains disproportionately affected by poverty, trapped in a cycle where lack of resources perpetuates further deprivation [12][24][25][26].

Additionally, the efficiency and impact of poverty alleviation programs are often compromised by a host of operational challenges. Limited funding is a significant hurdle, constraining the scale and reach of these initiatives. Inefficient implementation mechanisms further dilute their effectiveness, leading to suboptimal outcomes. Moreover, pervasive issues of corruption within the system can divert resources meant for poverty alleviation, severely undermining the objectives of these programs. These systemic flaws in program delivery and resource management are critical roadblocks in the path towards achieving Goal 1 [12][24][25][26]. The persistence of a high national poverty rate, despite various governmental initiatives, paints a sobering picture of the current state of affairs. The challenges of rapid population growth, unequal resource distribution, and implementation inefficiencies present complex, interconnected hurdles. To make substantial progress in reducing poverty and achieving sustainable development, Nigeria must address these challenges holistically. This requires not only the refinement of

existing strategies but also the innovation of new approaches that are scalable, sustainable, and resilient to the diverse socio-economic landscape of the country. In essence, the task ahead for Nigeria is not only to intensify its efforts in poverty reduction but also to reimagine and restructure these efforts to be more inclusive, efficient, and impactful. By doing so, Nigeria can hope to make significant strides towards eradicating poverty and moving closer to realizing the ambitious vision set forth by the SDGs.

3. Goal 2: Zero Hunger

Nigeria's standing on the global hunger index is labeled as 'serious,' as indicated by the latest data from the 2022 Global Hunger Index annual report. In 2022, Nigeria was ranked 103rd out of 121 countries, and in the 2023 global hunger index, it has further slipped to 109th out of 125 countries with sufficient data. The 2023 Global Hunger Index records a score of 28.3 (refer to figure 2 below). Notably, Nigeria has witnessed a continuous increase in undernourishment prevalence since 2015, with recent years displaying a performance even worse than that of 2001. The report highlights a 'serious' hunger level for the country, scoring 27.3 on the global hunger index, measured on a 100-point scale. The metrics employed in the global hunger index encompass undernourishment, child wasting, child stunting, and child mortality, revealing the multifaceted nature of the issue. Thus, Nigeria faces significant hurdles in achieving Sustainable Development Goal 2, which aims to eliminate hunger. Despite a slight reduction in undernourishment, dropping from 21.1% in 2013 to 20.8% in 2018, the overall situation remains deeply worrisome. The prevalence of undernourishment, despite its slight decline, underscores the persistent issue of food insecurity in the country [29]. Several factors contribute to this ongoing challenge. Poor agricultural practices are a significant impediment, hindering efficient food production and sustainable farming. Additionally, the impact of climate change has become increasingly pronounced, affecting crop yields, disrupting weather patterns, and exacerbating the vulnerabilities of the agricultural sector. Compounding these issues is Nigeria's high population growth rate, which continuously escalates the demand for food, putting additional pressure on already strained food supply systems [29][30][31][32][33][34][35][36][37][38][39][40][41][42][43]. Goal 2 of the SDGs ambitiously aims not only to eradicate hunger but to ensure universal access to safe, nutritious, and sufficient food all year round. Achieving this goal requires a multifaceted approach, addressing the root causes of food insecurity and implementing sustainable solutions. In this context, Table 2 provides a critical analysis of Nigeria's challenges in achieving zero hunger. The table presents an in-depth examination of the current state of food security in Nigeria, identifying key contributing factors to the country's food insecurity, and evaluating the initiatives undertaken to mitigate these issues. This analysis includes an exploration of Nigeria's agricultural policies and practices, assessing how they align with the demands of a growing population and the challenges posed by climate change. It also examines the government's strategies for boosting agricultural productivity and ensuring food availability, especially in regions most affected by hunger and malnutrition.

Furthermore, the table delves into the effectiveness of national and local initiatives aimed at addressing food insecurity. It evaluates the impact of these programs in terms of improving food access, enhancing nutritional quality, and building resilience in food systems. It also considers the role of international aid and partnerships in supporting Nigeria's efforts to achieve zero hunger. In expanding upon these points, the table underscores the complexity of the issue and highlights the need for integrated solutions that are tailored to Nigeria's unique socio-economic and environmental context. Only through a coordinated approach that addresses both immediate needs and long-term sustainability can Nigeria hope to make significant progress towards the ambitious goal of zero hunger. In conclusion, while the slight decrease in undernourishment indicates some progress, the path

towards achieving zero hunger in Nigeria is fraught with challenges. Addressing these effectively requires comprehensive strategies that encompass improvements in agricultural practices, adaptation to climate change, population management, and enhancement of food distribution and accessibility. By tackling these issues holistically, Nigeria can move closer to ensuring that all its citizens have access to the safe, nutritious, and sufficient food necessary for a healthy life.

Table 2. Goal 2 Indicators and Projected Targets

S/N	Indicators	Baseline 2015 (%)	Derived ERGP Target 2020	SDG 2030 Target
1.	Prevalence of Under nourishment	25.5	17	0
2.	Prevalence of moderate or severe food insecurity in the population based on the food insecurity experience scale (FIES)	26.4	17.6	0
3.	Prevalence of stunting (height for <- 2 standard deviation from the median of the world Health Organisation (WHO) Child Growth Standards among children under 5 years of age.	37.4	18.7	0
4.	Prevalence of malnutrition (weight for height >+ 2 or <- 2 standard deviation from the median of the WHO Child Growth Standards) among children under 5, disaggregated by type (wasting & over weight)	16.4	10.9	0
5.	Volume of production per labour. Unit by classes of farming/pastoral/forestry enterprises size.		33.3	100
6.	Percentage of agricultural areas under sustainable agricultural practices	56.6	71.1	100

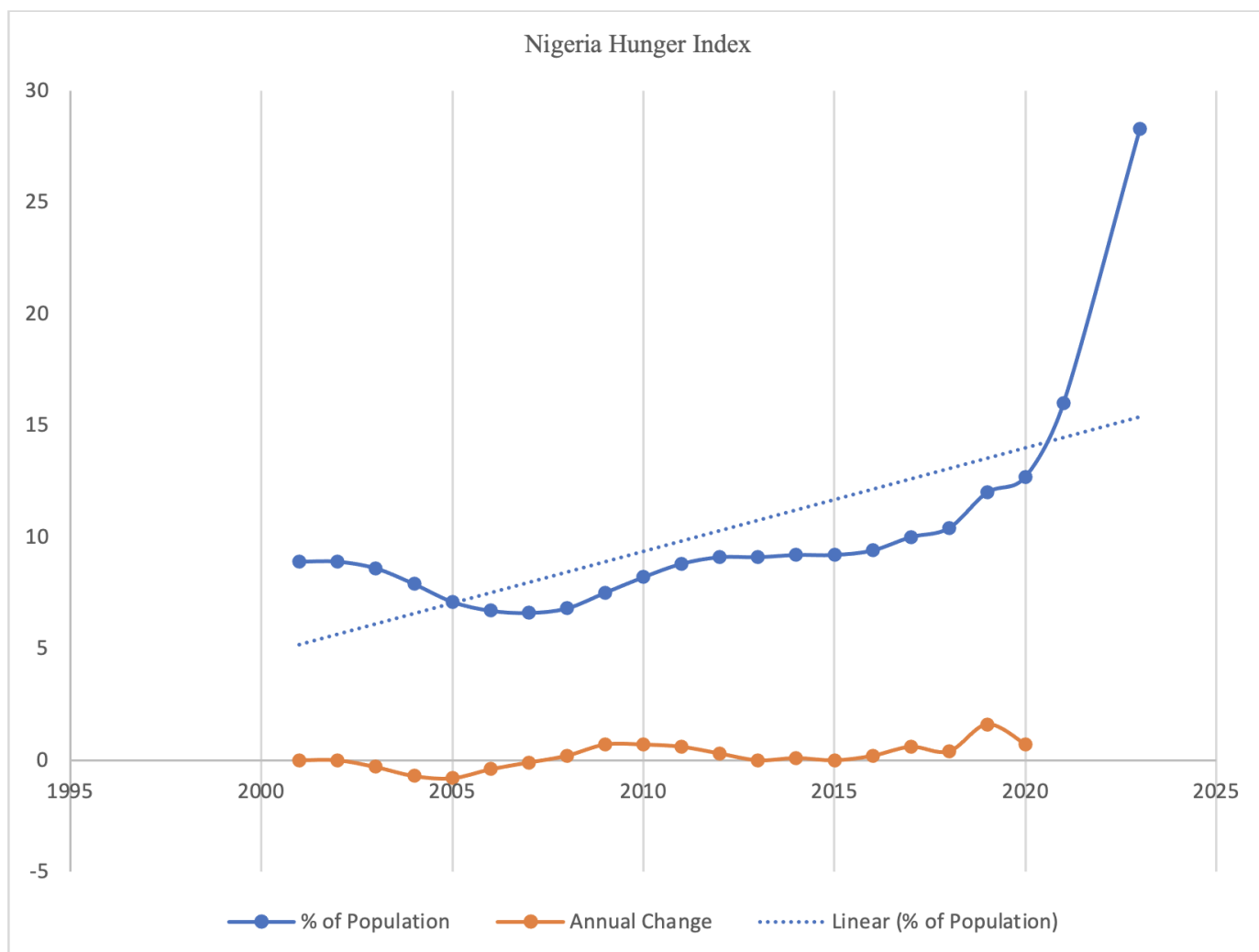*Adapted from Nigerian Sustainable Development Goals (SDGs)* [44]

Figure 2. Nigeria Poverty Index

Source: Adapted and Modified from World Bank [12][27]; *Global Hunger Index* [45]

Current Situation

Nigeria's journey towards the critical goal of zero hunger, a cornerstone of the Sustainable Development Goals, is marked by significant obstacles. The Food and Agriculture Organization (FAO) reports that as of 2018, the prevalence of undernourishment in Nigeria stood at 20.8%, a figure that, while representing a marginal improvement from the 21.1% recorded in 2013, underscores the persistent issue of food insecurity in the nation [29]. This modest reduction in undernourishment levels, though indicative of some progress, highlights the ongoing struggle many Nigerians face in accessing adequate nutrition. The challenge of achieving zero hunger in Nigeria is multifaceted. The country's large and rapidly growing population intensifies the demand for food, placing immense pressure on the existing food supply systems. This situation is further complicated by a range of structural and environmental factors. Inadequate agricultural practices, often characterized by low productivity and sustainability issues, impede the capacity to meet the escalating food demands. Moreover, the effects of climate change including erratic rainfall patterns, extreme weather events, and environmental degradation exacerbate the vulnerability of agricultural production, a key source of food supply in the country [29][30][31][32].

Despite these challenges, the slight decrease in undernourishment rates does signal some positive developments. It suggests

that interventions and policies aimed at improving food security may be having an impact, albeit limited. However, the persistence of high undernourishment rates indicates that these efforts need to be significantly amplified and refined. Addressing food insecurity in Nigeria requires a comprehensive approach that goes beyond merely increasing food production. It necessitates the implementation of strategies that ensure the equitable distribution of food, improve the resilience of agricultural systems to environmental changes, and enhance access to nutritious food for all, particularly for the most vulnerable segments of the population [33][34][35][36][37][38][39][40][41][42][43]. Efforts must also focus on improving rural infrastructure, enhancing agricultural technology, and providing support to farmers to boost productivity and sustainability. In conclusion, while Nigeria has made some strides in reducing undernourishment, the journey towards achieving zero hunger is still fraught with challenges. A concerted effort from the government, in collaboration with international organizations, local communities, and the private sector, is essential to overcome these obstacles. By adopting a holistic and multi-pronged approach, Nigeria can move closer to ensuring that all its citizens have reliable access to sufficient and nutritious food, ultimately achieving the goal of zero hunger.

