



EBONYI STATE CLIMATE CHANGE POLICY





**Climate
Change
IS REAL**

**Be part of the
Solution**

**His Excellency
Engr. David Nweze Umahi, Fdate, Fnse
Governor of Ebonyi State**

Ebonyi State Climate Change Policy



Table of Contents

List of Figures

List of Acronyms and Abbreviations

List of Consultants

Acknowledgment

Foreword

1.	Introduction	10
1.1.	Background	10
1.2.	Justification	11
1.3.	Link with National Policy	11
1.4.	Objectives	12
1.5.	Methodology	12
2.	Current and Future Impacts of Climate Change in the State	12
2.1.	Climate data	12
2.2.	Mean Precipitation Projections	12
2.3.	Mean Temperature Projections	13
3.	Vision, Mission & Guiding Principles	16
4.	Sectoral Strategies	18
4.1.	Agriculture	18
4.1.1.	Crop sub-sector	18
4.1.2.	Livestock Sub-Sector	19
4.1.3.	Fisheries Sub-Sector	20
4.1.4.	Forest Sub-Sector	21
4.2.	Health Sector	21
4.3.	Water Resources Sector	23
4.4.	Housing and Human Settlements Sector	25
4.5.	Energy Sector	26
4.6.	Commerce and Industry	28
4.7.	Education Sector	30
4.8.	Transport Sector	32
4.9.	Gender and Vulnerable Groups	34
4.10.	Disaster Management Sector	36
5.	Broader Strategies for Implementation	36
6.	Legal and Institutional Frameworks for Climate Change Response in the State References	38

List of Figures

Figure 1. Historical (1960-1990) and projected mean annual precipitation (mm) over Nigeria for 2050- and 2070-time horizons for RCP 4.5 and 8.5. 10

Figure 2. Mean annual temperature changes for time series of 2050 and 2070 at RCP4.5 and RCP8.5 compared to the historical baseline of 1960-1990. 11

List of Acronyms and Abbreviations

Acronym/Abbreviation Description

AFOLU	Agriculture, Forest and Other Land Uses
CDM	Clean Development Mechanism
CNG	Compressed Natural Gas
CO ₂	Carbon Dioxide
CSA	Climate-Smart Agriculture
CSO	Civil Society Organisation
GCM	Global Circulation Model
GHG	Greenhouse Gas
GII	Gender Inequality Index
HFC	Hydro fluorocarbons
IPCC	Intergovernmental Panel on Climate Change
LGA	Local Government Area
LPG	Liquefied Petroleum Gas
NAP	National Action Plan
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organizations
PPP	Public Private Partnership
RCP	Representative Concentration Pathways
REA	Rural Electrification Agency
REDD	Reducing Emissions from Deforestation and Forest Degradation
SLCP	Short-Lived Climate Pollutant
TNC	Third National Communication
UNFCCC	United Nations Convention on Climate Change
WHO	World Health Organisation

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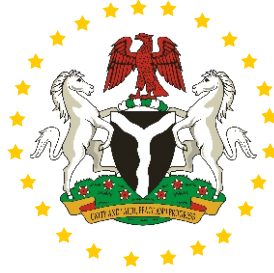
The opinions and data provided by these stakeholders greatly improved the contents of the policy. Finally, the efforts and dedication of the staff members in the Office of Senior Special Assistant to the Governor of Ebonyi State on Climate Change are very well acknowledged.



DR OBIANUJU ALOH (MRS.)

Senior Special Assistant to the Governor of Ebonyi State on Climate Change

Foreword



EBONYI STATE GOVERNMENT OF NIGERIA SECRETARY TO THE STATE GOVERNMENT

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EBONYI STATE CLIMATE CHANGE POLICY DOCUMENT AND ACTION PLAN ON AGRICULTURE

Foreword by Secretary to Ebonyi State Government/Coordinating Commissioner:

This report represents a major landmark in the effort of Ebonyi State Government to take a serious and structured approach in combating the menace of climate change in the state, as well as turn climate change into an opportunity to achieve sustainable low-carbon development.

Many will agree that the central purpose of any serious government is to help people meet their needs for secure and decent livelihood. It was the desire of Ebonyi State Government to play her own part in helping the people of Ebonyi State to attain better levels of development and reap the dividends of democracy that propelled His Excellency, Engr. Dr. David Nweze Umahi, FNSE, FNATE, to seek political office.

It has now become very obvious that climate change is a major threat to development all over the world and most especially to states like Ebonyi, where the vast majority of people are highly vulnerable to the impact of long term climate variability due mainly to the dependence on substance rain-fed agriculture, wide-scale poverty and weak adaptive capacity. In the past years, we have witnessed increased flooding and drought in the state among other climate impacts, all of which have affected lives and property and reduced crop yield. Large places across the state have become uninhabitable because they are either flooded frequently or get hardly any rainwater at all. Heavy waves have also become more regular in the state.

When we saw the increasing threat of climate change to the safety, livelihood and development of the state, and the need for serious effort to address the problem, His Excellency moved quickly to create the Ebonyi State Climate Change Office and instructed the team, headed by Dr Obianuju Aloh, to work with the Ministry Environment, Ministry of Agriculture and other relevant stakeholders to come up with plans and initiatives to combat the menace and promote green and sustainable growth in Ebonyi State.

We also started to take meaningfully practical steps to combat the adverse effect of climate change. Thus, in this regard His Excellency embarked on the construction of a pulverization plant at Umuoghara, Ezza North Local Government Area, the biggest in Nigeria with the capacity to process 200 metric tons every day. His Excellency established a number of solar power panel that contributes a good fraction of the State's power supply, and he have procured Carbon Free Environment Friendly Tricycle which are already in use in our dear state. Under the Ebonyi Green Project, the governor directed that trees should be planted along all major roads and rural areas (especially those constructed under this administration). Worthy of note too, is the recent action of sending a bill to the State House of Assembly on Climate Change.

His Excellency also approved the drafting of Ebonyi State Climate Change Policy Document and Action plan on Agriculture because he believed that we need to have document(s) that will provide a strategic and a clear framework that can help Ebonyi State to take coordinated, structured and ambitious action on climate change. I am delighted that these reports have been completed. I believe that this will put Ebonyi among the few states in the Federal Republic of Nigeria that have developed a clear climate change policy.

I thank the lead Consultant for the project, Prof. Chuwumerije Okereke and his team for an excellent report, the international organizations that helped to fund the project and the Senior Special Assistant to the Governor on Climate Change, Dr. Obianuju Aloh, for her good leadership in the effort to complete the project.

I hereby request that all key stakeholders identified in the report, as having key roles to play in the efforts to address climate change, to study the report and come up with actionable plan on how we can work together to put Ebonyi State in the path of Climate Resilient and prosperous green economy in the interest of the present and future generations.



Dr. Kenneth Ugbala
Secretary to the State Government/Coordinating Commissioner

Introduction

1.1 Background

The Ebonyi State Government is committed to addressing the multiple development challenges facing the people of the state and lifting as many people as possible out of poverty. It is now widely known that climate change is one of the biggest development challenges facing Nigeria and the rest of the world today. Although no country or region in the world is exempted from the challenges of climate change, the biggest threats and risks are often borne by the countries, regions, and communities that are already struggling with other aspects of human development challenges; mainly poverty and the weak capacity to adapt. While some aspects of climate change are natural, the world's scientists have long established that the bulk of the Green House Gas Emissions (GHG) responsible for climate change comes from human activities associated with economic growth [1].

Climate change is occurring at a rate and scale described as unprecedented in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [2]. This calls for an urgent and coordinated action at all levels of government. The Nigerian government has already taken steps in combating the menace of climate change. Nigeria is a party to the United Nations Convention on Climate Change (UNFCCC) and the Paris Agreement. Nigeria has developed a Nationally Determined Contribution (NDC) which outlines what the country will do to tackle climate change. The country has also developed various editions of National Climate Policy which lay out the range of interventions that the country is making to tackle climate change. These include encouraging state governments to take climate change seriously and develop their own state level policies. Therefore, as a mark of true and responsible leadership, the government of Ebonyi State is determined to do her fair share in tackling climate change and to engage other stakeholders to articulate and pursue measures that will enable the state to respond effectively to climate change. Ebonyi state is particularly exposed and vulnerable to climate change. It is therefore necessary to act swiftly to protect livelihoods and preserve the development gains that have been made in the different sectors in the state.

1.2. Justification

There is abundant evidence that climate change affects virtually all sectors of the state in ways that threaten the lives and livelihoods of people. Nigeria is often described as one of the most vulnerable countries in the world. In Ebonyi state as well as in many other parts of the country, the majority of Nigerians depend on climate-sensitive livelihood activities such as farming, fishing and livestock production. Also, there is widespread poverty in the country equally characterized by poor infrastructural development which leads to low adaptive capacity.

The projections in Nigeria's Third National Communication [3] and the National Adaptation Strategy and Plan of Action on Climate Change for Nigeria [4] indicate that the country will generally experience significant temperature variations in the future. The rate of precipitation is also projected to change in different parts of the country. Studies [5,6] show that Ebonyi State is already experiencing a raft of negative impacts of climate change such as unprecedented degrees of flooding, erosion, irregular rainfall pattern and distribution, increased heat and so on. Agriculture is the main means of livelihood in the State and this activity is largely rainfed. This makes the State very vulnerable to the impacts of climate change.

At the same time, while climate change brings a lot of threats and risks, it also presents some opportunities. The biggest opportunity in climate change is that it opens up space for serious conversations about how to build a sustainable resilient economy that conserves the natural environment and does not compromise the opportunity of future generations to have meaningful lives. By pursuing economic development in ways that also address or alleviate the problem of climate change, the state can secure the livelihoods of her citizens and also create opportunities for them in clean industries that align with the direction of global development and technological advancement.

It is against this backdrop that Ebonyi State is developing this climate change policy intended to provide a framework to respond to risks of climate change and explore potential benefits presented by a changing climate. The policy demonstrates the commitment of Ebonyi State to combat climate change, explore any opportunities that it presents and show support for Nigeria's effort in fighting climate change. The Policy is in line with the 1999 Constitution of the Federal Republic of Nigeria and complements various Nigerian climate change plans, strategies and policies.

1.3. Link with National Policy

The policy recommendations will be closely linked to the existing state and national development and sectoral plans, policies and strategies. These include sectoral policies and strategies related to the environment, agriculture, energy, housing and urban development, education, commerce and industry, among many others. Alongside this climate policy document, the government is also developing an Action Plan to guide her intervention in the area of Agriculture. Work is also underway to formulate a climate change law to help the state anchor some of the policies into legislations in ways that will increase the chances and sustainability of the actions and measures.

Nationally, these policy recommendations are in line with the National Adaptation Strategy and Plan of Action on Climate Change for Nigeria, National Agricultural Resilience Framework, Agriculture Promotion Policy, National Policy on Climate Change, Nationally Determined Contributions, Nationally Determined Contributions Sectoral Action Plans, National Action Plan on Gender and Climate Change for Nigeria, Nigeria's National Action Plan to reduce Short-Lived Climate Pollutants (SLCPs). These policies, plans and strategies demonstrate actions/strategies needed to respond to climate change.

1.4. Objectives

The objectives of this policy are to:

1. Provide and or support any existing institutional frameworks on climate change governance in the state intended to coordinate and implement climate change response strategies, initiatives and activities;
2. Identify priority adaptation and mitigation action areas and the respective roles of different stakeholders in the state in addressing such action;
3. Provide a framework for capacity building efforts towards addressing climate change in the state. Such efforts could be education and training; awareness, outreach and networking; research and innovation; technology development and transfer; and information and knowledge management;
4. Promote a framework for coordinated research on climate change through support to and from universities in the state, especially in the areas of climate information services, adaptation, resilience, green economic growth and disaster risk management;

5. Provide a framework to facilitate the mainstreaming of climate change into all planning and development efforts in the state including budgeting;
6. Facilitate the mobilization of resources for the implementation of identified and prioritized actions, programs and activities.
7. To ensure effective implementation of the policy, a monitoring and evaluation (M&E) framework shall be developed. The Ministry of Environment shall be responsible for this. It is important to continuously review this policy every four years while taking into account emerging issues at the local, national, regional and global levels.

1.5. Methodology

A collaborative approach was employed to develop the framework, which started with the formation of an Ebonyi State Climate Policy and Action Plan for Agriculture team comprising the Special Assistant to the Governor on Climate Change, the consultants, academics and government officials. This team had several meetings with the funding agencies to discuss the scope and objectives of the policy. Detailed outlines were then circulated and reviewed by the members of the team and by the funding organizations. Next came the holding of an inception stakeholder workshop involving the Chairman of the Committee on Environment in the State House of Assembly, Non-Governmental Organizations (NGOs), directors of relevant agencies and representatives from all the local governments of the state. The inception meeting was used as an opportunity to administer a survey on several aspects of climate change to different stakeholders, including relevant state ministries, local governments, the private sector and NGOs. The survey yielded valuable information about climate threats that people are facing, on-going activities and suggestions on priority mitigation and adaptation actions. The Policy drafting also involved extensive literature review and analysis.

2. Current and Future Impacts of Climate Change in the State

2.1 Climate data

Ebonyi State is located in southern Nigeria, and a greater part of the State could be categorized into the Guinea Savanna and Rainforest agro-ecological zones of the country. Nigeria's Third National Communication (TNC) to the United Nations Framework Convention on Climate Change (UNFCCC) analysed historical climate data and made future climate projections [3]. The analysis was based on a multi-model ensemble dynamic downscaling method using 11 Global Circulation Models (GCMs) of future climate scenarios for Nigeria (for a list of the 11 GCMs, see Third National Communication: TNC, 2020, p. 162) [3]. Furthermore, the data were sourced from WorldClim global spatial dataset based on the national meteorological stations, which are then interpolated at different grid-resolutions at the national level. The data used constitutes the baseline for the years 1960-1990 and projections for the 2050 (average for 2041-2060) and 2070 (average for 2061-2080) time horizons. The emissions scenarios considered in the analysis are the Representative Concentration Pathways 8.5 (RCP 8.5 or high emissions scenario) and Representative Concentration Pathways 4.5 (RCP 4.5 or low to medium emissions scenario).

2.2 Mean Precipitation Projections

Figure 1 shows the spatial mean annual precipitation of the baseline (1960-1990) and for time horizons of 2050 (mean 2041-2060) and 2070 (mean 2061-2080) for the emission scenarios RCP4.5 and RCP8.5. Both RCP4.5 and RCP8.5 predict that there is likely to be a

variable increase in precipitation up to 2070 in all parts of Nigeria. In terms of an aggregated mean annual precipitation, the southern part of the country is expected to have more areas with more than 3,000mm/year in the future up to 2070 [3].

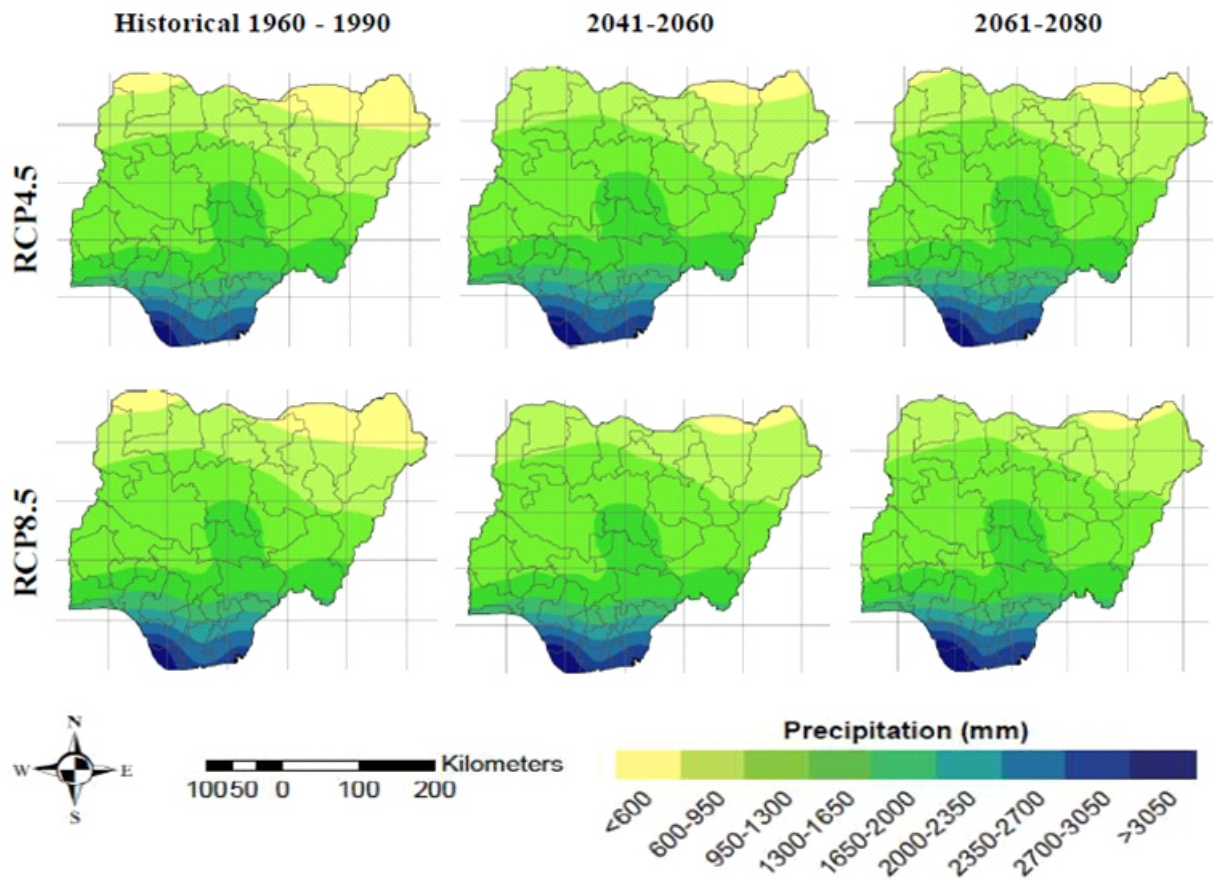


Figure 1. Historical (1960-1990) and projected mean annual precipitation (mm) over Nigeria for 2050- and 2070-time horizons for RCP 4.5 and 8.5. Source: Federal Ministry of Environment [3]

2.3 Mean Temperature Projections

Figure 2 shows the spatial mean temperature of the baseline (1960-1990) and for time horizons of 2050 (mean 2041-2060) and 2070 (mean 2061-2080) for the emission scenarios RCP4.5 and RCP8.5. Both RCP 4.5 and RCP8.5 predict that there is likely to be a variable increase in temperature up to 2070 across Nigeria. The Rainforest and Guinea Savanna zones are projected to increase around 2°C and 3°C under the RCP4.5 and RCP8.5, respectively, for the 2050-time horizon. The projections for the 2070-time horizon indicate higher increases of 2.5°C and 3.25°C under the RCP4.5 and RCP8.5 scenarios [3].

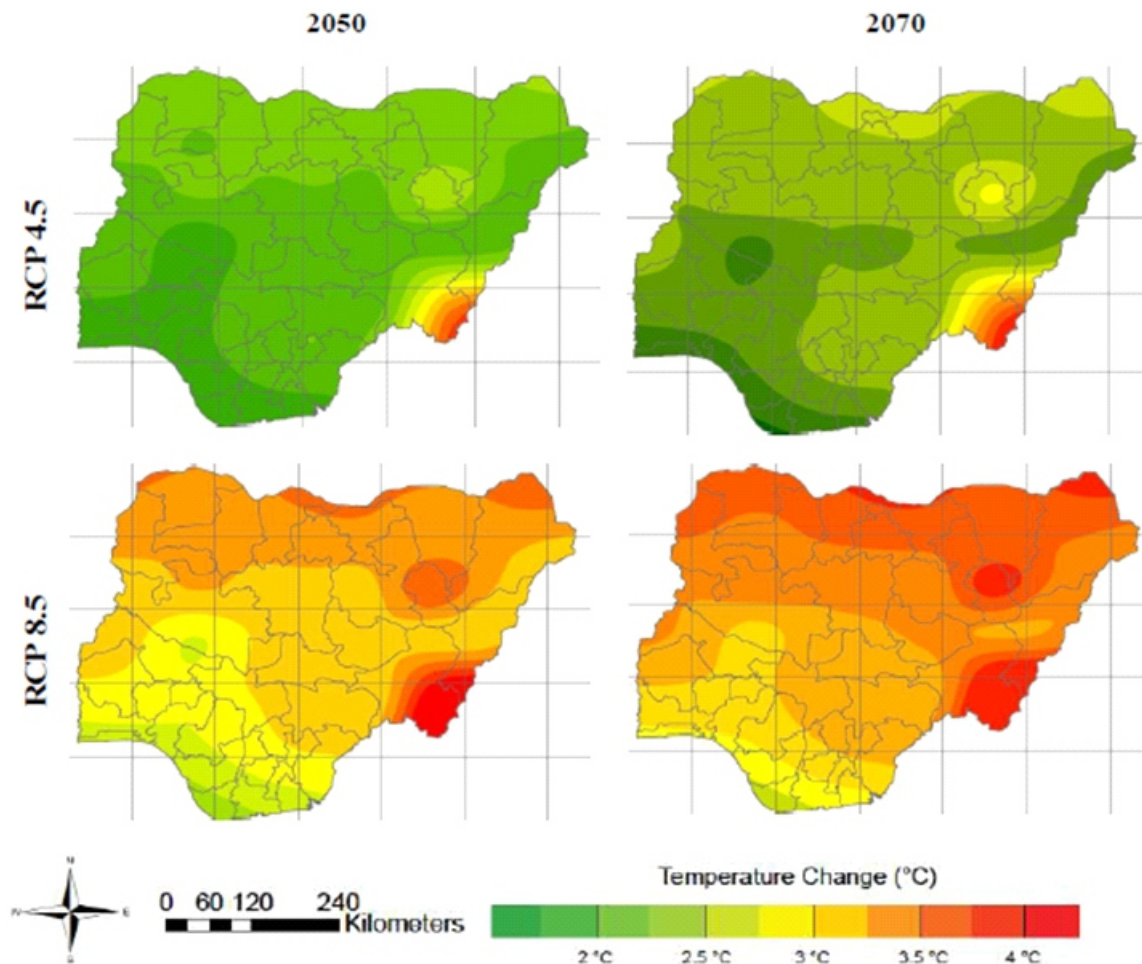


Figure 2. Mean annual temperature changes for time series of 2050 and 2070 at RCP4.5 and RCP8.5 compared to the historical baseline of 1960-1990.
Source: Federal Ministry of Environment [3]

Studies confirmed that climate projections about rising sea levels and soaring temperatures are real with examples in river flooding in Ebonyi [7,8]. Heavy rainfall peculiar to the southern part generates large volumes of runoff which create waterways and channels that result in gullies [9]. The survey also classified risk of extreme heat hazard as “high” in the state. This means that prolonged exposure to extreme heat, resulting in heat stress, is expected to occur frequently. Continued emissions of greenhouse gases will cause further warming, and it is virtually certain that there will be more frequent hot temperature extremes over most land areas of the state in the immediate future.