Factors Contributing to Food Insecurity

Food insecurity in Nigeria, a critical challenge impeding the country's progress towards zero hunger, can be attributed to a constellation of interrelated factors. These factors not only impinge on the availability and accessibility of food but also on the resilience of the population in the face of fluctuating food supplies.

Inadequate Agricultural Practices

At the forefront of these issues are suboptimal agricultural practices. Nigerian farmers often grapple with limited access to modern farming techniques, quality seeds, fertilizers, and efficient irrigation systems, all of which are pivotal for enhancing agricultural productivity. This gap in resources and technology significantly limits the country's agricultural output, making it challenging to produce sufficient food to meet the growing needs of its population. Additionally, the lack of adequate infrastructure, such as effective storage facilities and reliable transportation networks, exacerbates this problem. These deficiencies lead to considerable post-harvest losses, further reducing the overall availability of food and contributing to persistent food insecurity [29][30][31][32][33][34][35][36][37][38][39][40][41][42][43].

Impact of Climate Change

Compounding these agricultural challenges is the looming threat of climate change, which presents a profound risk to food security in Nigeria. Erratic rainfall patterns, prolonged droughts, and rising temperatures directly impact crop production and livestock rearing. These climatic changes are particularly detrimental to smallholder farmers, who constitute a significant portion of Nigeria's agricultural sector. Predominantly dependent on rain-fed agriculture and with limited capacity to adapt, these farmers find themselves exceedingly vulnerable to the adverse effects of climate change. This vulnerability not only undermines their livelihoods but also jeopardizes the nation's food supply [29].

Rapid Population Growth

Another critical factor exacerbating Nigeria's food insecurity is the country's rapid population growth. With one of the highest

population growth rates globally, Nigeria faces increasing pressure on its agricultural systems. As the population expands, so does the demand for food, intensifying the challenges of feeding a burgeoning populace. This demographic trend amplifies the strain on already constrained food resources, making the attainment of zero hunger an even more daunting task [29].

Addressing the Challenges

To effectively combat these issues, a multi-faceted approach is needed. Enhancing agricultural practices through the introduction of modern farming technologies, improved seed varieties, and efficient irrigation systems can significantly increase productivity. Developing robust infrastructure for storage and transportation is also crucial to minimize post-harvest losses and ensure the steady supply of food. In addition, adopting climate-smart agricultural practices is essential to build resilience against the impacts of climate change, particularly for smallholder farmers. Furthermore, addressing the rapid population growth through effective policy interventions can help to balance the demand and supply dynamics of food in Nigeria. This involves not only promoting sustainable agricultural practices but also ensuring equitable access to food, particularly for the most vulnerable segments of the population. In summary, tackling food insecurity in Nigeria requires a comprehensive strategy that addresses the root causes of the problem. By focusing on improving agricultural productivity, adapting to climate change, and managing population growth, Nigeria can make significant strides towards achieving zero hunger, ensuring that all its citizens have access to sufficient, safe, and nutritious food.

Initiatives to Address Food Insecurity

In response to the pressing challenge of food insecurity, the Nigerian government has launched a series of targeted initiatives aimed at enhancing agricultural productivity and ensuring widespread access to nutritious food for its population.

Agricultural Transformation Agenda (ATA)

A cornerstone of these efforts is the Agricultural Transformation Agenda (ATA), an ambitious program designed to modernize and revitalize Nigeria's agricultural sector. The ATA's primary objective is to significantly boost food production, a move seen as crucial in mitigating food scarcity. To achieve this, the government has channeled substantial investments into several key areas. Firstly, research and development have been prioritized, recognizing the vital role of innovative agricultural techniques and technologies in increasing crop yields and improving food quality. By fostering a robust R&D ecosystem, the ATA seeks to introduce more efficient farming practices and resilient crop varieties, tailored to Nigeria's diverse climatic zones. Secondly, enhancing infrastructure related to agriculture is another focal point. This encompasses the development of better storage facilities to reduce post-harvest losses, improvement of transportation networks for efficient food distribution, and the establishment of irrigation systems to mitigate the impacts of erratic rainfall and droughts. These infrastructure upgrades are crucial for ensuring a consistent and stable food supply. Finally, capacity building is a critical component of the ATA. This involves providing farmers with the necessary training and resources to adopt modern farming techniques, thereby increasing their productivity and resilience. The government's efforts here include initiatives to improve farmers' knowledge of sustainable farming practices, access to quality seeds and fertilizers, and use of efficient irrigation and soil management techniques [29].

National Food Security Program (NFSP)

In parallel, the National Food Security Program (NFSP) focuses specifically on enhancing food availability and accessibility, particularly for vulnerable segments of the population. The NFSP encompasses a range of interventions designed to directly support farmers and strengthen the overall food system. This includes the provision of subsidized fertilizers and high-yield seed varieties to farmers, aiming to enhance crop productivity and thereby increase food availability. The program also promotes sustainable agricultural practices such as agroforestry and efficient land management, which are vital for preserving the environment and ensuring long-term agricultural productivity. Additionally, the NFSP places a strong emphasis on empowering small-scale farmers, who are pivotal in the country's food supply chain. This empowerment is facilitated through various means, such as providing training in modern farming techniques, access to credit facilities, and support in forming cooperatives. Such measures aim to bolster the capacity of these farmers, enabling them to contribute more effectively to food security in Nigeria [29].

International Collaborations and Assistance

Furthermore, recognizing the importance of collaboration in addressing such a complex issue, the Nigerian government has sought partnerships with international organizations and development partners. A notable example is the collaboration with the United Nations World Food Programme (WFP). The WFP has played an instrumental role in providing emergency food assistance in areas affected by conflict and displacement, which are particularly susceptible to food insecurity. Additionally, WFP's involvement extends to implementing nutrition programs aimed at the most vulnerable populations, thereby contributing to the broader goal of achieving food security in Nigeria [29], In summary, through initiatives like the ATA and NFSP, complemented by international partnerships, Nigeria is making concerted efforts to combat food insecurity. These initiatives represent a multifaceted approach, addressing various aspects of the food system from production to distribution, and from capacity building to emergency assistance. The success of these efforts is crucial for Nigeria's journey towards ensuring food security for all its citizens, in alignment with the Sustainable Development Goals.

Challenges and Constraints

While Nigeria has initiated a number of strategies to combat hunger, the nation continues to face formidable challenges in achieving Goal 2 of the Sustainable Development Goals (SDGs), the goal of achieving zero hunger. These challenges, stemming from a variety of factors, significantly impede the progress towards ensuring food security for all its citizens.

Inadequate Funding and Limited Access to Credit

A major impediment is the inadequacy of funding allocated for agricultural development. This financial constraint severely limits the government's capacity to implement effective agricultural programs and to invest in advanced technologies that could substantially enhance productivity. In addition to government funding issues, a significant obstacle for smallholder farmers, who are vital to the nation's food production, is the lack of access to credit and financial services. This lack of financial support hinders these farmers' abilities to invest in essential inputs like quality seeds and fertilizers, and to adopt modern agricultural techniques, all of which are necessary to improve their yields and contribute to the overall food security [29][30][31][32][33][34][35][36][37][38][39][40][41][42][43].

Security Challenges and Agricultural Disruptions

Furthermore, security concerns, especially in regions affected by conflict, pose a severe challenge to achieving food security. In these areas, agricultural activities are frequently hampered, disrupting both food production and distribution systems. The resultant instability not only exacerbates food insecurity but also impedes the effective implementation of food security initiatives. Farmers in these conflict-affected regions face enormous risks, and this insecurity can lead to abandoned farms, reduced agricultural output, and consequently, increased food scarcity [29][30][31][32].

Broader Challenges Impacting Food Security

The quest to achieve zero hunger in Nigeria is further complicated by a confluence of factors. Poor agricultural practices continue to plague the sector, limiting crop yields and the quality of produce. The impacts of climate change including erratic weather patterns and extreme climatic events add another layer of difficulty, affecting crop and livestock production and posing a threat to food security. Additionally, Nigeria's high population growth rate puts extra pressure on the already strained food supply, exacerbating the challenges of ensuring adequate food for all.

Ongoing Efforts and Future Needs

In response to these challenges, initiatives such as the Agricultural Transformation Agenda and the National Food Security Program have been put in place. These programs aim to address key issues in agriculture and food security, but they themselves face hurdles, including the aforementioned inadequate funding and security concerns. To effectively move towards zero hunger, Nigeria requires a comprehensive approach that encompasses sustainable agricultural development, adaptation to climate change, and enhanced support for smallholder farmers.

Comprehensive Analysis

To provide a clearer picture of the situation, Table 3 offers a detailed summary of the specific targets under Goal 2 and their corresponding SDGs indicators. It serves as a critical tool for understanding the nuances of the challenges faced, the progress made so far, and the gaps that need to be addressed in Nigeria's journey towards achieving zero hunger. In conclusion, while some progress has been made, the road to achieving zero hunger in Nigeria is fraught with challenges. Addressing these effectively requires a strategic, well-funded, and coordinated approach that involves all stakeholders, including the government, the agricultural sector, international partners, and the communities themselves. By tackling these challenges head-on and leveraging a multi-dimensional strategy, Nigeria can work towards fulfilling the ambitious goal of ensuring food security for all its citizens.

Table 3. Goal 3 Indicators and Targets

S/N	SDGs Indicators	Baseline 2015 (%)	Derived 2020 Benchmark (%)	2030 Target (%)
1.	Proportion of births attended by skilled health personnel	59	72	100
2.	Under 5 mortality rate (deaths per 1000 live births)	89	68	25
3.	Neo-natal mortality rate (deaths per 1000 live births)	37	29	12
4.	New HIV Infections per 1000 uninfected population	264	176	0
5.	Tuberculosis incidence per 1000 persons per year (male)	12	8	0
6.	Tuberculosis incidence per 1000 persons per year (female)	8	5	0
7.	Malaria Incidence per 1000 population per year (male)	99	66	0
8.	Malaria Incidence per 1000 population per year (female)	99	66	0
9.	Number of New hepatitis B infections per 100, 000 population in a given year	0.01	0.05	0
10	The prevalence of hepatitis B infections in the female population per 100,000 in Nigeria in 2015	0.09	0.062	0
11.	Number of people requiring interventions against neglected tropical diseases (male)	15,003,034	10,004,806	0
12.	Number of people requiring interventions against neglected tropical diseases (female)	15,007,209	10,004,806	0
13.	Mortality of cardiovascular diseases, cancer, diabetes or chronic respiratory diseases (male)	159	141	106
14.	Mortality of cardiovascular diseases, cancer, diabetes or chronic respiratory diseases (female)	129	115	88
15.	Suicide Mortality rate (male)	246	219	164
16.	Suicide Mortality rate (female)	128	113	85.34
17.	Coverage of treatment intervention (pharmacological, psychosocial & rehabilitation & aftercare service for substance use disorders)	443	295	0
18.	Coverage of treatment intervention (pharmacological, psychosocial & rehabilitation & aftercare service for substance use disorders)	591	394	0
19.	Number of road traffic, fatal injury, deaths within 30days per 100, 000 population (age standardised male)	4245	3538	2122.50
20.	Number of road traffic, fatal injury deaths within 30days per 100, 000 population (age standardised male)	1195	996	597.55
21.	Proportion of women of reproductive age 15-49years who have their need for family planning satisfied with modern methods	78%	855	100%
22.	Mortality rate attributed to unsafe water, unsafe sanitation & Lack of hygiene by sex 7 year (male)	335	223	0
23.	Mortality rate attributed to unsafe water, unsafe sanitation & Lack of hygiene by sex 7 year (female)	382	255	0

Adapted from DHS [23] *& United Nation* [46]

4. Goal 3: Good Health and Well-Being

Nigeria has seen progress in improving health outcomes, yet it continues to struggle in attaining the goal of universal health coverage. The World Health Organization (WHO) reports a reduction in the maternal mortality ratio in Nigeria, which declined from 814 deaths per 100,000 live births in 2015 to 525 deaths per 100,000 live births in 2019 [47]. Despite this improvement, Nigeria's rate remains substantially higher than the Sustainable Development Goals' global target of fewer than 70 maternal deaths per 100,000 live births [48]. The country still faces significant challenges in healthcare, including limited access to quality healthcare services, persistently high infant mortality rates, and a deficiency in health infrastructure, all of which contribute to the ongoing health crisis [47][49][50][51][52][53][54][55].