Ebonyi State is ravaged by flood and erosion which are visible in many communities across the State. Among the areas where erosion has wreaked havoc is Afikpo South [5]. Many communities in the State have experienced frequent flooding that washes away crops [10, 11]. Moreover, the likelihood of reduced agricultural productivity and outputs/yields is very high due to the combined effects of floods and degraded lands/soils resulting from erosion.

The continual dissection from gully formations leads to the loss of cultivable land area available for agricultural production, and causes the removal of plant nutrients and organic matter content from the soil, resulting in elevated soil infertility. Agribusiness is impacted negatively especially for communities where distortion, destruction and breakage of feeder

road networks have reduced access to markets. Consequently, the reduction of agricultural productivity, aquatic resources such as fish and crustacean and contamination of surface water sources elevate the vulnerability of smallholder households to food and nutrition insecurity. Women and youth who engage in crop production and fishing in communities proximate to streams and rivers are particularly exposed to reaping poorer economic benefits due to these agroecological hazards. Health, energy, transport systems, housing and human settlements, education, water resources, commerce and industry, disaster risk reduction and forests are all affected.

Climate change affects soil nutrients and soil microbial activities, alters rainfall patterns and distribution, which may contribute to decreased crop yield. High temperature and drought affect crop production. Climate change can also increase the incidence of pests and diseases harmful for crop, livestock and fisheries. Flooding could reduce soil fertility and destroy farm assets. Agriculture also contributes to greenhouse gas emissions. Nigeria's Third National Communication to the United Nations Framework Convention on Climate Change reports that Agriculture, Forest and Other Land Use (otherwise called the AFOLU sector) sector is the largest contributor of greenhouse gas emissions in Nigeria [3].

Climate change is expected to increase the incidence of heat-related health diseases and the breeding of disease vectors. With changes in the climate and migration patterns towards the cities, infrastructural shortages related to waste disposal pose serious health hazards. According to the United Nations Population Division, "The proportion of the population living in urban areas has increased to 46.9% in 2014, from 34.8% in year 2000, with an urbanization growth rate of 3.75%". This has clearly resulted in increased pressure on the meagre infrastructure (social amenities and facilities) in cities. Again, the felling of forests trees for agricultural production results in habitat displacements/ecosystem disruptions for animals such as rodents. This situation accentuates the spread of diseases of poor sanitation such as cholera, enteric fever, typhoid and other diarrhoeal diseases; and haemorrhagic fever diseases such as Lassa fever. If nothing is done to reverse these trends, there will be increases in the climate-related health challenges in the future in Ebonyi State. Other less obvious health-related challenges of the changing climate include overt- and hidden-hunger due to poor agricultural yields, increasing incidents of vector-borne diseases such as malaria, and pollution of underground water supplies by flood-borne organisms.

The degree to which climate change impacts people depends, in part, on their social status, gender, poverty and access to livelihood resources. Despite growing awareness of the disparities between experiences and skills that men and women have in development and environmental sustainability initiatives in the international community, women often have less financial, political and legal influence, and are thus more vulnerable and less able to cope with the negative impacts of climate change. Climate change could intensify vulnerability and hamper the achievement of Sustainable Development Goals [12]. The 2019 Human Development Report notes that climate change affects livelihoods in less-developed nations and that it will even escalate the most severe environmental challenges, including deforestation, erosion, and land degradation that adversely affect the poorest. The poorest and vulnerable communities tend to rely largely on climate-sensitive livelihood sources (e.g., agriculture), making them excessively vulnerable to climate change [13]. They lack funding to counter extreme climatic impacts (e.g., through better housing, drought-tolerant varieties). This reduced adaptive ability renders them more vulnerable, making them to participate in environmentally destructive practices, such as deforestation, to sustain their well-being [14].

The energy sector contributes to climate change. Emissions from this sector come from mainly use of fossil fuels. Another predominant source of energy in Nigeria is the use of firewood and charcoal, which involves the cutting and burning of trees. However, the cutting of trees and the replacement of trees is not proportionate, leading to catastrophic environmental issues (e.g., erosion, floods, and droughts). On the other hand, climate change impacts the energy sector of Ebonyi State. Rising temperatures will contribute to increased demand for air conditioning, ventilation, and other household uses. Predicted higher temperatures in the state will also impact thermal power transmission lines. Moreover, extreme climate events may cause power transmission problems and the collapse of distribution lines. Climate change will reduce the already limited power supply. Service disruption can result from damage to vulnerable transmission lines and substation equipment caused by flash floods, high winds and other severe weather events.

Climate change extensively affects water resources and its effects are mainly the results of changes in precipitation and air temperature over time. GCM analysis indicates that there is a lot of uncertainty about the changes rainfall, with tendencies of having drier dry seasons and wetter wet seasons in the southern part of Nigeria, along with increases in the rate of change with time (same as with the air temperature). These changes bring about a reduction in annual runoff which indicates a scarcer water condition arising with time. The water quality of rivers tends to decrease in the dry seasons due to low flow and filtration efficiency.

The Commerce and Industry sub-sector activities have implications on the environment and climate realities. Industry and waste management contribute carbon emissions. Nigeria has a weak industrial sector characterised by high energy inefficiencies due to the use of old, obsolete and inefficient appliances. Many industries still operate with fossil fuel-powered generating sets and this contributes to greenhouse gas emissions. Also, there are other industry-activity sources that release into the environment pollutants harmful to the climate. Climate change impacts transportation infrastructures. Highways are weakened and expand as temperature increases. This will cause dangerous road potholes and severe strain on bridge joints. In case of floods, traffic is halted, construction work is suspended and entire pavements, culverts and bridges are washed away in extreme circumstances. Flood damages road infrastructure.

3 Vision, Mission & Guiding Principles

In drafting the state Climate Policy, the government is guided by the following visions and principles:

Climate Risk Management: The government is determined to understand and manage the risks imposed by climate change in order to limit its negative impacts on the lives, livelihood and wellbeing of the people of the state. Effective risk management, for the state, involves a systematic identification, evaluation and prioritization of the various risks associated with climate change. It also involves mapping out resources and an action plan to combat such risks. The government understands that the risks associated with climate change increase when action is delayed. Hence, there is a commitment to act promptly to limit the negative impact of climate change on all sectors of the state.

Sustainable Development: The government is committed to the pursuit of the economic development of the state and her citizens in a sustainable way. Sustainable development

enables the present generation to meet its needs without compromising the ability of future generations to meet their own needs. The principle of sustainable development dictates that economic growth needs to be pursued in a manner that does not destroy the natural resources or base on which life and development depend. Climate action is one of the Sustainable Development Goals to which the country and world governments are committed.

Green Economy Opportunities: While climate change poses severe threats and risks to economic development and the livelihood of the people, the government believes that the phenomenon also carries significant opportunities. The government sees a major opportunity in leveraging climate change in the state to work towards the green economy defined in terms of an economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In tackling climate change the government will seek to prioritise efforts that help to build the resilience of vulnerable and marginal communities, especially women and children that have been shown to be disproportionately impacted by climate change. Green growth also dictates that efforts be invested in promoting clean technologies that will drive industrial growth in the future so that Ebonyi state is not left behind. Climate change also offers opportunities for green finance which the government is keen to leverage in the fight against poverty.

Mainstreaming: Government is conscious that, to succeed in its effort to fight climate change, it would be vital that climate considerations are fully integrated and mainstreamed into all the sectors of the economy. The government does not understand climate change as a stand-alone narrow environmental problem but rather as a challenge that permeates other critical economic sectors such as agriculture, health, commerce and industry, education, housing, water resources, to name only a few. It is therefore logical that effective response to climate change will involve coordination with and across all the sectors of the economy. **Collaboration and Partnerships:** Government is prepared to take the lead in the fight against climate change. In the effort to combat climate change in the state and with the understanding that no one actor can do it all alone, the government will seek the active involvement and participation of all the different stakeholders, including civil society organizations, NGOs, the academia and the private sector. The state government, therefore, expects the local governments throughout the state to key into the efforts to combat climate change. The government will make every effort to disseminate the policy to all the local governments and communities in the state and build the capacities necessary to enable them to translate the policies into action in their respective areas of jurisdiction.

Alignment with National and International Efforts: The Nigerian government is also doing a lot to tackle climate change. Its efforts include the drafting of the Third National Communication plan, the submission of the Nationally- Determined Contributions and the drafting of the two iterations of the National Climate Change Policy. To maximise the synergy, the action of the government will, to the fullest extent possible, be aligned with the National Climate Policy of the Federal Republic of Nigeria.

Science-Based Actions: The government understands the need for her efforts on climate change to be based on clear scientific analysis and evidence. The government will vigorously support more science on climate change so that it can identify the risks and opportunities as well as the best course of action. The integration of climate change action in all sectors, such as in road construction, agriculture, urban planning, and health policy, will be based on solid scientific evidence.

4. Sectoral Strategies

4.1 Agriculture

Agriculture is one of the areas where the impact of climate change in Ebonyi state is most acutely felt. It also represents the greatest areas of vulnerability going forward in the future. Ebonyi state is an agrarian state with an overwhelming majority of the people depending, for their livelihood, on rain-fed agriculture which is highly vulnerable to climate change. At the same time, agriculture-related activities, such as slash and burn, dairy farming, and deforestation, represent a major source of GHG emissions. To proffer a better understanding of the wide-ranging risks of climate change to agriculture and effective response actions, this section is sub-divided into sub-sectors covering crop; livestock and fisheries.

4.1.1. Crop sub-sector

There are several challenges posed by climate change in the crop sub-sector in Ebonyi State. Some of these challenges may include lack of enhanced, high-yielding and/or climate-friendly varieties; inadequate financial resources to adapt the sector to climate change (e.g. productivity-enhancing inputs); increased incidence of crop diseases affecting yield potentials; low levels of application of modern agricultural technologies, e.g. limited irrigation agriculture; large methane emission from expanding rice paddies; increasing rainfall causes floods and erosion which disrupt crops and farmlands; increasing temperatures have resulted in crop losses due to drought and high evapotranspiration; limited reach of early warning systems for climate events and disease outbreaks; inefficient water management practices; inadequate reach of agricultural extension services regarding climate change awareness; inadequate storage facilities; and lack of proper water and waste residue management to reduce methane emissions from rice cultivation.

Sectoral Specific Objectives

To support state policy-making in agriculture, rural development and food security in light of climate change

Sectoral Policy Statements

The State shall:

1. Promote climate-smart agriculture (CSA) practices that address crop productivity, increase climate change adaptation and decrease greenhouse gas (GHG) emissions;
2. Promote the use of appropriate technologies such as ridges, culverts, bonding technologies and other drainage infrastructure for flood risk reduction and management through various financial incentives like subsidies;
3. Support research and development as well as dissemination of climate-resilient and flood-tolerant varieties;
4. Promote early-maturing, varieties of crops in areas that are projected to receive below-average rainfall;
5. promote the use of smart weather equipment and agro-meteorological information generation for improved early warning system for agricultural productivity and food security;
6. Promote water availability and sustainable use practices and technologies in crop production for efficient utilisation of water such as water harvesting and small-scale irrigation, especially in areas that are projected to receive below-average rainfall;
7. Support agroecology, integrated farming, particularly the use of cover crops;

8. Promote the use of agricultural risk insurance to cushion farmers against unexpected losses resulting from climate change;
9. Promote agricultural extension services as a tool for passing to farmers critical information that can help them cope better with climate change, e.g., information such as what technology to apply;
10. Promote agro-processing and enhance food storage capacity;
11. Promote mixed cropping and agricultural diversification as a way of enhancing adaptive capacity and resilience.
12. Scale up agricultural practices that enhance the carbon storage capacity of land such as conservation agriculture (CA) and agro-forestry;
20. Promote the use of renewable energies to power agricultural processing mills and storage facilities in the state.
21. Promote research and enhanced capacity in climate information systems.
22. Promote dry season farming through the use of irrigation.

4.1.2. Livestock Sub-Sector

Sectoral Challenges

Some of the challenges for climate change adaptation and mitigation in the livestock sub-sector in Ebonyi State include shortage of livestock feed caused, in part, by adverse climate change hazards; inadequate financial resources to adapt to climate change in small ruminant (sheep and goats) production; periodic extreme climate events such as floods and droughts affect livestock production; degradation of forage land and shortage of fodder due to climate change hazards; lack of improved, high-yielding and/or climate-friendly livestock breeds and storage facilities; ineffective agricultural and related policies as well as skilled technicians to address climate change in the sector; increased incidence of livestock diseases which affect yield potentials; limited capacity/knowledge of livestock farmers to respond to climate change; ineffective extension service reach, which hinders wide dissemination of climate change information and risk management practices among farmers; lack of emission monitoring, reporting and verification systems hinders potential access to international finance for improved mitigation activities.

Sector-Specific Objective

To promote climate-smart livestock production through improved land management, planning and optimisation of agricultural resources so as to enhance employment opportunities, livelihoods and food security and reduce the sector's Greenhouse Gas (GHG) emissions.

Sectoral Policy Statements

The State shall:

1. Promote genetic improvement (early maturing, drought- and heat-tolerant, disease-resistant) of indigenous livestock breeds that are adapted to a changing climate
2. Develop novel insurance products, in concert with financial services providers, for smallholder livestock farmers to respond to climate change
3. Leverage on indigenous knowledge to foster food preservation and storage of livestock produce
4. Facilitate production of improved feeds and regulate feed manufacturing practices
5. Strengthen agro-meteorological information generation for improved early warning system for livestock productivity and food security;
6. Promote water availability and sustainable use practices and technologies in

- livestock production in areas that are projected to receive below average rainfall;
7. Enhance agricultural extension services as a tool for passing to farmers critical information that can help them cope better with climate change
 8. Promote the use of integrated crop and livestock pests and disease - control and management; and
 9. Promote involvement of the private sector, development partners and other relevant bodies in livestock production
 10. Promote efficient livestock production systems to reduce emissions associated with agricultural practices;
 11. Support future mitigation practices currently under research and development.
 12. Promote the intensification of crop-livestock production and the sustainable production of breeds of endemic livestock.

4.1.3. Fisheries Sub-Sector

Sectoral Challenges

In the fisheries sub-sector in Ebonyi state, climate change adaptation and mitigation are facing some challenges. These include changes in fish population size, development and seasonality; flooding which contributes to disruption of aquaculture ponds in flood-prone areas; poverty, which limits adaptive capacity; inadequate processing and storage facilities; insufficient improved fish breeds that adapt to changing climatic conditions; water supplies are under significant pressure which impacts fish resources; and changes in the rainfall calendar and intensity, dry conditions.

Sector-Specific Objective

To promote fish production for enhanced food nutrition and security, increase employment, increase income and improved general livelihood in light of the changing climate.

Sectoral Policy Statements

The State shall:

1. Promote climate change awareness in the fisheries sector;
2. Promote quality research to encourage climate change adaptation for fisheries and aquaculture;
3. Promote quality and sustainable fish- feeding;
4. Promote all the recommended aquaculture practices through extension;
5. Promote dissemination of weather and market information to fish farmers;
6. Promote insurance services for suppliers of fish and aquaculture farmers;
7. Conduct quality research to encourage climate change adaptation for fisheries and aquaculture;
8. Install weather and climate forecast stations and set up programmes to disseminate information thereof with fish farmers. For example, rainfall, flood and drought prediction;
9. Implement climate change awareness programme for the fisheries sector;
10. Promote use of climate-compatible pesticides;
11. Encourage use of improved and sustainable feeds;
12. Introduce innovative climate-referenced insurance products among fish producers and aqua-culturists;
13. Introduce programmes for feasible ecological management methods for atmospheric carbon reduction and storage: such practices include herbivorous species aquaculture; farming of shellfish, such as oysters and mussels is not only

good business, but also helps clean coastal waters; and culturing aquatic plants helps remove wastes from polluted waters.

4.1.4. Forest Sub-Sector

Sectoral Challenges

In Ebonyi State, in the agricultural sector, climate change adaptation and mitigation have some challenges. These include degradation of forested areas; biodiversity destruction in forests and weakened restoration capacity; poor engagement of private key stakeholders in forest conservation activities; limited environmentally-friendly alternative primary sources of energy, resulting in over-exploitation of forest products; limited access to carbon finance for afforestation and re-afforestation programmes; and lack of a REDD + programme to take advantage of opportunities within the REDD + framework.

Sector-Specific Objective

To develop climate-smart practices of forest management that ensure a healthy environment and self-sufficiency in both domestic consumption and export of wood products.

Sectoral Policy Statements

The State shall:

1. Promote renewable sources of energy to reduce biomass reliance in urban as well as rural areas
2. Promote law enforcement and good forest protection
3. Promote sustainable timber production including setting up of sustainable timber plantations, setting up a timber certification body, and mandating the use of sustainable timber in government projects;
4. Encourage regeneration programs for quick maturation tree species;
5. Promote collaborative forest management practices, involving different stakeholders such as community-based organisations, youth and women organisations, civil society, and the private sector;
6. Promote a framework to access carbon financing for afforestation programmes;
7. Promote community-based forestry management: introduction of forest resource security guards;
8. Promote improved risk and disaster management: early warning systems for occurrences such as fires, pests and diseases; integrating mapping and risk assessment into climate change adaptation;
9. Promote sustainable forest management: sustainable forest management practices such as afforestation and reforestation activities were included in the Nigeria NDC. Afforestation and reforestation have the potential for carbon sequestration; thus, they are good climate change mitigation practices;
10. Promote the use of improved fuelwood cookstoves and other clean cooking technologies.

4.2 Health Sector

Climate change is expected to result in increases in mean annual temperature and humidity, and the intensity and frequency of heat waves. This will lead to a large proportion of the population being at risk of heat-related medical conditions. High temperature, precipitation and humidity are typically favourable to the breeding of disease vectors and the infectious agents they carry and consequently increase the transmission of water and

food-borne diseases. The WHO [15] expects that “climate conditions are projected to become significantly more favourable for transmission, slowing progress in reducing burdens, and increasing the populations at risk if control measures are not maintained or strengthened.”

There will be a rise to the tune of about 14.2% in deaths attributable to climate change in the corresponding period [15]. Apart from the obvious problem of deaths from drowning and population displacement, flooding also causes widespread indirect health effects, related to food insecurity, potable water inadequacy, ecosystem disruption, etc. Flooding also causes post-traumatic stress among those affected.

Therefore, the major hazards arising from climate change which impact health in Ebonyi State include:

- Increasing temperature; and
- High intensity of precipitation/rainfall leading to flooding.
- These climate change hazards result in a number of issues including, but not limited to:
- Poor agricultural yield
- Increase in poverty and reduced budget for health
- Higher prevalence of vectors due to higher temperatures
- Deforestation leading to displacements of wildlife such as disease-bearing rodents and bats
- Dislocation of populations leading to an increase in the number of internally displaced persons
- Increase in water-borne diseases due to flooding and poor waste management

Sectoral Challenges

In the health sector, Ebonyi State faces a number of challenges caused (in part) by climate change. Some of the challenges include inadequate pipe-borne water and sanitation in large swathes of the State; increasing burden of diseases such as Lassa fever, and other diseases related to habitat change for animals; increasing burden of cholera, typhoid fever and diarrhoeal diseases, especially during the rainy season; inadequate allopathic health facilities in the hinterlands; inadequate emergency preparedness of the health systems; and absence of universal health cover for the population.

Sectoral Objectives

This policy therefore deliberately seeks to:

1. Reduce the vulnerability of inhabitants of Ebonyi State to climate-sensitive diseases, and
2. Enhance the capacity of the health sector in the State to respond timely and professionally to climate-related diseases.

Sectoral Policy Statements

The Government

Ebonyi State Government shall:

1. Provide health facilities, equipment and consumables to all the wards of the state to assist in combating climate change related diseases;
2. Promote awareness among residents, using traditional and social media on climate-related diseases, particularly their prevention;
3. Prioritize access of vulnerable groups such as pregnant women and the elderly to

- healthcare services;
4. Provide potable water to all communities, including informal settlements, in the State;
 5. Enforce the ban on open defecation, and provide proper sewage treatment plants especially in the urban areas;
 6. Support farmers with proper inputs to reduce deforestation;
 7. Deepen the use of insecticide treated nets in communities;
 8. Use training and retraining to enhance the capacity of medical personnel to effectively manage climate-related diseases.

NGOs, CSOs, FBOs, academics and private sector

In support of an improved health sector in the face of a changing climate, NGOs, CSOs, FBOs and the private sector shall:

1. Facilitate the education of the population on climate matters as they relate to health;
2. Support and promote research on new diagnostics and therapeutics for climate change-related diseases;
3. Provide water and sanitation facilities even at small scales

Communities

Communities within the State shall:

1. Take seriously educative messages from Government, NGOs, CSOs, FBOs, etc.
2. Galvanise support for public health policies at the community level;
3. Act responsibly to prevent diseases; and
4. Report any outbreaks immediately to avert spread.

4.3. Water Resources Sector

Climate change decimates available useful water resources in the State. The presence of impurities and mineral deposits in the ground water and the ground water recharge potentials also contributes to the water resources problem of the State. Climate change also influences ground water recharge and could increase total water demand and water use rate with time and thus threaten the total water resources potential and total usable water. Furthermore, climate change is likely to reduce water level, decrease aquifer level, flooding, drying up of dams and rivers and so on.

Sectoral Challenges

The following are some of the challenges facing climate change adaptation and mitigation in the water resource sector in Ebonyi State: inadequate and poor drainage network; inadequate public water storage and distribution infrastructure causing a problem of stability of water supply; poor water source management especially at the level of households, farms and industries; limited education of local communities on the benefits of rainfall harvesting and training in the construction of low cost storage facilities; lack of research on alternative schemes for long term water availability to communities; high investment cost in the water sector development; lack of reliable hydro-meteorological data that can allow proper planning and management.

Sectoral Specific Objectives

In view of the changing climate, to improve water resource conservation, promote efficient and sustainable exploitation and use of the State's water resources at affordable costs.