Maternal and Child Health

One of the key health challenges in Nigeria is the high maternal and child mortality rates. Maternal mortality refers to the death of a woman during pregnancy, childbirth, or within 42 days of delivery, while child mortality refers to the death of a child under the age of five. These indicators are often seen as measures of the overall health and well-being of a population. To address these challenges, the Nigerian government has implemented various programs and initiatives aimed at improving maternal and child health. For example, the National Primary Health Care Development Agency (NPHCDA) has launched the Integrated Maternal, Newborn, and Child Health Strategy (IMNCH) to provide comprehensive and integrated healthcare services for women and children [56]. This strategy focuses on promoting antenatal care, skilled attendance at birth, essential new-born care, immunization, and access to family planning services [49][50][57].

Additionally, the Nigerian government has also made efforts to improve access to quality healthcare services. The National Health Insurance Scheme (NHIS) was established to provide financial risk protection and access to healthcare for all Nigerians. However, the implementation and coverage of the NHIS still face significant challenges, hindering the achievement of universal health coverage in the country. Goal 3 of the United Nations' Sustainable Development Goals (SDGs) aims to ensure healthy lives and promote well-being for all at all ages. Nigeria, like many other developing countries, faces significant challenges in achieving this goal. While the country has made some progress in improving health outcomes, it still lags behind in achieving universal health coverage [11]. According to the World Health Organization (WHO), Nigeria's maternal mortality ratio decreased from 814 deaths per 100,000 live births in 2015 to 525 deaths per 100,000 live births in 2019 [47]. This is a positive development, but the country still has one of the highest maternal mortality rates in the world. One of the major challenges facing Nigeria's healthcare system is limited access to quality healthcare services. Many people in the country, particularly those living in rural areas, do not have access to basic healthcare services. This is due to a shortage of healthcare workers, inadequate health infrastructure, and a lack of funding for healthcare [47]. In addition, high infant mortality rates remain a significant challenge in Nigeria. According to UNICEF, the infant mortality rate in Nigeria was 67 deaths per 1,000 live births in 2019 [58]. This is much higher than the global average of 28 deaths per 1,000 live births.

To address these challenges, the Nigerian government has developed various policies and initiatives aimed at improving health outcomes in the country. For example, the National Economic Recovery and Growth Plan (2017-2020) includes provisions for improving healthcare infrastructure, increasing the number of healthcare workers, and expanding access to healthcare services (Federal Government of Nigeria, 2017) [11]. The government has also launched various health campaigns aimed at improving maternal and child health, such as the National Strategic Health Development Plan II (2018-2022) and the Saving One Million Lives Initiative [11]. While Nigeria has made some progress in improving health outcomes, there is still a long way to go in achieving universal health coverage and ensuring good health and well-being for all. Limited access to quality healthcare services, high infant mortality rates, and inadequate health infrastructure remain significant challenges. However, the government's policies and initiatives aimed at improving healthcare in the country are a step in the right direction.

Communicable Diseases

Nigeria grapples with substantial obstacles in mitigating the prevalence and transmission of infectious diseases, especially HIV/AIDS, malaria, and tuberculosis which exert a massive burden on population health [59][60]. As per UNAIDS estimates, Nigeria bears the second highest HIV/AIDS burden globally with around 1.9 million people living with the infection in 2019 [60]. Additionally, the country registers exceptionally high malaria caseloads of approximately 97 million cases annually [61]. To

counter the severity of these communicable diseases, the government has instituted disease-specific interventions albeit with varying degrees of success. For HIV/AIDS, the National Agency for the Control of AIDS (NACA) developed a robust National Strategic Framework that delineates priority areas like prevention, testing, treatment, care and support programs [62]. Similarly, the National Malaria Elimination Program (NMEP) actively works to expand insecticide-treated net coverage, bolster diagnostic and treatment accessibility and intensify surveillance mechanisms [63].

However, glaring gaps continue to constrain Nigeria's ability to adequately respond to and effectively control these major public health challenges. Especially in rural and remote areas, the skeletal healthcare system grapples with scarce health infrastructure, human resources, medical supplies and health financing to cater to care needs. Entrenched socioeconomic barriers further widen health disparities while cultural beliefs and stigma deter health-seeking behaviors. Undeniably, solving Nigerians longstanding vulnerability to infectious diseases will necessitate sizable investments in strengthening healthcare capacity and community-based services. Beyond programmatic interventions, establishing resilient health systems grounded in accessible primary care delivery, surveillance networks and patient-centered care will be instrumental to curbing communicable disease mortality and morbidity. Sustained political will, community participation and integrated partnerships across public and private stakeholders can help advance Nigeria's aspirations for universal health coverage and improved population health.

Non-Communicable Diseases

In recent decades, Nigeria has witnessed surging cases of non-communicable or lifestyle-related diseases such as cardiovascular conditions, diabetes, chronic respiratory illnesses and cancers. As per World Health Organization estimates, non-communicable diseases accounted for 29% of total registered deaths in Nigeria in 2016, establishing them as leading causes of mortality and morbidity [64]. In response to this epidemiological shift and confronting public health threat, the Nigerian government instituted a National Strategic Plan focused singularly on mitigating risk factors, enhancing early diagnosis and optimizing evidence-based management of non-communicable diseases. The plan delineates interventions like raising community awareness of modifiable risk factors, implementing fiscal policies to curb tobacco and alcohol consumption, promoting nutrition education and physical activity, and re-orienting health systems towards continuity of care for those requiring lifelong treatment [65][66][67].

However, deeply-entrenched barriers continue to impede successful prevention and control of non-communicable diseases. Key amongst them are poor health literacy rates regarding chronic disease risk factors, severe shortages of healthcare infrastructure and workforce outside urban concentrations, and inability of rural populations to access screening or sustain treatment adherence. To genuinely curb preventable mortality from non-communicable diseases, Nigeria needs to leverage multi-sector collaboration between health, education, trade, fiscal and environment agencies. Increasing both governmental and private investment in human resources, medical technologies and community-based primary care is equally vital. Integrating non-communicable disease surveillance, education and management into existing primary healthcare systems can help extend continuity of care to Nigeria's dispersed rural communities.

Mental Health

Mental health is a critical, yet oveneglected component of holistic population wellbeing in Nigeria. As per World Health Organization estimates, Nigeria's mental health disorder prevalence was around 21.7% in 2019, signaling that over a fifth of the

country's population suffered from some form of mental illness [61]. However, a grave lack of infrastructure, human resources and awareness continues to undermine access to essential mental healthcare. At present, Nigeria has very few specialized facilities and an extreme shortage of qualified mental health professionals to cater to the diverse needs of patients. To start addressing this service delivery gap, the Nigerian government has prioritized building mental health capacity within its primary healthcare system. The guiding framework for this effort is the Mental Health Policy and Strategic Plan for Nigeria (2013-2020) which outlined key focus areas like awareness promotion, workforce development, facility expansion and integrating screening and treatment at community levels [68]. Additionally, civil society and advocacy campaigns are actively working to increase mental health literacy and counter the pervasive stigma that silences those afflicted. But despite policy provisions and fledgling partnerships, mental healthcare remains a largely neglected domain in practice.

Going forward, Nigerian needs to ramp up investments towards actualizing the provisions of its policy frameworks. More financing is imperative for training specialized mental health workers, building dedicated wards and treatment centers, expanding community-based rehabilitation support and meeting the needs of vulnerable groups. Simultaneously, cultural attitudes and beliefs that inhibit care-seeking or perpetuate human rights violations require sensitivity training across healthcare and law enforcement sectors. In summary, without resolute efforts to increase investments, address systemic gaps and sensitize communities, Nigeria cannot holistically meet the mental health needs or ensure the rights of citizens impacted by mental health disorders. Prioritizing mental health is indispensable for improving quality of life and achieving sustainable good health and wellbeing targets.

5. Goal 4: Quality Education

Nigeria contends with monumental barriers to fulfilling the fundamental right to inclusive and equitable quality education for all its citizens, especially girls and those residing in rural areas. As of 2018, the country's net primary school enrollment rate stood at just 61.7%, reflecting a disconcerting decline from 72.8% in 2010. This signals that over a third of Nigerian children remain deprived of essential education opportunities [26][69]. Multifaceted and complex factors undermine meaningful advancement towards universal education access and quality learning outcomes. Severely underfunded education budgets constrain building an adequate number of schools with trained teachers and functional facilities. Rural communities tend to suffer the most from a debilitating lack of usable classrooms, instruction materials, technology access or skilled educators. Simultaneously, the escalating phenomenon of insecure environments due to insurgencies obstructs education continuity for vulnerable children while girls remain highly susceptible to socio-cultural pressures that perpetuate the cycle of denial, underinvestment and poverty [26][69].

Evidently, Nigeria needs urgent and coordinated reforms like increasing budgetary allocation for education, implementing decentralized management and accountability structures, enhancing teacher training programs, utilizing low-cost technologies and prioritizing clusters mired in poverty or conflict. Above all, political will and community participation are vital to reinforce education's role in empowering citizens and enabling national development. Targeted interventions to boost enrollment and learning key performance indicators can help Nigeria expedite progress across the gamut of Sustainable Development Goal 4 that envisions quality education for all by 2030. See table 4 for selected SDG goal 4 indicator and target for details below.

S/N	SDGs Indicators	Baseline 2015 (%)	Derived 2020 Benchmark	2030 Targets
	Table 4. Selected Goals for SDGs Indicators and Target			
1.	Percentage of children under 5 years of age who are developmentally on track in Health	Male – 93.5 Female – 93.1	Male – 95.6 Female – 93.4	100 100
2.	Percentage of Children under 5 years of age who are developmentally on track in learning	Male – 77.4 Female – 79.2	Male – 84.9 Female – 86	100 100
3.	Percentage of children under 5 years of age who are developmentally on psychosocial well being	Male – 63.8 Female – 66.1	Male – 75.9 Female – 77.4	100 100
4.	Participation rate of youth & adults in formal education & Training in the past 12 months	Male – 51.6 Female – 48.5	Male – 66.4 Female – 65.7	100 100
5.	Participation rate of youth & adults in non-formal education & Training in the last 12 months	Male – 49 Female – 51	Male – 66 Female – 74	100 100

Adapted from DHS [70]*; WHO* [71].