Sectoral Policy Statements

The State shall:

1. Protect water resources from pollution through necessary legal and institutional instruments;
2. Promote sustainable exploitation of groundwater resources through regulation of abstraction of these resources, artificial recharge of aquifers, and creation of dams;
3. Institute legal measures to discourage illegal tapping, destruction of water pipelines and wastage of treated water;
4. Promote transfer and dissemination of water- efficient technologies including technologies for recycling waste water and treating brackish/saline water through linkages with expatriate and international firms;
5. Improve water supply infrastructure to ensure adequate and reliable supply of water;
6. Promote investment in water storage infrastructure including dams/man-made lakes to hold sufficient reserve for agricultural use during dry seasons;
7. Improve water security by protecting watersheds and riparian bodies and promoting rain-water harvesting at both household and regional scheme levels;
8. Support development and transfer of water and hydro-climatic information and technology to support water conservation and management;
9. Set up an organization to promote and monitor water efficiency and conservation practices;
10. Facilitate access to international climate change adaptation funding to support State-level initiatives in water supply and water infrastructure development, maintenance and management;
11. Promote participation of the private sector and civil society in management of water resources through Public Private Partnerships (PPPs) to ensure regulated abstraction and distribution of water for domestic, industrial and agricultural production.
12. Promote digging of wells and drilling of water boreholes to tap the groundwater resources and solve the problems of inadequate town water supply.
13. Support construction of dams in rivers to store and channel water for irrigation dry season agriculture or for irregular rainfall periods.
14. Encourage rainwater harvesting during the rainy season by collecting and storing water in underground or surface tanks for use in domestic and industrial activities during the dry season or dry spells.
15. Encourage engaging in alternative livelihoods and activities that are less dependent on water.
16. Embark on reinforcement of bridges, dams, reservoirs and water structures.
17. Prohibit refuse or waste disposal within or around waterways, drainage or water bodies.
18. Formulate, regulate and implement a policy on the sinking of water boreholes.
19. Adopt the use of climate early warning signals from metrological agencies to prepare for floods.
20. Apply stricter management of industrial effluent and the provision of industrial waste- disposal facilities.
21. Embark on construction of erosion and watershed structures.
22. Dredge rivers and waterways.
23. Promote afforestation of bare lands and conservation of forest reserves.
24. Enact legislations and sanctions on the dumping of wastes and effluents on waterways or water bodies.

25. Design new water pipeline network in built-up areas in strict compliance with the town/city building plans.
26. Increase public engagement and education on the need for water conservation and the various methods of water conservation.
27. Institute the use of integrated water resources management projects in water development and supply plans.

4.4. Housing and Human Settlements Sector

The housing sector is a key aspect in any climate change policy consideration. First, the production of cement, with which most houses are built, is one of the most polluting and carbon emission industrial processes in the world. Second, both cement production and the construction of houses consume a huge amount of water resources. Third, a vast amount of energy is required to heat and cool houses and offices. According to the IPCC, up to 32 per cent of global carbon emissions comes from the housing sector. When houses are constructed in ways that are not climate-friendly, they would require more energy to be either heated or cooled. Climate-friendly housing, on the other hand, would require fewer resources and emphasise energy efficiency. The lack of climate change consideration in the patterns of human settlement can increase the risk of flooding, heat wave and the number of people that can be affected when such events occur. Poor urban design and waste management practices can lead to severe flooding due to blockage of drains and waterways, groundwater pollution and very poor urban aesthetics. Ebonyi State is developing at a rapid pace. It is therefore important to ensure climate change considerations are factored into urban development and human settlements across the State.

Sectoral Specific Objectives

To ensure that climate change mitigation and adaptation are fully considered and integrated in the housing, urban development and human settlement in the State.

Sectoral Policy Statements

The State shall:

1. Encourage and promote the use of climate-friendly material in housing and building construction in the State;
2. Explore and promote the use of climate-friendly technologies in cement production
3. Undertake energy audit in all government-owned and rented buildings; as well as in businesses and commercial premises in the State.
4. Elaborate and pursue energy efficiency measures in all government-owned and rented buildings and promote energy-efficient housing in the State generally;
5. Ensure that climate change is considered an integral part of all urban planning efforts. This includes avoiding building in flood plains, increasing nature reserve areas, gardens, parks and other green spaces.
6. Continue to expand and intensify nature-based city beautification efforts such as flower and tree planting along the road, bearing in mind the air-cleaning and carbon-sequestration potential of such approaches;
7. Promote efforts to carve out more green spaces in the capital city and other urban centres across the State;
8. Promote and encourage the use of solar energy in both old and new government-owned buildings as well as in privately-owned residential and commercial properties in the State;
9. Promote efforts to reduce the growth of slum, congestion, and human settlement

- across the State;
10. Introduce efficient integrated waste management practices including the conversion of waste to energy.
 11. Encourage and incentivise residential and commercial homes to plant trees in their vicinities.
 12. Regulate all commercial premises in the state in line with relevant climate-change related laws.

4.5. Energy Sector

Nigeria has the largest population and economy in Africa; however, the country's per capita on-grid energy consumption is deficient—estimated at 144 kWh per capita annually [16]. The Nigerian electricity grid is unable to provide the capacity needed and reliability to meet expanding demand [16]. On account of this, more than two-thirds of the electricity is generated off-grid through diesel and petrol generators [17]. Diesel generator use acts as a source of short-lived climate pollutants (SLCPs) emissions in the country. The inadequate electricity generation and distribution have thus forced many households to depend, for their energy need, on alternative energy sources such as petrol, diesel, kerosene, coal, and fuelwood. Kerosene accounts for the high usage of alternative energy in the residential sector, especially for cooking. An average of 84% of urban households depend on petrol or diesel-powered generators for their electricity supply [16].

Currently, global focus is shifting away from fossil fuel-based energy sources, with substantial financial resources being invested in research and development in the renewable energy sub-sector. In developing countries, governments are currently setting goals and targets for transitioning towards alternative and renewable energy and investing extensively in renewable energy for the realization of the set goals and targets. In order to become an industrial state capable of attracting environmentally-sustainable trade, investment and tourism, Ebonyi State should follow the same route.

However, the State has immense capacity for renewable resources such as solar, wind and biomass that it can tap to support its economy [18, 19, 20]. A variety of clean energy initiatives and projects have been initiated or have already been rolled out to provide a learning platform for future related projects: for example, the installation of pilot hybrid (solar-diesel generator) efficient electricity generation technologies at the Alex Ekwueme Federal University, Ndufu-Alike in Ikwo Local Government Area by the Federal Government, through the Rural Electrification Agency (REA) and financed by the Federal Government Green Bonds Programme; the plan to acquire 5.5-megawatt biomass plant which would utilize rice husks and other available waste materials to generate electricity at Iboko in Izzi Local Government Area and Ikwo LGA; the United Nations Industrial Development Organisation (UNIDO) demo biomass gasifier power plant located at Ekwashi Ngbo in Ohaukwu LGA; the establishment of the clean cookstoves fabrication centre at Afikpo by International Centre for Energy, Environment Development (ICEED); Ebonyi Independent Power Project (EIPP) 4185MW Power Plant at Oferekpe/Akahufu Inyimagu land in Ikwo LGA [21].

Sectoral Challenges

The challenges facing the energy sector in Ebonyi State and Nigeria, in general include the low generation of megawatts of electricity compared to the demand. Electricity is largely imported through the national grid, resulting in weak transmission and distribution. Underdeveloped domestic market for low carbon energy options; over-reliance on lowly-

priced fossil oils for electricity generation; negligible power transmission and distribution network nationally; and underdeveloped low-carbon electricity alternatives such as natural gas and gas products are other pressing challenges facing the energy sector in the state and country.

Sectoral Specific Objectives

1. To complement the Federal Government's efforts in its commitment to increase power generation capacity and availability; and
2. To increase energy security and economic, social, and environmental sustainability through renewable energy alternatives.

Sectoral Policy Statements

The State shall:

1. Develop an approach to identify the GHG reduction potentials, explore low Carbon development opportunities in the State and actively participate in Clean Development Mechanism (CDM) programmes
2. Promote energy conservation initiatives that emphasize women's needs in terms of supply transmission;
3. Support energy supply diversification through increasing renewables, for example, wind, solar, and bioenergy, and decentralise transmission to reduce exposure to climate impacts
4. Promote different strategies to make renewable fuels and innovations available and affordable across various segments of the industry;
5. Promote research and development into renewable sources of energy through legislative, fiscal incentives, and other measures in remote and off-grid markets
6. Develop and incorporate mini / micro-grid clean energy systems using both renewable and traditional sources for rural applications, healthcare environments, street lighting, and energy for small business and agricultural purposes;
7. Encourage increased participation in cooking technology value chains by women to boost their economic empowerment
8. Collaborate with relevant federal government agencies to set requirements for building and sustaining energy infrastructure, taking into account anticipated climate change impacts;
9. Promote accounting for potential climate change impacts when locating new energy facilities;
10. Promote reducing household and office building energy consumption by using energy-efficient light bulbs and electrical appliances;
11. Promote mechanism for scaling-up anaerobically digested rice husk biomass for cooking, and other energy uses.
12. Provide sufficient funding facilities to promote indigenous investments in remote and off-grid renewable energy production.
13. Scale-up efforts towards the production and use of rechargeable automobiles for commercial transportation
14. Develop energy-efficiency regulations for residential, manufacturing, service, transportation, and urban planning technologies and processes to use climate conditions to reduce energy consumption.
15. Develop an energy audit program and various energy quality criteria.
16. Promote the use of natural gas (e.g., liquefied petroleum gas, LPG) rather than liquid fuels.

4.6. Commerce and Industry

Commercial and industrial activities are crucial for the economic well-being of the citizenry and development of the State. However, these business activities are not without negative effects on the ecosystem and subsequently the climate. The activities of hoteliers, restaurants and market areas bring about environmental pollution of different forms such as effluents (gaseous and liquid), solid wastes, non-biodegradable substances. Liquid effluents let out in open places from these commercial setups deteriorate to some GHGs like methane, CO₂, SO₂, etc.; other gaseous effluents noticed from these business areas include - CO₂, Hydro fluorocarbons (HFC) - from refrigerators, cooling facilities, compressors, etc. Also, the atmosphere around the business areas is often choky and laden with carbon monoxide (CO) due to the constant use of power generator sets in enclosed areas for extended periods. The concentration of the power generating sets of low quality - "I better pass my neighbour" type, with the accompanying poor maintenance culture of the users result in engines with poor/incomplete combustion leading to more copious release of CO and even soot in the atmosphere. This situation is common at the non-food markets areas, plazas, ICT and other service market areas in the state. The commercial and industrial activities also generate solid wastes which are poorly disposed of and thus constitute a nuisance and environmental pollution. The bio-degradable solid wastes disposed of in open dustbins degenerate into methane and marsh gas (GHG gases) while the non-biodegradable wastes are mostly swept and blown into drainage, blocking waterways and increasing the incidence of flooding and flood plains. Furthermore, these solid wastes are either openly set on fire indiscriminately or are gathered and inappropriately incinerated in larger open dumps, thereby releasing GHGs in to the atmosphere, which exacerbates the negativity of climate change. Another important industrial hub found in Ebonyi State is rice milling. Husks from rice mills are often set ablaze in the open which may also contribute to greenhouse gas emissions. The fertilizer blending plant as well as mining activities in the State could also contribute to greenhouse gas emissions.

Commerce and industry in the State are facing adverse impacts from climate change-related hazards. These hazards include:

- Increasing temperature;
- High variability and intensity of rainfall; and
- Extreme climate events such as droughts and flooding.

Commercial and industrial activities in the State are highly vulnerable to the vagaries of climate impacts because of individuals' and organizations' limited adaptive capacity and the high sensitivity of the environment to climate stressors.

Sectoral Challenges

Some of the challenges facing climate change adaptation and mitigation in the Commerce and Industry sector in Ebonyi State include poor state of energy supply; poor enforcement of environmental regulations; obsolete and energy-inefficient machines and processes; unclear and overlapping jurisdiction among regulatory agencies; low investment in new and efficient modern technologies; lack of incentives to adopt new energy- efficient and greener technologies and processes; and lack of awareness among the general public of the environmental cost of products and services; hence there are no market-induced forces that would compel the sector to adopt green technologies and processes.

Sectoral Specific Objectives

To reduce the vulnerability of industry and commerce to the expected impacts of climate change and promote sustainable development in Ebonyi State.

Sectoral Policy Statements

The State shall:

1. Support waste energy recovery opportunities, which represent a large potential in energy savings.
2. Support opportunities for cleaner and efficient production.
3. Promote Best Environmental Technologies (BET) and Best Available Technologies (BAT) such as switching from petro liquids and fossil fuels to natural gas.
4. Promote waste-energy schemes in the sector.
5. Ensure that the private sector, the chemical companies and mining industries continue to cooperate with the relevant Government Agencies to ensure better management of industrial wastes and pollution.
6. Increase the fines and legislative restrictions on all illegal activities and breach of regulations by the chemical companies, mining industries and other related industries in the State.
7. Support and incentivize producers to adopt clean production and increase awareness on sustainable consumption.
8. Encourage the adoption of appropriate technologies for more efficient utilization of farm resources and planting of climate-resilient crops to boost industrial production of crops for local industries and for export.
9. Intensify, at the information centres, the climate and energy – efficiency information service for industries and companies for better management of the environment through best practices.
10. Create an enabling environment for both foreign and local investors and facilitate the establishment of industries that will be private sector-driven to ensure their sustainability.
11. Ensure credit mobilization for commercial activities and the setting up of an insurance facility fund – to create improved access to resources and markets for large scale commercial activities.
12. Strengthen markets for locally made products through deliberate government intervention to encourage processing/consumption of local goods and services and tax reliefs – which serves for building the capacity to diversify local production through value addition to products.
13. Provide incentives to industries and establishments adopting environmentally sensitive/cleaner technologies as a form of climate financing.
14. Establish regulations and strict checks for the activities of climate sensitive/climate evasive industrial processes: legislations which include the establishment of parcels of green environment areas as requirement for establishing climate-sensitive industries, prohibition of indiscriminate waste disposal, etc.
15. Prohibit open space incineration of waste products – the state should encourage the establishment of competent waste collection, waste renewable and waste disposal companies.
16. Encourage use of sustainable and climate-smart technology for industrial activities – this involves the introduction of clean energy-saving technologies like a solar panel system; also designing new industrial technologies/activities with increased resilience and flexibility to build in climate change adaptation technologies.
17. Promote diversification of livelihoods by building for private investment and

- providing exclusive insurance system for businesses against climate risks – this is achieved by the provision of physical and social infrastructure and skill acquisition programmes.
18. Mobilize investment in climate-friendly commercial activities/industry (e.g. recycling industries) through incentives for environmentally sensitive/clean energy technologies.
 19. Introduce energy saving and solar energy technologies for the purpose of the reduction of GHG emissions.
 20. Reduce and remove SLCPs emissions from human populations and cities by relocation of factory activities to designated industrial clusters.
 21. Build resilience of society to economic shocks through the provision of appropriate physical and social infrastructure.
 22. Ensure the better management and elimination of industrial wastes and pollution of the environment by establishing climate compliant waste disposal and renewable waste companies.

4.7 Education Sector

Nigeria generally faces specific challenges in relation to climate change adaptation due to high illiteracy rates and low awareness of climate change issues [22]. There is low awareness among male and female junior secondary school teachers of science and non-science background in Ebonyi state [23]. This implies that sensitisation of citizens on the causes, impacts, adaptation and mitigation of climate change despite the research activities of Ebonyi State University and Alex Ekwueme Federal University Ndufu-Alike in that area has been largely insufficient. It thus becomes imperative that those in the education sector are charged with the responsibility of determining how to make the public become more enlightened on the issues through formal and informal education. This is an important function expected to be performed by schools as harbingers of knowledge. Even the students who are expected to act pro-environmentally and champion the crusade against environmental degradation are less aware of what this global challenge is all about and how it can be relatively managed. This scenario of lack of knowledge brings to mind the herculean task for every citizen. As such, teaching of climate change-related units should be mainstreamed in the academic curriculum of climate - related subjects.

Furthermore, the comfort of pupils and students in a school is to a great extent dependent on the school environment and the sector is highly susceptible to weather variability and climate change. Adverse climate conditions directly and indirectly affect teaching and learning in the state. For instance, extreme rainfall in some parts of the state leads to flooding and displacement of inhabitants of such affected communities as was the case of June 2016, Abakaliki, Ebonyi flooding [24] and that of subsequent years. Flooding consequently impacts school attendance and learning as many children in the affected areas are kept away from school for a number of days. Floods contaminate freshwater supplies, thus heightening the risk of water-borne diseases and creating safe breeding grounds for insects like mosquitoes with resultant effects of malaria and dengue [25].

During the dry season, students, mostly the females, go in search of water for family use to the detriment of their studies. Ebonyi State is experiencing a rise in air surface temperature, implying that the state is susceptible to the attendant consequences of global warming [26]. Inhabitants of the state could become vulnerable to medical disorders which may include heat stroke, heat rash, heat cramp, and so on. These are un-easy conditions which may cause heat stress in the classroom, affecting students' capacity to learn,

academic performance and other school activities [4]. Another effect of climate change on education (though secondary) is prevalent malnutrition among school children as a result of interruption to existing agricultural practices.

On the other hand, the Education Sector contributes to greenhouse gas emissions in the state through some of its activities. The clearing of grasses and cutting down of trees within school premises expose the school environment to storms, heavy winds and erosion as well as reduction of oxygen in the air. There is no proper or systematic way of disposing of solid waste, especially papers used in schools. Most of the wastes are burnt in the open air which leaves flames and smokes hovering in the air and increasing the heat in the atmosphere. Some schools use generating sets as a major source of power supply.

Sectoral Challenges

Some of the challenges facing the Education sector for climate change adaptation and mitigation in Ebonyi State include non-mainstreaming of climate change education in school curriculum; poor level of awareness on climate change issues specifically with its causes, adaptation and mitigation strategies among residents, including students; low capacity to manage disasters due to lack of awareness and of skills acquired for disaster adaptation; absence of climate-smart buildings to withstand climate disasters like winds and storms; displacement of families due to flood disaster; inability of the teachers to teach climate change issues in the classroom due to inadequate knowledge of the subject matter; intermittent absence from school due to climate disasters like floods or heavy storms; disruption of teaching and learning as a result of the impact of winds and storms on school buildings; malnutrition as a result of reduced farm production and limited financial capacity of parents to provide quality food. This goes a long way to affect academic performance; limited access to early warning systems for climate events and disease outbreaks; periods of intense droughts which keep mostly the female students away from school in search of clean water for domestic use; exposure to sickness and diseases due to high temperatures.

Specific Objectives

To create an in-depth understanding of the connections between climate change and education in Ebonyi State and support policy-making and adaptation-strategy action plan for the sector.

Policy Statements

The State shall:

1. Support local and international training of relevant stakeholders (including teachers) on climate change issues;
2. Improve school buildings, for example, by erecting climate-smart schools as adaptive and mitigation strategies;
3. Make it mandatory that the Meteorological department of the State disseminates interpretation of early warning signals for residents so as to take precautions for any impending danger and in line with the climate change law of Ebonyi State
4. Organize training for teachers on techniques for informal teaching of climate change mitigation and adaptation at all levels of education, while waiting for its inclusion in the curriculum of related subjects;
5. Create awareness at the communal level of the dangers of climate change, its adaptation and possible mitigation strategies;
6. Encourage a shift in attitude among community members so as to reduce

- vulnerability at the communal level;
7. Partner with communities on data-gathering at the community level;
 8. Encourage the formation of climate movements and clubs.
 9. Develop skills-based curricula in environmental education, science subjects, geography, language arts, social studies and technology to empower children for better response to climate change threats;
 10. Train teachers on climate change adaptation teaching techniques across the different levels of education in the State;
 11. Create environmental awareness and consciousness of human impacts on the environment and contribution to climate change;
 12. Erect well-structured climate-smart school buildings to reduce the occurrence of classroom destruction and interruptions with teaching and learning;
 13. Develop a Disaster Risk Reduction Plan (DRR) for the State to equip residents with adequate knowledge to handle disaster situations;
 14. Promote research on communal adaptation and mitigation strategies which could possibly be adopted by communities;
 15. Promote formation of climate movements and clubs in schools for early indoctrination of the young minds into acting pro-environmentally wherever they find themselves;
 16. Promote tree-planting exercise to improve the ecosystem and save the particular environment from harsh impacts of severe winds and storms;
 17. Adopt climate-smart agriculture in school farms in order to reduce carbon emissions;
 18. Increase awareness level and equip learners with necessary skills and coping strategies for resilience;
 19. Enhance resilience among learners specifically and residents at large through training to get them well-equipped for climate eventualities;
 20. Engender climate-friendly attitudes through talks, campaigns and other welcome avenues at least biannually
 21. Promote attitudinal change from harmful activities that impact the environment;
 22. Enhance resilience among residents of the state through disaster risk-reduction trainings;
 23. Sensitize people on the need to plant trees to control wind effect on buildings, to curb erosion impacts in premises and reduce other vulnerabilities coming from deforestation;
 24. Sensitize Education Stakeholders on the need to construct buildings (classrooms, offices, laboratories) that are climate-resilient.

4.8. Transport Sector

Ebonyi State's economy is mostly agrarian, with the majority of the population earning their livelihoods from agriculture. The farming communities in the state rely on road transportation to supply farm produce. Many commuters in urban centres use public transport, mostly made up of privately-owned mini-buses, taxis, and motorcycles. With a significant proportion of commuters and goods carried by the roads, the State's road network is highly overstretched. Most roads in the state are impassable during the rainy season (floods usually compound the situation).

The transport sector's environmental effect is substantial because it is a big oil user that burns much of the world's fossil fuels responsible for many air pollutants such as carbon dioxide emissions, nitrous oxides, and other particulates that contribute significantly to

global warming. According to Nigeria's National Action Plan (NAP), emissions from road transport account for 98.3% of the total transport emissions. Furthermore, the NAP reported that the more significant percentage of air pollutants and GHG emissions come from urban buses, while passenger cars are the primary sources of methane, carbon monoxide, and carbon dioxide emissions [27].

A sustainable transport system is the latest global movement to reduce emissions, regulate air pollution, and combat climate change. Not just that, it contributes positively to the sustainability of the populations that it serves. Sustainable transportation energy usage primarily includes improving energy consumption quality, renewable fuel technologies, and integrated transportation. The current government of Ebonyi State is expanding the transport sector, with a focus on energy-efficient, economical, and time-saving transportation for the state. Examples of transport sector development projects undertaken recently include:

Introducing renewable energy-powered tricycles for short-distance commute in the capital metropolis as an eco-friendly alternative to motorised tricycles (popularly known as Keke) and reduce CO₂ emissions. This innovative solution is a promising development in climate change mitigation and GHG emission reduction in Ebonyi State.

Other interventions include constructing, expanding, and improving road networks within the metropolis and rural communities [28].

Sectoral Challenges

The following are some of the challenges facing the energy sub-sector in Ebonyi State and Nigeria, in general: heavy reliance on fossil oils for electricity generation; no transport sector pollution cap law; concentration of commercial and non-commercial activities within Abakaliki metropolis leads to light traffic jam conditions which increase carbon dioxide and other contaminants emissions; the State's Motor Vehicle Inspection Agency is not adequately equipped and empowered to monitor vehicular emissions; poor planning in the transport and housing sectors, forcing many to commute from one end of the State to another to get to work, schools, markets and other facilities; over-reliance on the informal and inefficient transport means such as motorcycles, mini-buses, small boats etc., making it challenging to and monitor emissions from the sector; federal import regulation and requirements that impede state control of pollution by limiting non-energy-efficient goods; and the existence of 2-stroke engines for motorcycle operations, albeit on a limited scale due to bans in the metropolis, contributes to increased emissions.