Current Situation

Nigeria contends with extensive exclusion in basic education access and completion resulting in a sizeable population of out-of-school children across all geopolitical zones. However, girls and children from poor rural communities remain particularly deprived with only 61.7% net primary enrollment reported as of 2018. This rate signals a 11.1 percentage point decline within a decade, underscoring backsliding on commitments to achieve universal access [26][69]. The endemic barriers fueling Nigeria's out-of-school crisis are multilayered and frequently intersectional in impact. Key impediments include the prohibitive distances between remote settlements and nearest public schools, rampant poverty throttling families' ability invest in education, sociocultural practices like early marriage that disproportionately deny girls' schooling opportunities and a debilitating lack of resources flowing into the public education system nationwide [69].

Combined, these obstacles have substantially thwarted Nigeria's aspirations to guarantee inclusive and equitable access to 12 years of free basic education as enshrined by national laws. With nearly 4 out 10 primary-aged children still unenrolled, meeting targets aligned with the Sustainable Development Goal on quality education remains an immense challenge. Addressing the crisis requires quad-sectoral interventions from the government, civil society, communities and external donors to tackle both demand-side and supply-side drivers. Improving enrollment and retention of girls and rural populations would involve incentives like conditional cash transfers, providing free meals and transportation, constructing community schools and conducting sensitization drives on gender roles and early marriage. Simultaneously, education infrastructure, technologies, recruited qualified teachers and learning materials require huge investments to bridge system-wide gaps hampering equitable access countrywide.

Challenges and Constraints

Insufficient funding is a major contributor to the low quality of education in Nigeria. The education sector in the country is characterized by limited financial resources, resulting in inadequate infrastructure, poorly equipped classrooms, and a lack of teaching materials. According to UNESCO [69], Nigeria's education expenditure as a percentage of its national budget is only 6%, which falls below the recommended benchmark of 15% set by the UNESCO's Education for All (EFA) initiative. This lack of funding severely hampers efforts to improve the quality of education and provide equal opportunities for all children, regardless of their socio-economic background. In addition to inadequate funding, the shortage of qualified teachers is another significant obstacle to achieving quality education in Nigeria. The country is facing a shortage of trained and experienced teachers, especially in rural areas [69]. This shortage affects the teaching and learning process, as there are not enough teachers to provide quality instruction to all students. Furthermore, the quality of teacher training programs and professional development opportunities need improvement to ensure that teachers are equipped with the necessary skills and knowledge to deliver quality education.

Furthermore, inadequate infrastructure such as classrooms, libraries, and laboratories also hinder the delivery of quality education in Nigeria. Many schools lack essential facilities, making it difficult for students to engage in hands-on learning experiences and access resources that facilitate effective learning [26][69]. Dilapidated classrooms and a lack of basic amenities such as clean water and sanitation facilities further deter students from attending school regularly and limit their overall educational experience [72][73][74][75][76].

6. Goal 5: Gender Equality

Although Nigeria has taken steps towards achieving gender equality, significant disparities persist. Female representation in political and economic decision-making roles remains low. In 2019, women held only 6.7% of parliamentary seats and accounted for 22.4% of the labor force participation rate [12]. Gender-based violence and harmful cultural practices also impede progress in this area [12]. Table 5 below shows goal 5 indicators and SDGs targets.

Table 5. Indicators and SDGs Targets

S/N	SDGs Indicators	Baseline 2015 (%)	Derived ERGP Target 2020 (%)	SDGs Target 2030 (%)
1.	Proportion of ever partnered women & girls aged 15 years & older subjected to physical, sexual or psychological violence by a current or former intimate partner in the last 12 months, by forms of violence & age group.	33.5	20.4	0
2.	Proportion of ever partnered women & girls aged 15 years & older subjected to physical, sexual or psychological violence by a current or former intimate partner in the last 12 months, by forms of violence & age group.	34.9	23.2	0
3.	Percentage of Women aged 20-24 who were married or in a union before age 15. Child marriage is condemned would over as a result of several issues associated with it.	17.7	11.8	0
4.	Percentage of women aged 20-24 who were married or in a union before aged 18.	39.9	26.6	0
5.	Percentage of girls & women aged 15-49 who have undergone female genital mutilation/cutting by age group.	24.8	16.6	0
6.	Proportion of women aged 14-49 who make their own informed decision regarding sexual relative, contraceptive use & reproductive health care.	24.8	49.9	100
7.	Percentage of total agricultural population with ownership or secure rights over agricultural land (male).	78.1	85.4	100
8.	Percentage of total agricultural population with ownership or secure rights over agricultural land (female).	71.1	80.8	100
9.	Proportion of Individuals who own a mobile phone (Urban).	74	82.7	100
10	Proportion of Individuals who own a mobile phone (Rural).	48.3	65.6	100

Adapted from [77][78], *UN,* [79]

Gender equality is a fundamental human right that is essential for the achievement of sustainable development. It is a critical component of Goal 5 of the United Nations Sustainable Development Goals (SDGs), which aims to achieve gender equality and empower all women and girls. Nigeria, like many other countries, has made efforts towards achieving gender equality. However, significant disparities still exist, particularly in political and economic decision-making roles. The table 5 above examine the progress made towards achieving gender equality in Nigeria, the challenges faced, and the way forward.

Progress towards Gender Equality in Nigeria

Nigeria has made some progress towards achieving gender equality in recent years. For instance, the country has enacted laws and policies aimed at promoting gender equality. The National Gender Policy, which was launched in 2006, is one such policy. The policy seeks to promote gender equality and women's empowerment in all sectors of the economy. It also aims to eliminate all forms of discrimination against women and girls [80]. In addition, Nigeria has ratified several international conventions and treaties that promote gender equality. These include the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and the Beijing Declaration and Platform for Action. These international instruments provide a framework for promoting gender equality and empowering women. Furthermore, Nigeria has made some progress in increasing female representation in political and economic decision-making roles. For instance, in 2019, women held 6.7% of parliamentary seats, up from 5.6% in 2015 [12]. The country has also made some progress in increasing the number of women in leadership positions in the private sector. For example, in 2019, women held 22.4% of senior management positions in Nigerian companies, up from 19.7% in 2016 [12].

Challenges to Gender Equality in Nigeria

Despite the progress made towards achieving gender equality in Nigeria, significant challenges still exist. One of the major

challenges is gender-based violence. Women and girls in Nigeria are at risk of various forms of violence, including domestic violence, sexual violence, and harmful cultural practices such as female genital mutilation and child marriage. According to the National Demographic and Health Survey (NDHS) conducted in 2018, 30% of women aged 15-49 have experienced physical violence, and 10% have experienced sexual violence [81]. Another challenge is the low level of female participation in the labor force. Although the number of women in the labor force has increased in recent years, women still account for only 22.4% of the labor force participation rate [3][4][12][82][83]. This is partly due to cultural and social norms that limit women's access to education and employment opportunities [84]. Furthermore, women's representation in political and economic decision-making roles remains low. Despite the increase in the number of women in parliament, women still hold only 6.7% of parliamentary seats [12]. This is far below the global average of 25% [85]. Similarly, women's representation in senior management positions in the private sector is still low, with women holding only 22.4% of such positions [12].

7. Goal 6: Clean Water and Sanitation

Access to safe drinking water along with adequate sanitation facilities remains a severe challenge confronting Nigeria, especially in marginalized rural areas (see figure 3a, b, c & d below). As of 2017 statistics, only 67% of Nigerians had access to basic water services while a mere 40% could utilize basic sanitation solutions [24][25][58][72][73][74][75][76]. This glaring lack of access and infrastructure in essence deprives millions of Nigerians of their fundamental human rights. The deficits underscore Nigeria's immense difficulties in fulfilling Sustainable Development Goal 6 that envisions universal access to clean water and sanitation by 2030. Disparities between urban concentrations and remote villages are stark spanning piped supplies versus untreated sources to modern toilet availability versus open defecation practices [58][86][87][88][89][90][91][92][93][94][95][96]. Bridging these gaps require urgent infrastructure upgrades and behavior change interventions. Significant investments must expand piped water networks, build more boreholes and treatment plants, provide alternate solutions like rainwater harvesting and ensure regular maintenance. Simultaneously, promoting hand hygiene, making sanitary products affordable via subsidies and constructing public toilet facilities can help end open defecation [97][98][99]. However, beyond physical upgrades, achieving genuine improvements necessitate community participation, educational campaigns, transparency reforms, public-private partnerships and decentralized governance. Integrating interventions across health, environment and economic sectors is equally vital to manage Nigeria's water resources sustainably. Tackling multifaceted challenges around clean water availability and sanitation access is indispensable for safeguarding human capital, ecosystem stability and long-term national growth.

Progress towards Clean Water and Sanitation in Nigeria
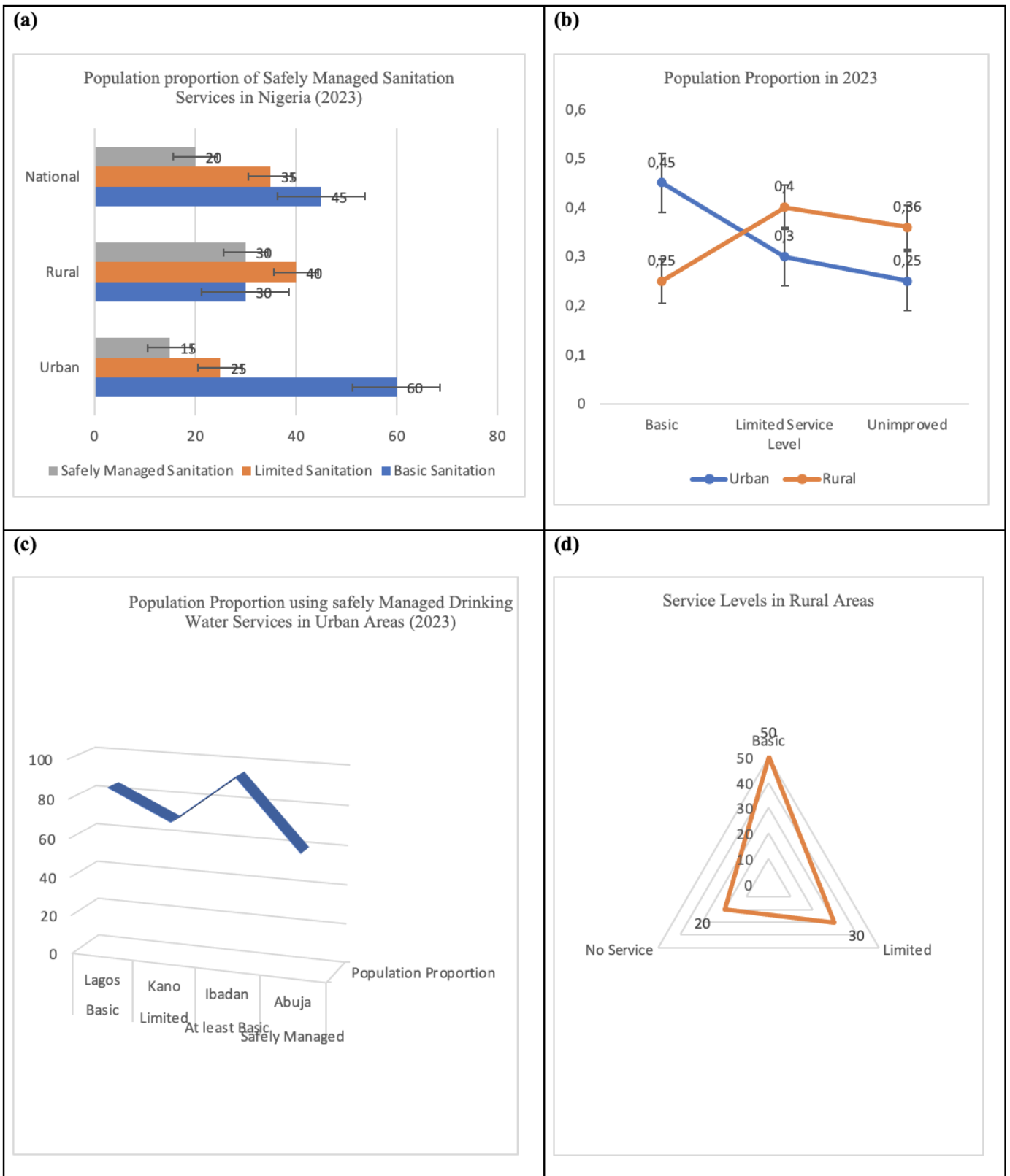
In recognition of the acute challenges hampering clean water availability and sanitation access for millions of citizens, the Nigerian government instituted dedicated policies and programs to expand coverage and improve infrastructure nationwide since the turn of the century [42]. The foremost development was the ratification of the National Water Supply and Sanitation Policy in 2000 which ambitiously outlined plans to extend piped water schemes and modern toilet facilities to underserved groups, especially across neglected rural areas. By providing binding targets, guidelines and accountabilities, this policy signaled Nigeria's commitment to water, sanitation and hygiene sector reforms [100]. Additionally, to catalyze action, the launch of national vision plans like the Nigeria Vision 20:2020 in 2009 also embedded ambitious targets around raising basic water and sanitation access to 75% and 90% respectively before the end of this decade [24][25][26][58].

Bolstered by these enabling frameworks, Nigeria has managed to incrementally expand clean water availability and sanitation solutions over the past years though immense gaps remain, particularly across rural villages. As of 2017 statistics, 67% of Nigerians could access basic drinking water sources, a 6% point rise over 2015 data. In the same period, basic sanitation coverage escalated from 29% to 40%, indicating gradual improvements in modern toilet access yet majority still rely on unsafe disposal means [58][72][73][74][75][76]. However, in 2023, the population proportion in rural settings in Nigeria using safely managed drinking water services varied based on the service level provided (see figure 3a, b, c & d below). While these are important steps forward, intensified efforts are indispensable if Nigeria aims to achieve universal coverage targets under Sustainable Development Goal 6 by 2030. More than ever, the country needs to translate national policies into augmented investments, localized infrastructure expansion, transparent governance, integrated planning and sustainability mechanisms across the WASH sector.

Challenges to Clean Water and Sanitation in Nigeria

While Nigeria has progressed in expanding clean water and sanitation coverage over the past decades, systemic and cross-cutting challenges continue to obstruct efforts to achieve sustainable universal access, especially across underserved rural areas. Foremost among prevailing challenges is the country's struggle with developing comprehensive WASH infrastructure to connect all households with piped water supplies and modern toilet facilities [97][98][99]. This stems from chronically low investments into building climate-resilient water systems and decentralized sanitation solutions. Consequently, Nigeria's existing infrastructure remains highly concentrated around wealthy urban areas while remote communities suffer without basic access. Simultaneously poor adoption of safe hygiene practices like handwashing with soap exacerbates public health risks associated with unsafe water and open defecation. As of 2018 statistics, only 13% of Nigerians wash hands with soap post defecation thereby heightening prospects of diarrheal diseases spreading across populations lacking access to safe sanitation means [24][25][81][97][98][99].

Additionally, Nigeria's vulnerability to climate change-fueled extreme weather events threatens sustainability of water availability for consumption, agriculture and sanitation needs of economically disadvantaged groups. Intensifying droughts and floods damage water catchment and storage infrastructures. This particularly endangers remote villages dependent on season rainfall and natural sources like lakes, rivers and streams [20][30][101]. Undeniably, Nigeria cannot genuinely combat preventable WASH-related diseases, achieve human capital development targets or manage its water resources sustainably without surmounting these systemic deficits impeding universal clean water availability and sanitation access. It necessitates redoubled efforts across all governance levels towards infrastructure upgrades, community mobilization, climate adaptation, transparency enhancement and integrated planning between health, environment and economic policy domains.

(a)

Population proportion of Safely Managed Sanitation Services in Nigeria (2023)

■ Safely Managed Sanitation ■ Limited Sanitation ■ Basic Sanitation

(b)

Population Proportion in 2023

●—Urban ●—Rural

(c)

Population Proportion using safely Managed Drinking Water Services in Urban Areas (2023)

(d)

Service Levels in Rural Areas

Way Forward

Advancing Quality Education in Nigeria

To overcome the barriers to quality education in Nigeria, prioritizing and investing in the education sector is essential. This involves increasing education funding and ensuring effective management and utilization of these resources. Such measures are critical for enhancing school infrastructure, providing necessary teaching materials, and overall improvement in education quality. Additionally, attracting and retaining qualified teachers is paramount. This can be achieved by offering competitive salaries, opportunities for professional development, and incentives for teaching in under-served rural areas. Moreover, strengthening teacher training programs to align with contemporary educational needs and standards will further enhance the quality of education. Furthermore, the development of school infrastructure, including the construction and renovation of classrooms, libraries, and laboratories, is crucial in creating conducive environments for effective teaching and learning. Addressing these issues, including the high out-of-school rate and teacher shortages, will propel Nigeria towards achieving Goal 4 of the Sustainable Development Goals, thereby providing quality education to its populace.

Promoting Gender Equality

Transitioning to the realm of gender equality, Nigeria requires concerted efforts from the government, civil society organizations, and various stakeholders to make significant strides. A primary focus should be on eradicating gender-based violence, achievable through the enactment and strict enforcement of protective laws and policies. Raising awareness to shift cultural and social norms that perpetuate violence against women is also crucial. Concurrently, promoting women's economic empowerment is vital. This can be realized by providing educational and training opportunities for women and creating a supportive environment for their active participation in the labor force. Moreover, the government should encourage gender equality in recruitment and promotion policies within companies. Another critical aspect is enhancing women's representation in political and economic decision-making roles, which can be facilitated by laws promoting gender parity and affirmative action policies within political parties. Despite some progress, disparities in gender-based violence, labor force participation, and women's representation in decision-making roles persist. Addressing these areas will significantly contribute to achieving sustainable development through gender equality in Nigeria.

Ensuring Access to Clean Water and Sanitation

Finally, in the pursuit of clean water and sanitation, Nigeria needs the collective effort of the government, civil society, and other stakeholders. A key focus should be on improving infrastructure, achievable through increased funding for water and sanitation projects and the adoption of innovative technologies. Alongside this, promoting safe hygiene practices is critical and can be fostered through awareness campaigns and education on hygiene. Incentivizing communities that adopt these practices can also be an effective strategy. Additionally, addressing the challenges posed by climate change is imperative. This involves implementing climate-resilient water and sanitation infrastructure and promoting sustainable water management practices. Despite some advancements, issues like inadequate infrastructure, poor hygiene practices, and climate change impacts continue to hinder progress. By focusing on infrastructure improvement, hygiene promotion, and climate-resilient strategies, Nigeria can make substantial progress towards achieving sustainable access to clean water and sanitation for all.

8. Conclusion

Since the adoption of the Sustainable Development Goals (SDGs) in 2015, Nigeria has made notable advancements in specific

areas aligned with the ambitious targets set out under this global development framework. However, persisting and significant obstacles continue to impede the country's progress towards numerous goals centered on improving socioeconomic conditions and environmental sustainability. Specifically, Nigeria has achieved moderate success in expanding access to affordable and clean energy as well as developing resilient infrastructure through investments in renewable power generation and improvements in road networks and transportation systems. Additionally, partnerships between the federal government, state authorities and the private sector have bolstered industrialization and innovation in pockets of the country.

However, systemic challenges severely affect Nigeria's advancement across various critical goals connected to eradicating poverty and hunger, enhancing health and wellbeing, ensuring inclusive and equitable quality education, achieving gender equality, and providing clean water and sanitation. These obstinate issues stem from pervasive corruption and mismanagement of resources, lack of continuity in development policies and programs, rising insecurity, widening inequality between socioeconomic classes, and the overall struggle with diversifying the economy away from oil dependency. To genuinely accelerate Nigeria's SDG achievements by the set 2030 target, urgent and coordinated efforts are needed from the government, international development institutions, local non-governmental organizations and the private sector. Specifically, sustained political commitment to human-centered national development policies, increased budgetary allocations to social sectors, multi-stakeholder partnerships, rigorous monitoring and evaluation frameworks, and effective resource mobilization strategies have to be prioritized. Significant improvements on foundational issues like poverty alleviation, nutrition, healthcare access, education quality, gender mainstreaming, clean water availability and sanitation are indispensable for the country to unlock its human capital potential and foster widespread economic prosperity.

Nigeria's Progress and Remaining Challenges in Achieving the Sustainable Development Goals

Since the adoption of the Sustainable Development Goals (SDGs) by the United Nations in 2015, Nigeria has witnessed progress in certain areas while grappling with persistent challenges across various goals. This conclusion highlights the need for sustained efforts from the Nigerian government, international organizations, and civil society in addressing poverty eradication, hunger reduction, healthcare improvements, quality education, gender equality, and access to clean water and sanitation. Additionally, continuous monitoring, evaluation, and resource mobilization are crucial to achieving these goals by 2030.

Poverty Eradication

Despite the efforts of the Nigerian government to combat poverty, the country still faces significant challenges in this area. Limited access to economic opportunities, inadequate social safety nets, and unequal wealth distribution continue to impede progress. To effectively eradicate poverty, Nigeria needs to implement comprehensive poverty reduction strategies, including job creation, skill development programs, and targeted interventions in marginalized communities.

Hunger Reduction

Nigeria has made some strides in reducing hunger, but the prevalence of food insecurity remains a major concern. Limited access to arable land, climate change-induced challenges, and conflicts in some regions contribute to this persistent problem. The government must prioritize investment in agriculture, promote sustainable farming practices, and strengthen social protection programs to achieve significant progress in hunger reduction.

Healthcare Improvements

Improving healthcare remains a critical challenge for Nigeria. While there have been advancements in healthcare infrastructure and the provision of essential services, access to quality healthcare remains unequal across the country. Universal healthcare coverage, increased funding for healthcare, and proactive community-based efforts are essential to bridge the healthcare gap and ensure better health outcomes for all Nigerians.

Quality Education

Nigeria faces significant challenges in providing quality education to its citizens. Issues such as inadequate infrastructure, insufficient qualified teachers, and a high number of out-of-school children persist. Furthermore, gender disparities and insufficient access to educational opportunities for marginalized groups hinder progress towards achieving quality education. To address these challenges, the Nigerian government must prioritize education funding, implement comprehensive teacher training programs, and ensure inclusive educational policies.

Gender Equality

Gender equality is crucial for Nigeria's socio-economic development. Despite policy frameworks and legal provisions promoting gender equality, women still face discrimination and unequal opportunities. Gender-based violence, limited access to economic resources, and cultural norms continue to hinder progress. The Nigerian government should implement affirmative action policies, enhance women's participation in decision-making processes, and provide economic empowerment opportunities to foster gender equality.