Sectoral Specific Objectives

To pursue a climate-friendly, reliable transport system with increased energy efficiency that will reduce greenhouse gas emissions from the transport sector by stimulating and mobilising adequate investment in knowledge, innovation, technology, infrastructure, and human resources.

Sectoral Policy Statements

The State shall:

1. Invest in high-quality public infrastructure for long-term climate resilience;
2. Ensure that all malfunctions and hindrances in the flow of traffic are reduced through optimised road network and traffic management measures;

3. Reduce journeys by car through modal transport shifts from road to light rail and water transport systems;
4. Scale-up use of electric motorcycle for urban and rural commercial transportation
5. Promote public-private partnership investment initiatives in the sector that will address the critical need for sustained and uninterrupted services during the transition to a low carbon economy;
6. Use financial instruments to promote improved transportation initiatives toward ensuring low carbon emission in the State (e.g., car-pooling or office-assisted bus services).
7. Encourage fuel-efficient car imports and attract international firms that manufacture fuel-efficient vehicles such as plug-in hybrids;
8. Pilot an urban transit scheme that uses bus rapid transit systems in the state capital; and
9. Promote the adoption of compressed natural gas (CNG) for commercial vehicles in the state.

4.9. Gender and Vulnerable Groups

Gender equality and empowerment are necessary conditions for economic development. However, women in developing countries are incredibly vulnerable to climate change due to a limited adaptive capacity. The characteristics of their limited adaptive capacity are such that:

- Their livelihood depends heavily on local natural resources;
- Women tasked with obtaining water, food, and heating fuel face the most significant challenges;
- Women face unequal access to services and decision-making processes, with restricted rural mobility.

There is considerable gender inequality in Ebonyi State, and women represent a greater share of people living below the poverty level. The state's Gender Inequality Index (GII) score is 0.504 [12]. The GII is a measure of disparities in gender relations, which account for three components: reproductive health, empowerment, and labour market. GII indicates the loss in potential human development due to gender disparities. It ranges from 0, where women and men fare equally, to 1, where one gender fares in all component dimensions as poorly as possible relative to the other [12]. Furthermore, women are under represented in decision-making, including climate-related decisions, and make up the vast majority of subsistence farmers who lack access to and control of vital infrastructures such as land, water, and agricultural extension services [14]. For the empowerment dimension, women and men occupy only 13% and 87% respectively of parliamentary seats. “Additionally, the population's gender-composition for the population aged 25 and older with at least secondary school education is approximately 39.2% and 53% for women and men, respectively [29]. For the labour market participation dimension, it is 78.2% and 75% for women and men, respectively [29].” These pervasive gender inequalities intersect with current and projected risks associated with climate change and often determine the extent of men and women's vulnerability to climatic changes.

Therefore, it is crucial to recognise gender-sensitive strategies that respond to women's crises [14]. Women play a vital role in natural resource management and other household and community-level productive and reproductive practices. Their vast experience and expertise—which can also be used in the prevention, disaster avoidance, and adaptation

strategies—make them useful actors and agents of change. Gender must also be integrated into climate change adaptation to ensure climate project and policy efficiency and sustainability. Adaptation responses, including catastrophic risk avoidance, would be more robust if women and men were appropriately considered.

Sectoral Challenges

The sectoral challenges include limited adaptive capacity and high vulnerability to climate change impacts, especially among women; underlying gender disparities such as high illiteracy levels and inadequate access to information and technology among women and skewed decision-making processes; insufficient research and evidence-based analysis of gender and other social perspectives of climate change to inform appropriate and adequate adaptation and mitigation responses; rising unemployment particularly among youths, exacerbating their vulnerability to climate change; and gender-based truncation of economic rights.

Sectoral Specific Objectives

To mainstream gender into the climate change adaptation process to ensure all demographics' inclusivity in the formulation and implementation of climate change initiatives, programs, and policies.

Sectoral Policy Statements

1. Before implementing climate change adaptation technologies, conduct relevant gender needs assessments in strategic areas impacting women, such as water consumption, lighting, cooking and heating, food storage, grain production, small/micro income-generation businesses, and agriculture.
2. Promote policy of social security for disadvantaged populations, households, and individuals including women, men, infants, youth, and special needs populations;
3. Promote alternative livelihoods activities and livelihood security among women
4. Strengthen capacity in the production of gender-sensitive policy, behaviours, tools, and methodology for climate change policymakers, decision-makers, planners, programs implementing personnel and project managers;
5. Create awareness and build women's capacity to attain influential positions, to foster gender balance in representation for both women and men, especially in decision-making positions;
6. Take gender-conscious measures to reduce the negative impacts of natural disasters on women, especially given their crucial position in rural water, food, and energy supply;
7. Boost capacity of local women's organisations in particular to analyse and measure the main dangers of a catastrophe and enhance their access, in disaster times, to technology and financing by women farmers' cooperatives and through other outlets;
8. Promote new cooking technologies among households in the State (e.g., renewable biomass cookstoves and LPG cookstoves)
9. Increase awareness or education of women/disabled people with disabilities on modern technologies that reduce deforestation and emissions;
10. Embark on community-led afforestation and reforestation activities;
11. Construct new roads (or rebuild dilapidated roads, where necessary) to improve rural communities' access to markets
12. Increase targeted grants to women farmers and traders to boost their operations and improve livelihoods

13. Mainstream climate change education into the school curriculum.

4.10. Disaster Management Sector

Climate change has increased the number, scale and intensity of disasters around the world. This is also evident in Ebonyi State. The most evident climate change-induced disaster in Ebonyi state is flooding. In the last few years Ebonyi State has witnessed an unprecedented amount of flooding. In many cases, almost entire villages are affected and lives have been lost. Wildfires are also increasing in their frequency and intensity. Cyclones, mudslides, and storms caused by climate change can displace communities, render citizens homeless and increase the number of internally displaced people. Other climate change induced disasters or extreme weather events include heatwaves due to a rise in atmospheric temperature. When people are forced to migrate due to climate change, they lose social connections and cultures that are valuable to them. Unplanned migration can also lead to increased competition for scarce resources which in turn can create conflict and wars. Huge economic losses can also result from climate-induced disasters such as flooding, land degradation and heatwaves. Therefore, the State needs to be sensitive to the multiple ways through which climate change can cause disaster and be prepared to take action to minimise the risks.

Sectoral Specific Objectives

To proactively minimise the risk of climate change-induced disaster in the State and take prompt and effective action to minimize the impact on those that are affected by disasters.

Sectoral Policy Statements

The State shall:

1. Develop, integrate and train stakeholders on climate change adaptation and Disaster Risk Reduction (DRR).
2. In conjunction with Local governments, facilitate climate change awareness campaigns in English and local dialects spoken in different communities through the print media, the radio and television, using jingles and short dramas and possibly involving students themselves.
3. Install early weather warning equipment and systems.
4. Provide weather data collection equipment and training.

5 Broader Strategies for Implementation

The government shall adopt the following efforts to enable the implementation of this policy:

Awareness Campaign: The government will organise a series of events to promote awareness of these policies. A series of dialogues shall be held with the different ministries to sensitize them to the policy position and objectives that have been outlined in this document and explain how each of the ministries can work in conjunction with the office of the special assistant on climate change, where necessary, to facilitate the implementation of the policy. The awareness campaign will also be held in all the local governments in the state so that they can be informed on the ways in which they could help to implement the policy in their respective councils. Similar dialogues will also be held with NGOs and civil society organisations and the private sector to promote awareness of and engagement with the policy.

Climate Education: The children are the leaders of tomorrow. All over the world one sees school children taking serious interest and action on climate change and also mounting pressure on their governments and leaders to take climate change more seriously. Evidence also shows that children who are informed and passionate about climate change can also be agents of change in their homes and immediate communities. Unfortunately, the rate of climate change knowledge among primary, secondary and even tertiary education students in Ebonyi State remains very low. As part of the broad efforts to promote the implementation of this policy the government will intensify the promotion of climate education in all levels of educational institutions in the state, from primary through secondary to the tertiary level. The government, through the office of the special assistant on climate change, has already started the formation of climate change clubs as well as the planting of orchards in schools. This effort will be intensified following the launch of this report. The government will also work with experts to develop systematic climate curriculum and teaching materials for primary and secondary school as well as train the teachers to instruct their students effectively using the developed material.

Sectoral Strategies: A key step in the implementation of the policy is the development of sectorial strategies. In some of the cases, more knowledge and analysis, including detailed risk assessment and cost-benefit analysis, may be required to inform the elaboration of specific policies. It may also be necessary to conduct a detailed assessment of impact on policy on different sectors in the State. Further analysis may also be needed on the range of capacity and technology needs that may be required to achieve the policy objectives outlined in this document. Therefore, the government will work with experts to undertake the analysis and production on sectorial strategies focusing, in the first instance, on priority sectors and areas where there are opportunities to generate win-win solutions with regards to addressing climate change and tackling poverty.

Capacity-Building: To ensure effective implementation of the policy, there is a need for capacity-building in several areas, including on climate-modelling, climate information-gathering and documentation, energy-modelling, integrated assessment, energy scenario, disaster risk management and reduction, climate insurance, GHG emissions measurements, climate risk assessment, climate budget analysis, climate mainstreaming, and many more. A technology needs analysis is also necessary to identify and prioritise the corpus of technologies that are necessary to facilitate the implementation of the policies and actions identified in the document. Government will work with relevant stakeholders such as academic experts and departments in and outside the state, NGOs, the private sector and international development partners in the capacity-building drive to help ensure the successful implementation of the strategy.

Climate Finance: The government sees the opportunity to attract climate finance as one of the motivations for the elaboration of this climate policy. It is well understood that policy documents such as this, which identify the intention of the state to act on climate change alongside the areas of priority, constitute a major step in focusing the effort to attract climate finance. Following the launch of the policy, the government will work with climate experts to identify opportunities for attracting private, national and international funding that will help with the implementation of the policy. Moreover, the government will also set aside financial resources, including budgetary allocations, to help with the implementation of the policy. Government shall ensure full implementation of climate change budgets in the state.

Legal and Institutional Frameworks for Climate Change Response in the State

The interrelationship between agriculture and climate change should continue to shape the way the related laws in the field are conceived and applied in connection with mitigation and adaptation. This is because agricultural practices can turn out to have either an adverse impact or a positive impact on climate change. On the other hand, climate change may affect production yields of agriculture, affecting plants, animal, and the functionality of the ecosystem. The policies and laws should therefore be conceived in a manner that the ecological carrying capacity of the environment is not adversely affected.

The development of a policy should be backed by law. The essence of having a climate change policy is to see it work. The law therefore should follow the process after policy formulations and should be the instruments that promote the realisation of a particular policy. The translation of the objectives of Ebonyi State into law should be the ultimate goal of a policy. The law is fundamental to the success or failure of any policy and may stimulate or impede growth in any area. In this regard, the underlying objectives of the policy on climate change relevant to agriculture can be achieved through the law conceived in line with the policy objectives. This brief is a review of the position and role of the law vis-à-vis the effective promotion of climate change mitigation and adaptation measures encapsulated in the proposed climate change policy relevant to agriculture in Ebonyi State, Nigeria.