Access to Clean Water and Sanitation

Access to clean water and sanitation remains a significant challenge in Nigeria, particularly in rural areas. Limited infrastructure, inadequate maintenance, and pollution of water sources contribute to the problem. To achieve universal access, the government needs to invest in water and sanitation infrastructure, prioritize hygiene education, and strengthen water governance systems to ensure sustainable water resource management.

Continuous Monitoring, Evaluation, and Resource Mobilization

To achieve the SDGs by 2030, Nigeria must establish comprehensive monitoring and evaluation mechanisms. Regular assessment of progress, identification of gaps, and data-driven decision-making are crucial in guiding policy formulation and intervention strategies. Additionally, resource mobilization from both domestic and international sources is essential for the successful implementation of sustainable development projects. Nigeria has made progress in some areas of the SDGs since their inception, but significant challenges persist across various goals. Poverty eradication, hunger reduction, healthcare improvements, quality education, gender equality, and access to clean water and sanitation require sustained efforts from the Nigerian government, international organizations, and civil society. Continuous monitoring, evaluation, and resource mobilization are crucial to achieving the SDGs by 2030. It is through collective action, effective policies, and targeted interventions that

Nigeria can overcome these challenges and ensure a sustainable and prosperous future for its citizens.

Statements and Declarations

Other References

- Federal Ministry of Health. (2019). National Strategic Plan for the Prevention and Control of Non-Communicable Diseases (2019-2025). Retrieved from https://www.health.gov.ng/doc/National%20Strategic%20Plan%20for%20the%20Prevention%20and%20Control%20of%20Non-Communicable%20Diseases%202019-2025.pdf
- https://data.who.int/indicators/i/12EE54A

References

1. [a, b]*Morufu OR, Tonye VO, Ogah A, Henry AE, Abinotami WE (2021) Articulating the effect of Pesticides Use and Sustainable Development Goals (SDGs): The Science of Improving Lives through Decision Impacts. Research on World Agricultural Economy. Vol 2, No. 1. DOI: http://dx.doi.org/10.36956/rwae.v2i1.347. http://ojs.nassg.org/index.php/rwae/issue/view/31*

2. [a, b]*Raimi MO, Ihuoma BA, Esther OU, Abdulraheem AF, Opufou T, Deinkuro NS, Adebayo PA and Adeniji AO (2020) "Health Impact Assessment: Expanding Public Policy Tools for Promoting Sustainable Development Goals (SDGs) in Nigeria". EC Emergency Medicine and Critical Care 4.9 (2020).*

3. [a, b]*Raimi MO, Odubo TR, Ogah A (2022) Women, Water and Development in the Global South. Oral Presentation Presented at the Multidisciplinary International Conference on Water in Africa (ICWA 2022) on the theme: Towards Successful Delivery of SDGs 3 & 6, which held February 09 – 11, 2022.*

4. [a, b]*Raimi MO, Odubo TR, Odubo TV, Omidiji AO (2022) Gender and Sustainability in the Niger Delta. Oral Presentation Presented at the Multidisciplinary International Conference on Water in Africa (ICWA 2022) on the theme: Towards Successful Delivery of SDGs 3 & 6, which held February 09 – 11, 2022.*

5. [^]*Adedoyin OO, Olalekan RM, Olawale SH, et al (2020). A review of environmental, social and health impact assessment (Eshia) practice in Nigeria: a panacea for sustainable development and decision making. MOJ Public Health. 2020;9(3):81–87. DOI: 10.15406/mojph.2020.09.00328. https://medcraveonline.com/MOJPH/MOJPH-09-00328.pdf.*

6. [^]*Olalekan RM, Oluwatoyin OA, Olawale SH, Emmanuel OO, Olalekan AZ (2020) A Critical Review of Health Impact Assessment: Towards Strengthening the Knowledge of Decision Makers Understand Sustainable Development Goals in the Twenty-First Century: Necessity Today; Essentiality Tomorrow. Research and Advances: Environmental Sciences. 2020(1):*

72-84. DOI: 10.33513/RAES/2001-13. https://ospopac.com/journal/environmental-sciences/early-online.

7. ^Olalekan RM, Oluwatoyin O and Olalekan A (2020) Health Impact Assessment: A tool to Advance the Knowledge of Policy Makers Understand Sustainable Development Goals: A Review. ES Journal of Public Health; 1(1); 1002. https://escientificlibrary.com/public-health/in-press.php.

8. ^Omidiji AO and Raimi MO (2019) Practitioners Perspective of Environmental, Social and Health Impact Assessment (ESHIA) Practice in Nigeria: A Vital Instrument for Sustainable Development. Paper Presented at the Association for Environmental Impact Assessment of Nigeria (AEIAN) On Impact Assessment: A Tool for Achieving the Sustainable Development Goals in Nigeria, 7th and 8th November, 2019 In University of Port Harcourt. https://aeian.org/wp-content/uploads/2019/08/EIA-Presentations-Portharcourt.pdf.

9. ^Raimi MO, Omidiji AO, Adio ZO (2019) Health Impact Assessment: A Tool to Advance the Knowledge of Policy Makers Understand Sustainable Development Goals. Conference paper presented at the: Association for Environmental Impact Assessment of Nigeria (AEIAN) On Impact Assessment: A Tool for Achieving the Sustainable Development Goals in Nigeria, 7th and 8th November, 2019 in University of Port Harcourt. DOI: 10.13140/RG.2.2.35999.51366. https://www.researchgate.net/publication/337146101.

10. ^United Nations Development Programme. (2015). Sustainable Development Goals. Retrieved from https://www.undp.org/content/undp/en/home/sustainable- development-goals.html.

11. a, b, c, d, e, f Federal Government of Nigeria. (2017). National Economic Recovery and Growth Plan (2017-2020). Retrieved from https://www.nigeriahealthwatch.com/wp-content/uploads/2017/04/Nigeria-Economic-Recovery-and-Growth-Plan-2017-2020.pdf

12. a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t World Bank. (2021). World Bank Open Data: Nigeria. Retrieved from https://data.worldbank.org/country/Nigeria.

13. ^United Nations. (2017). Sustainable Development Goals: 17 Goals to Transform Our World. Retrieved from https://www.un.org/sustainabledevelopment/

14. ^Sylvester CI, Odangowei IO, Matthew CO, Saoban SS, Zaharadeen MY, Muhammad A, Morufu OR, and Austin-Asomeji I (2023) Historical Perspectives and Overview of the Value of Herbal Medicine. In: Izah S. C et al. (eds.), Herbal Medicine Phytochemistry, Reference Series in Phytochemistry, https://doi.org/10.1007/978-3-031-21973-3_1-1.

15. ^Saliu, A.O., Komolafe, O.O., Bamidele, C.O., Raimi, M.O. (2023). The Value of Biodiversity to Sustainable Development in Africa. In: Izah, S.C., Ogwu, M.C. (eds) Sustainable Utilization and Conservation of Africa's Biological Resources and Environment. Sustainable Development and Biodiversity, vol 888. Springer, Singapore. https://doi.org/10.1007/978-981-19-6974-4_10.

16. ^Raimi MO, Abiola OS, Atoyebi B, Okon GO, Popoola AT, Amuda-KA, Olakunle L, Austin-AI & Mercy T. (2022). The Challenges and Conservation Strategies of Biodiversity: The Role of Government and Non-Governmental Organization for Action and Results on the Ground. In: Chibueze Izah, S. (eds) Biodiversity in Africa: Potentials, Threats, and Conservation. Sustainable Development and Biodiversity, vol 29. Springer, Singapore. https://doi.org/10.1007/978-981-19-3326-4_18.

17. ^Raimi MO, Austin-AI, Olawale HS, Abiola OS, Abinotami WE, Ruth EE, Nimisingha DS & Walter BO (2022). Leaving No One Behind: Impact of Soil Pollution on Biodiversity in the Global South: A Global Call for Action. In: Chibueze Izah, S. (eds) Biodiversity in Africa: Potentials, Threats and Conservation. Sustainable Development and Biodiversity, vol 29. Springer, Singapore. https://doi.org/10.1007/978-981-19-3326-4_8.

18. ^Raimi, MO., Sawyerr, HO., Ezekwe, IC., & Gabriel, S. (2022). Toxicants in Water: Hydrochemical Appraisal of Toxic Metals

Concentration and Seasonal Variation in Drinking Water Quality in Oil and Gas Field Area of Rivers State, Nigeria. In P. H. Saleh, & P. A. I. Hassan (Eds.), Heavy Metals - New Insights [Working Title]. IntechOpen. https://doi.org/10.5772/intechopen.102656. ISBN 978-1-80355-526-3.

19. ^Morufu OR, Aziba-anyam GR and Teddy CA (2021) 'Silent Pandemic': Evidence-Based Environmental and Public Health Practices to Respond to the Covid-19 Crisis. IntechOpen. DOI: http://dx.doi.org/10.5772/intechopen.100204. ISBN 978-1-83969-144-7. https://www.intechopen.com/online-first/silent-pandemic-evidence-based-environmental-and-public-health-practices-to-respond-to-the-covid-19-Published: December 1st 2021; ISBN: 978-1-83969-144-7; Print ISBN: 978-1-83969-143-0; eBook (PDF) ISBN: 978-1-83969-145-4. Copyright year: 2021.

20. a, bMorufu OR, Tonye VO & Adedoyin OO (2021) Creating the Healthiest Nation: Climate Change and Environmental Health Impacts in Nigeria: A Narrative Review. Scholink Sustainability in Environment. ISSN 2470-637X (Print) ISSN 2470-6388 (Online) Vol. 6, No. 1, 2021 www.scholink.org/ojs/index.php/se. URL: http://dx.doi.org/10.22158/se.v6n1p61. http://www.scholink.org/ojs/index.php/se/article/view/3684.

21. ^Afolabi AS, Raimi MO (2021) When Water Turns Deadly: Investigating Source Identification and Quality of Drinking Water in Piwoyi Community of Federal Capital Territory, Abuja Nigeria. Online Journal of Chemistry, 2021, 1, 38-58; DOI: 10.31586/ojc.2021.010105. www.scipublications.org/journal/index.php/ojc.

22. ^Olalekan MR, Abiola I, Ogah A, Dodeye EO (2021) Exploring How Human Activities Disturb the Balance of Biogeochemical Cycles: Evidence from the Carbon, Nitrogen and Hydrologic Cycles. Research on World Agricultural Economy. Volume 02, Issue 03. DOI: http://dx.doi.org/10.36956/rwae.v2i3.426. http://ojs.nassg.org/index.php/rwae.

23. a, bNational Bureau of Statistics. (2019). Nigeria Demographic and Health Survey2018. Retrievedfrom https://dhsprogram.com/pubs/pdf/FR359/FR359

24. a, b, c, d, e, f, g, h, iGift RA, Olalekan RM, Owobi OE, Oluwakemi RM, Anu B, Funmilayo AA (2020). Nigerians crying for availability of electricity and water: a key driver to life coping measures for deepening stay at home inclusion to slow covid-19 spread. Open Access Journal of Science. 2020;4(3):69–80. DOI: 10.15406/oajs.2020.04.00155.

25. a, b, c, d, e, f, g, h, iGift RA, Olalekan RM (2020). Access to electricity and water in Nigeria: a panacea to slow the spread of Covid-19. Open Access J Sci. 2020;4(2):34. DOI: 10.15406/oajs.2020.04.00148. https://medcrave.com/index.php?/articles/det/21409/

26. a, b, c, d, e, f, g, h, i, j, kOlalekan RM, Dodeye EO, Efegbere HA, Odipe OE. Deinkuro NS, Babatunde A and Ochayi EO (2020) Leaving No One Behind? Drinking-Water Challenge on the Rise in Niger Delta Region of Nigeria: A Review. Merit Research Journal of Environmental Science and Toxicology (ISSN: 2350-2266) Vol. 6(1): 031-049 DOI: 10.5281/zenodo.3779288

27. a, b, chttps://data.worldbank.org/indicator/SH.H2O.SMDW.ZS?locations=NG.

28. ^https://www.dataphyte.com/latest reports/what-does-multidimensional-poverty-really-mean-for-135-million-nigerians/.

29. a, b, c, d, e, f, g, h, i, j, k, lFAO. (2019). The State of Food Security and Nutrition in the World 2019. Retrieved from http://www.fao.org/3/ca5162en/ca5162en.pdf

30. a, b, c, d, e, fRaimi MO, Tonye VO, Omidiji AO, Oluwaseun EO (2018) Environmental Health and Climate Change in Nigeria. World Congress on Global Warming. Valencia, Spain. December 06-07, 2018.

31. a, b, c, d, eJacob OA, Anuoluwa OE and Raimi MO (2023) The notorious daredevils: potential toxic levels of cyanide and heavy metals in cassava flour sold in selected markets - taken Oke Ogun Community, Oyo State as an example. Front. Sustain. Food Syst. 7:1165501. doi: 10.3389/fsufs.2023.1165501. http://journal.frontiersin.org/article/10.3389/fsufs.2023.1165501/full?

&utm_source=Email_to_authors_&utm_medium=Email&utm_content=T1_11.5e1_author&utm_campaign=Email_publica.

32. a, b, c, d, e Modupe AO, Adebayo O, Sawyerr OH, Opasola AO, Morufu OR (2023) Concentrations of Pesticides Residues in Grain Sold at Selected Markets of Southwest Nigeria. Natural Resources for Human Health. 1-15 https://doi.org/10.53365/nrfhh/171368. eISSN: 2583-1194.

33. a, b, c, d Oshatunberu, MA., Oladimeji, A., Sawyerr, OH., & Raimi, MO. (2023). Searching for What You Can't See - Evaluation of Pesticide Residues in Grain Sold at Selected Markets of Southwest Nigeria. Current Research in Public Health, 3(1), 10–36. Retrieved from https://www.scipublications.com/ journal/index.php/crph/article/vie w/566.

34. a, b, c, d Asiegbu OV, Ezekwe IC, Raimi MO (2022). Assessing pesticides residue in water and fish and its health implications in the Ivo river basin of South-eastern Nigeria. MOJ Public Health. 2022;11(4):136–142. DOI: 10.15406/mojph.2022.11.00390.

35. a, b, c, d Hussain MI, Morufu OR, Henry OS (2021). Probabilistic Assessment of Self-Reported Symptoms on Farmers Health: A Case Study in Kano State for Kura Local Government Area of Nigeria. Environmental Analysis & Ecology Studies 9(1). EAES. 000701. 2021. DOI: 10.31031/EAES.2021.09.000701. Pp. 975- 985. ISSN: 2578-0336.

36. a, b, c, d Hussain MI, Morufu OR, Henry OS (2021) Patterns of Chemical Pesticide Use and Determinants of Self-Reported Symptoms on Farmers Health: A Case Study in Kano State for Kura Local Government Area of Nigeria. Research on World Agricultural Economy. Vol 2, No. 1. DOI: http://dx.doi.org/10.36956/rwae.v2i1.342. http://ojs.nassg.org/index.php/rwae/issue/view/31

37. a, b, c, d Hussain MI, Morufu OR, Henry OS (2021) Probabilistic Assessment of Self-Reported Symptoms on Farmers Health: A Case Study in Kano State for Kura Local Government Area of Nigeria. Research on World Agricultural Economy. Vol 2, No. 1. DOI: http://dx.doi.org/10.36956/rwae.v2i1.336. http://ojs.nassg.org/index.php/rwae-cn/article/view/336/pdf.

38. a, b, c, d Morufu OR (2021). "Self-reported Symptoms on Farmers Health and Commonly Used Pesticides Related to Exposure in Kura, Kano State, Nigeria". Annals of Community Medicine & Public Health. 1(1): 1002. http://www.remedypublications.com/open-access/self-reported-symptoms-on-farmers-health-and-commonly-used-pesticides-related-6595.pdf. http://www.remedypublications.com/annals-of-community-medicine-public-health-home.php.

39. a, b, c, d Isah, HM., Sawyerr, HO., Raimi, MO., Bashir, BG., Haladu, S. & Odipe, OE. (2020). Assessment of Commonly Used Pesticides and Frequency of Self-Reported Symptoms on Farmers Health in Kura, Kano State, Nigeria. Journal of Education and Learning Management (JELM), HolyKnight, vol. 1, 31-54. doi.org/10.46410/jelm.2020.1.1.05. https://holyknight.co.uk/journals/jelm-articles/.

40. a, b, c, d Olalekan RM, Muhammad IH, Okoronkwo UL, Akopjubaro EH (2020). Assessment of safety practices and farmer's behaviors adopted when handling pesticides in rural Kano state, Nigeria. Arts & Humanities Open Access Journal. 2020;4(5):191–201. DOI: 10.15406/ahoaj.2020.04.00170.

41. a, b, c, d Isah HM, Raimi MO, Sawyerr HO, Odipe OE, Bashir BG, Suleiman H (2020) Qualitative Adverse Health Experience Associated with Pesticides Usage among Farmers from Kura, Kano State, Nigeria. Merit Research Journal of Medicine and Medical Sciences (ISSN: 2354-323X) Vol. 8(8) pp. 432-447, August, 2020. DOI: 10.5281/zenodo.4008682. https://meritresearchjournals.org/mms/content/2020/August/Isah%20et%20al.htm.

42. a, b, c, d, e Suleiman RM, Raimi MO and Sawyerr HO (2019) A Deep Dive into the Review of National Environmental Standards and Regulations Enforcement Agency (NESREA) Act. International Research Journal of Applied Sciences. pISSN: 2663-5577, eISSN: 2663-5585. DOI No. Irjas.2019.123.123. www.scirange.com. https://scirange.com/abstract/irjas.2019.108.125

43. a, b, c, d *Raimi MO, Sawyerr HO and Isah HM (2020) Health risk exposure to cypermethrin: A case study of kano state, Nigeria. Journal of Agriculture. 7th International Conference on Public Healthcare and Epidemiology. September 14-15, 2020 | Tokyo, Japan.*

44. ^*Nigeria Sustainable Development Goals (SDGs) Indicators Baseline Report 2016. https://www.undp.org/nigeria/publications/nigeria-sdgs-indicators-baseline-report-2016*

45. ^*https://www.globalhungerindex.org/nigeria.html.*

46. ^*United Nation (2014). The Millennium Development Goal report 2014. New York, USA. www.un.org/en/development/desa/publications/mdg-re-port-2014.*

47. a, b, c, d *World Health Organization. (2020). Nigeria. Retrieved from https://www.who.int/countries/nga/en/*

48. ^*United Nations. (2015). Sustainable Development Goals. Retrieved from https://www.un.org/sustainabledevelopment/sustainable-development-goals/.*

49. a, b *Raimi OM, Lucky EC, Okoyen E, Clement A, Ogbointuwei C, et al. (2021) Making Better Informed, More Confident COVID-19 Decisions: Vaccine Hesitancy, Its Barriers and Impact Studies: Taking Bayelsa State as an Example. Int J Vaccine Immunizat 5(1): dx.doi. org/10.16966/2470-9948.126. https://sciforschenonline.org/journals/vaccines/IJVI126.php.*

50. a, b *Tuebi M; Franco, A; Raimi, MO; Chidubem, O; Sampou, WD (2021). The Quality and Acceptance of Family Planning Services in Improving Bayelsa State: Lessons Learnt From a Review of Global Family Planning Programs. Greener Journal of Medical Sciences, 11(2): 212-225.*

51. ^*Raimi, MO., Mcfubara, KG., Abisoye, OS., Ifeanyichukwu EC., Henry SO., & Raimi, GA (2021) Responding to the call through Translating Science into Impact: Building an Evidence-Based Approaches to Effectively Curb Public Health Emergencies [COVID-19 Crisis]. Global Journal of Epidemiology and Infectious Disease, 1(1). DOI: 10.31586/gjeid.2021.010102. Retrieved from https://www.scipublications.com/journal/index.php/gjeid/article/view/72.*

52. ^*Morufu OR, Ebikapaye O, Tuebi M, Aziba-anyam GR, Adedoyin OO, Aishat FA, Mariam OR, Beatrice OJ (2021) Do Weak Institutions Prolong Crises? [#ENDSARs] in the Light of the Challenges and opportunities beyond COVID-19 Pandemic and the Next Normal in Nigeria. Communication, Society and Media. ISSN 2576-5388 (Print) ISSN 2576-5396 (Online) Vol. 4, No. 2, DOI: https://doi.org/10.22158/csm.v4n2p1. http://www.scholink.org/ojs/index.php/csm/article/view/3790.*

53. ^*Raimi MO & Raimi AG (2020). The Toughest Triage in Decision Impacts: Rethinking Scientific Evidence for Environmental and Human Health Action in the Times of Concomitant Global Crises. CPQ Medicine, 11(1), 01-05.*

54. ^*Raimi MO, Moses T, Okoyen E, Sawyerr HO, Joseph BO, Oyinlola BO (2020) "A Beacon for Dark Times: Rethinking Scientific Evidence for Environmental and Public Health Action in the Coronavirus Diseases 2019 Era" Medical and Research Microbiology, Vol. 1, Issues 3.*

55. ^*Samson TK, Ogunlaran OM, Raimi OM (2020); A Predictive Model for Confirmed Cases of COVID-19 in Nigeria. European Journal of Applied Sciences, Volume 8, No 4, Aug 2020;pp:1-10. DOI: 10.14738/aivp.84.8705. DOI: https://doi.org/10.14738/aivp.84.8705.*

56. ^*National Primary Health Care Development Agency. (2017). Integrated Maternal, Newborn, and Child Health Strategy (IMNCH). Retrieved from https://nphcda.gov.ng/programmes/integrated-maternal-newborn-and-child-health-strategy-imnch/*

57. ^*Raimi MO, Omidiji AO, Ebikapaye O, Moses T, Adeolu TA, Makanjuola Bosede C (2019), Situational Analysis of National Immunization Programme in Nigeria, Journal of Immunology and Inflammation Diseases Therapy. Doi: http://dx.doi.org/10.31579/2637-8876.2019/008.*

58. a, b, c, d, e *UNICEF. (2019). Nigeria: Water, Sanitation and Hygiene (WASH). Retrieved from*

https://www.unicef.org/nigeria/water-sanitation-and-hygiene-wash.