Constitutional Basis of Climate Change Mitigation

The 1999 Constitution of Nigeria contains the fundamental objectives of environmental, economic, and social development. The letter of the Constitution is clear on how the country should reconcile issues relating to the environmental, economic, and social matters regarding development. The environmental objective of Nigeria, as enshrined in Section 20 of the 1999 Constitution, is not subject to other considerations, not even economic or social. The letter of the law is clear and without ambiguity. Section 20 provides that ‘the State shall protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria’. The key words here are ‘shall’, ‘protect’ and ‘improve’ and ‘safeguard’. Further, it is important that the obligor is listed as State, thus there is no ambiguity. Additionally, the obligation is not subject to any other act or obligation.

The Regulatory Role of the State and Limitations

The federalist’s constitutional structure of the country will be an important consideration in determining how the various institutions at the central, federating states and local governments will respond to climate change concerns.

Nigeria operates a federal system of government. This system of government has been practised by multicultural countries, under an arrangement whereby the states are given some level of autonomy, with affairs coordinated at the centre. This has been practised in Australia, Canada and the United States. The system, therefore, provides for a power-sharing arrangement with the central government having powers that it exercises to the exclusion of the constituent States. The brand of federalism practised in Nigeria grants the Exclusive Legislative powers to the federal government, while both the state and federal governments can exercise powers contained in the Concurrent Legislative Lists. However, where the powers of the States and the federal government are in conflict, the matter under the concurrent legislative list that has been legislated upon by the federal government prevails over the state legislations on the subject matter. This is rooted in the doctrine of

covering the field.

On the established doctrine of covering the field, the Nigerian Constitution provides: “If any Law enacted by the House of Assembly of a State is inconsistent with any law validly made by the National Assembly, the law made by the National Assembly shall prevail, and that other Law shall to the extent of the inconsistency be void” (Section 4 (5) 1999 Constitution). In the case of *Military Governor of Ondo State v. Adewunmi* ((1988) 3 NWLR (Pt. 82) 280, 293-294), the Nigerian Supreme Court observed that: “It is, of course, a well-known principle of our federalism, under the doctrine of covering the field, that where the Federal Government has validly legislated on a matter, any State legislation on the same matter which is inconsistent with the federal legislation, will be void to the extent of the inconsistency.” A similar position has been maintained by the Supreme Court in *Attorney General of the Federation v. Attorney General of Lagos State* ((2013) 8 SCM 58). States within the federating unit are, therefore, not required to take action on matters that have been exclusively preserved for the federal government. The main tension in the federal structure of Nigeria has been seen largely in the areas of regulation of natural resources and the recognition that the ownership is vested in the federal government. By the same token, the federal government has the exclusive powers to legislate on such matters.

The role of the local government in addressing grass roots phenomena has been eroded in Nigeria. Local government authorities should ideally be contributing to the prevention and control of climate change in Nigeria by exercising the powers granted to them. The local government can be strengthened for the purpose of disbursement of loans to promote climate- friendly agricultural practices. The role of the local governments should also include matters regarding climate change through the strengthening of the law. The establishment of departments offering orientation at the local level on how climate change can be minimized will be one of the ways to develop legal measures that give the local government authority to create awareness about the consequences of climate change.

Establishment of Regulatory Agency on Climate Change

The law provides for the establishment of a statutory corporation or a fund as a body corporate that oversees climate change matters and provides funding for addressing climate change in the agricultural sector. The initiative can be directed towards the realisation of educational development on climate change and agriculture, provisions of capacity-building on climate change in rural areas and promotion of climate-friendly transportation and contribution to agricultural development and micro credit finance for small and medium scale enterprises.

Establishment of Environmental Courts

The establishment of environmental courts through the creation of the law that allows such courts to hear matters on violation of climate change in Ebonyi State will be an added advantage in the fight against climate change. Defaulters can be penalized for violations or breach of provisions of the law.

Proceeds of Penalties for violation

Climate change violations should attract penalties. In the event of imposition of fines for breaching the laws, the proceeds can be channelled into the promotion of environmentally-friendly activities. The proceeds can be used in the form of grants to promote agricultural activities that support climate change mitigation. Where disincentives are inadequate, they

may not be able to change behaviour. That is, when external rewards undermine intrinsic motivation, the desired behaviour may not be achieved. For example, where parents are to pay fines for not picking up their children at the day care within a stipulated period and yet they persist in the habit, then the fine has no effect in changing their behaviour towards early pick-up of their children. The illustration above indicates that the defaulters perceive the fines as trivial. In other words, it may pay to continue to practise the activities intended to be discouraged, and thereafter pay the fine rather than changing in compliance with the desired behaviour. Where industries are more comfortable and happier to pay fines in order to emit greenhouse gases, they may not employ mitigation measures like sustainable energy technologies, since they benefit more by polluting. In this regard, the incentives are said to be counterproductive.

Levies on Companies and Businesses

One of the challenges discussed in respect of the Nigerian federal structure is that the states may not be able to exercise certain powers that are vested in the federal government. For example, the regulation of companies is within the exclusive legislative list. Likewise, companies' income tax is imposed by the federal government because the constitution places matters of taxation of companies in the legislative purview of the National Assembly and not of States Houses of Assembly. However, the government can employ an innovative approach to ensure that the companies having dealings with the states pay climate change levies which can be channelled as a climate change fund. For example, a company seeking approval from the state i.e., perfection of a title document regarding land may be required to pay such levies for the purpose of utilizing same to meet climate change mitigation.

Development of a State Renewable Energy Law Promoting the use of Biomass

Laws supporting the use of agricultural feedstock for biofuels or biomass will enhance the development of agribusiness and energy chain will receive a multiplier effect since activities will increase at the farm gate. Consequently, this will economically empower downstream agricultural and rural operators to attain capacity for best-practice; quality-determined competitive market plays right from the rural economy. Animal dungs and wastes from the abattoir are viable sources that can be utilized for the generation of electricity from biomass. Increased biofuel and biomass demand will lead to the structural development of rural markets. However, this development will need to take into account the promotion of sustainability by ensuring that the law does not allow the use of food products to lead to a shortage in Ebonyi State. Other non-edible feedstock such as jathropha and by-products obtained from plants can be utilized in the state. The people's right to food should be effectively guaranteed while exploring measures that will enhance the use of agriculture to promote the mitigation of climate change.

Encouraging the cultivation of these feedstocks will project the development of a good renewable energy base for the state. The state can achieve this by mandating the proper disposal of such waste, and promoting companies that will utilize the waste.

A competitive bidding scheme can be employed. This means that the State will call for bids investors interested in investing in capacity for the generation of electricity from biomass sources. The respective sources and technology will be spelt out as well as the expected capacity of electricity. The government will state the amount it intends to pay for the electricity to be generated. The government conducts inspections on the bids put in by the bidders who will forward a proposal stating how they intend to generate the capacity of

electricity required by the government. There will be need to state whether it should be daily, weekly or monthly capacity. Generally, under the rules governing power-purchase agreement, failure to meet the required capacity should attract penalties, depending on the unit of shortfall in capacity. Upon the confirmation of the invoice, the government will pay for the capacity generated. The use of biomass from agricultural products is more reliable and easier to forecast, unlike in the case of wind and solar energy that can vary. The supply of biomass feedstock can be stable and there could be constant supply of biomass to meet the demand.

Exploring the Opportunities in the Paris Agreement

After a long negotiation path for a Post-Kyoto Agreement, nations arrived at a negotiation outcome in Paris in December 2015. After being open for signature, the Paris Agreement came into effect in 2015. In Paris, it was agreed that nations will reduce global temperature ‘...below 2 °C above preindustrial levels and, to pursue efforts to limit the temperature increase to 1.5 °C above preindustrial levels...’ (Article 2), it stipulates that developed countries should provide financial resources for developing countries (Article 9). The agreement became legally binding 30 days after it was ratified by 55 of the members (Article 21).

Under the Paris Agreement, the Parties can voluntarily cooperate in meeting ‘their nationally- determined contributions to allow for higher ambition in their mitigation and adaptation actions and to promote sustainable development and environmental integrity’ (Article 6.1). The parties of their own volition can take up specific commitments on how they will mitigate climate change and employ adaptation measures to promote sustainable development and environmental integrity.

The parties, based on the above, may utilise ‘internationally transferred mitigation outcomes towards nationally determined contributions’, doing so in a transparent manner in governance, applying robust accounting to avoid double counting. Therefore, the Paris Agreement establishes a voluntary ‘mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development’. The mechanism aims to promote the mitigation of greenhouse gas emissions, while fostering sustainable development; incentivising and facilitating participation of private and public entities in the greenhouse gas emissions mitigation; contributing to the reduction of emission levels in the host party benefiting from the activities and at the same time enabling the other party to fulfil the obligation of its nationally-determined contribution; and delivering an overall mitigation in global emissions. Where a party has utilised the scheme in meeting its nationally-determined contribution, such a scheme cannot be used by the other party. Proceeds from the scheme shall be used to cover administrative costs and also ‘assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation’ (Article 6).

The Paris Agreement also provides for ‘integrated, holistic and balanced non-market approaches’ for ‘the implementation of their nationally-determined contributions, in the context of sustainable development and poverty eradication, in a coordinated and effective manner, including through, inter alia, mitigation, adaptation, finance, technology transfer and capacity-building’ It also has as its aim the promotion of mitigation and adaptation ambition; enhancing public and private participation in the implementation of nationally-determined contributions; and enabling opportunities for coordination across instruments and relevant institutional arrangement (Article 6).

The Paris Climate Change negotiations achieved a giant milestone with the agreement of nations to set up the framework for a robust climate change regime to succeed the Kyoto Protocol in 2020. Within the framework of the Paris Agreement, are mechanisms for climate finance. Funds are expected to be drawn from many sources. Ebonyi state can take steps to develop a robust framework for the utilisation of the mechanisms of the Paris Agreement to enhance the promotion of climate change in Agriculture.

The successful utilisation of the Paris Agreement will largely depend on the measures taken by the state to put in place agencies that explore how it can leverage on the deployment of climate-friendly technologies in the agricultural sector. Much commitment must be put in place to mainstream climate change concerns as envisioned by international climate change law, in agricultural practices in the state so that the state can explore the funds available to mitigate climate change without having to wait for the federal government.

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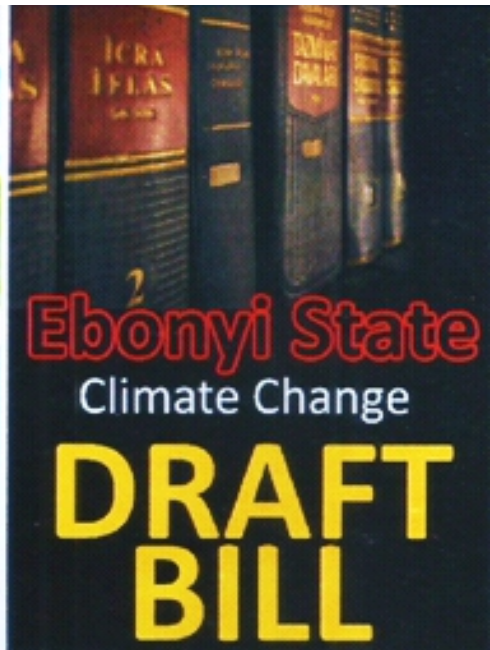
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**FLAG OFF OF EBONYI STATE CLIMATE CHANGE POLICY
BY HIS EXCELLENCY, THE EXECUTIVE GOVERNOR OF EBONYI STATE
ENGR. CHIEF DAVID NWEZE UMAHI, FNATE, FNSE**



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