59. ^*Raimi MO, and Ochayi EO. (2017) Assessment of the Rate of Sexually Transmitted Diseases in Kubwa F.C.T. Abuja, Nigeria, Science Journal of Public Health. Vol. 5, No. 5, 2017, Pp. 365-376. DOI: 10.11648/J.Sjph.20170505.12.*

60. a, b *UNAIDS. (2020). Nigeria. Retrieved from https://www.unaids.org/en/regionscountries/countries/Nigeria.*

61. a, b *World Health Organization. (2019). World Malaria Report 2019. Retrieved from https://www.who.int/publications/i/item/world-malaria-report-2019.*

62. ^*National Agency for the Control of AIDS. (2017). National Strategic Framework for HIV/AIDS Response (2017-2021). Retrieved from https://naca.gov.ng/wp-content/uploads/2017/06/NSF_Final_Document_2017.pdf.*

63. ^*National Malaria Elimination Program. (2020). About NMEP. Retrieved from https://nmcp.gov.ng/about-nmcp/*

64. ^*World Health Organization. (2018). Non-communicable diseases country profiles 2018. Retrieved from https://www.who.int/nmh/publications/ncd- profiles-2018/en/*

65. ^*Abdulraheem A. FO, Olalekan RM, Abasiekong EM (2018) Mother and father adolescent relationships and substance use in the Niger delta: a case study of twenty-five (25) communities in Yenagoa local government of Bayelsa state, Nigeria. Sociol Int J. 2018;2(6):541–548. DOI: 10.15406/sij.2018.02.00097*

66. ^*Funmilayo AA, Robert OT, Olalekan RM, Okoyen E, Tuebi M (2019). A study of the context of adolescent substance use and patterns of use in yenagoa local government, Bayelsa State, Nigeria. MOJ Addiction Medicine and Therapy. 2019;6(1):25–32. DOI: 10.15406/mojamt.2019.06.00142.s*

67. ^*Raimi MO, Abdulraheem AF, Major I, Ebikapaye O, Bilewu OO (2019). Public Health Impact of Substance Use on Adolescent: A Snapshot of Yenagoa in Bayelsa State, Nigeria. American Journal of Biomedical Science & Research. 2019 - 4(3). AJBSR.MS.ID.000796. DOI: 10.34297/AJBSR.2019.04.000796. https://biomedgrid.com/current-issue.php.*

68. ^*Federal Ministry of Health. (2013). Mental Health Policy and Strategic Plan for Nigeria (2013-2020). Retrieved from https://www.health.gov.ng/doc/Mental%20Health%20Policy%20and%20Strategic%20Plan%20for%20Nigeria%202013-2020.pdf*

69. a, b, c, d, e, f, g *UNESCO. (2020). Global Education Monitoring Report 2020. Retrieved from https://en.unesco.org/gem-report/report/2020*

70. ^*Demographic and Health Survey. (2008). DHS Nigeria 2008.*

71. ^*World Health Organization (2024) data.who.int, Proportion of population using safely managed sanitation services (%) [Indicator]. https://data.who.int/indicators/i/12EE54A (Accessed on 1 February 2024)*

72. a, b, c *Raimi MO, Omidiji AO, Adeolu TA, Odipe OE and Babatunde A (2019) An Analysis of Bayelsa State Water Challenges on the Rise and Its Possible Solutions. Acta Scientific Agriculture 3.8 (2019): 110-125. DOI: 10.31080/ASAG.2019.03.0572.*

73. a, b, c *Olalekan RM, Adedoyin OO, Ayibatonbira A, et al (2019). "Digging deeper" evidence on water crisis and its solution in Nigeria for Bayelsa state: a study of current scenario. International Journal of Hydrology. 2019;3(4):244–257. DOI: 10.15406/ijh.2019.03.00187.*

74. a, b, c *Raimi MO, Abdulraheem AF, Major I, Odipe OE, Isa HM, Onyeche C (2019). The Sources of Water Supply, Sanitation Facilities and Hygiene Practices in an Island Community: Amassoma, Bayelsa State, Nigeria. Public Health Open Access 2019, 3(1): 000134. ISSN: 2578-5001. DOI: 10.23880/phoa-16000134.*

75. a, b, c *Olalekan RM, Vivien OT, Adedoyin OO, et al. (2018). The sources of water supply, sanitation facilities and hygiene practices in oil producing communities in central senatorial district of Bayelsa state, Nigeria. MOJ Public Health. 2018;7(6):337–345. DOI: 10.15406/mojph.2018.07.00265.*

76. [a, b, c]Raimi, MO, Pigha, TK and Ochayi, EO (2017) Water-Related Problems and Health Conditions in the Oil Producing Communities in Central Senatorial District of Bayelsa State. Imperial Journal of Interdisciplinary Research (IJIR) Vol-3, Issue-6, ISSN: 2454-1362.

77. [^]https://dhsprogram.com/publications/publication-fr293-dhs-final-reports.cfm.

78. [^]https://www.unicef.org/nigeria/reports/nigeria-multiple-indicator-cluster-survey-mics-2011

79. [^]UN (2015). We can end poverty: Millennium Development Goals (MDGs) and beyond 2015. Retrieved from http://www.un.org/millenniumgoals/on November 10, 2015. Google Scholar

80. [^]Federal Ministry of Women Affairs and Social Development. (2006). National Gender Policy.Retrieved from https://www.unicef.org/nigeria/media/1361/file/National%20Gender%20Policy.pdf

81. [a, b]National Population Commission and ICF. (2019). Nigeria Demographic and Health Survey 2018. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF.

82. [^]Raimi MO, Bilewu OO, Adio ZO, Abdulrahman H (2019) Women Contributions to Sustainable Environments in Nigeria. Journal of Scientific Research in Allied Sciences. 5(4), 35-51. ISSN NO. 2455-5800. DOI No. 10.26838/JUSRES.2019.5.4.104.

83. [^]Raimi MO, Suleiman RM, Odipe OE, Salami JT, Oshatunberu M, et al (2019). Women Role in Environmental Conservation and Development in Nigeria. Ecology & Conservation Science; 1(2): DOI: 10.19080/ECOA.2019.01.555558. Volume 1 Issue 2 - July 2019. https://juniperpublishers.com/ecoa/pdf/ECOA.MS.ID.555558.pdf.

84. [^]Raimi MO, Raimi AG, Raimi Mariam O (2019). How Universities Can Create Green Jobs for Students. Peer Res Nest. 2019 - 1(2). PNEST.19.07.003. https://peernest.org/article-in-press.php.

85. [^]Inter-Parliamentary Union. (2021). Women in national parliaments. Retrieved from https://data.ipu.org/content/women-in-parliament.

86. [^]Morufu R and Clinton E (2017), Assessment of Trace Elements in Surface and Ground Water Quality (2017) LAP Lambert Academic Publishing. Mauritius. ISBN: 978-3-659-38813-2. www.omniscriptum.com.

87. [^]Olalekan AS, Adewoye SO, Henry SO, Olaniyi OA, Raimi MO (2023). Comprehensive understanding of hydrogeochemical evaluation of seasonal variability in groundwater quality dynamics in the gold mining areas of Osun state, Nigeria. Int J Hydro. 2023;7(5):206–220. DOI: 10.15406/ijh.2023.07.00359.

88. [^]Raimi, MO., Oyeyemi, AS., Mcfubara, KG., Richard, GT., Austin-Asomeji, I., Omidiji, AO. (2023). Geochemical Background and Correlation Study of Ground Water Quality in Ebocha-Obrikom of Rivers State, Nigeria. Trends Appl. Sci. Res, 18(1), 149-168. https://doi.org/10.17311/tasr.2023.149.168.

89. [^]Stephen OA, Olayinka AS, Olawale HS, Olalekan RM (2023). Comparative Assessment of Seasonal Variations in the Quality of Surface Water and Its Associated Health Hazards in Gold Mining Areas of Osun State, South-West Nigeria. Adv Environ Eng Res; 4(1): 011; doi:10.21926/aeer.2301011.

90. [^]Raimi, O., Ezekwe, C., Bowale, A. and Samson, T. (2022) Hydrogeochemical and Multivariate Statistical Techniques to Trace the Sources of Ground Water Contaminants and Affecting Factors of Groundwater Pollution in an Oil and Gas Producing Wetland in Rivers State, Nigeria. Open Journal of Yangtze Oil and Gas, 7, 166-202. doi: 10.4236/ojogas.2022.73010.

91. [^]Olalekan MR, Olawale HS, Clinton IE and Opasola AO (2022) Quality Water, Not Everywhere: Assessing the Hydrogeochemistry of Water Quality across Ebocha-Obrikom Oil and Gas Flaring Area in the Core Niger Delta Region of

Nigeria. *Pollution, 8(3): 751-778.*

92. ^*Raimi, M. and Sawyerr, H. (2022) Preliminary Study of Groundwater Quality Using Hierarchical Classification Approaches for Contaminated Sites in Indigenous Communities Associated with Crude Oil Exploration Facilities in Rivers State, Nigeria. Open Journal of Yangtze Oil and Gas, 7, 124-148. doi: 10.4236/ojogas.2022.72008.*

93. ^*Olalekan, RM., Omidiji, AO., Nimisngha, D., Odipe, OE. and Olalekan, AS. (2018). Health Risk Assessment on Heavy Metals Ingestion through Groundwater Drinking Pathway for Residents in an Oil and Gas Producing Area of Rivers State, Nigeria. Open Journal of Yangtze Gas and Oil, 3, 191-206. https://doi.org/10.4236/ojogas.2018.33017*

94. ^*Raimi MO and Sabinus CE (2017) An Assessment of Trace Elements in Surface and Ground Water Quality in the Ebocha-Obrikom Oil and Gas Producing Area of Rivers State, Nigeria. International Journal for Scientific and Engineering Research (Ijser): Volume 8, Issue 6, July Edition. ISSN: 2229-5518.*

95. ^*Raimi MO, Clinton IE, Olawale HS (2021) Problematic Groundwater Contaminants: Impact of Surface and Ground Water Quality on the Environment in Ebocha-Obrikom Oil and Gas Producing Area of Rivers State, Nigeria. Oral Presentation Presented at the United Research Forum. 2nd International E-Conference on Geological and Environmental Sustainability during July 29-30, 2021.*

96. ^*Raimi MO (2019) 21st Century Emerging Issues in Pollution Control. 6th Global Summit and Expo on Pollution Control May 06-07, 2019 Amsterdam, Netherlands.*

97. a, b, c*Raimi MO, Omidiji AO, Odipe OE, Suleiman HO (2019) Open Defecation and Public Toilets Importance: An Economic Perspective. Preventing Health Care in Nigeria: Everyone, Everywhere Leaving Nobody Behind. July 29 – August 1, 2019 National Open University Auditorium, University Village, Jabi Abuja.*

98. a, b, c*Oluwaseun EO., Raimi MO, Nimisingha DS, Abdulraheem AF, Okolosi-PE, Habeeb Modupe Lateefat and Mary Fadeyibi (2019) Assessment of Environmental Sanitation, Food Safety Knowledge, Handling Practice among Food Handlers of Bukateria Complexes in Iju Town, Akure North of Ondo-State, Nigeria. Acta Scientific Nutritional Health 3.6 (2019): 186-200. DOI: 10.31080/ASNH.2019.03.0308.*

99. a, b, c*Raimi MO, Omidiji AO, Abdulraheem AF, Ochayi EO (2018) A Survey of Hand Washing Behaviour and Awareness among Health Care Workers in Health Care Facilities in Kubwa District of Bwari Area Council, F.C.T. Abuja, Nigeria. Annals of Ecology and Environmental Science Volume 2, Issue 2, 2018, PP 1-18.*

100. ^*Federal Ministry of Water Resources. (2000). National Water Supply and Sanitation Policy. Retrieved from https://www.washghana.net/wp-content/uploads/2015/08/National-Water-Supply-and-Sanitation-Policy.pdf.*

101. ^*Odubo TR and Raimi MO (2019) Resettlement and Readjustment Patterns of Rural Dwellers During and After Flood Disasters in Bayelsa State Nigeria. British Journal of Environmental Sciences Vol.7, No.3, Pp. 45-52, July 2019. www.eajournals.org.*