

MANAGING CLIMATE REALITY IN SUB- SAHARA AFRICA

Fighting Poverty Through Climate Action

ABSTRACT

This work takes a look at climate reality in the Niger Delta region in particular, and the entire Sahel Region of Nigeria in general, to draw insight into climate reality in Sub-Saharan Africa. From demonstrating the need for resilient communities to withstand the effects of environmental degradation on roads, it recommends sustainable development across the Lake Chad basin economies. Whilst it encourages transition to renewables, it references Carbon Capture technology as the technology that can significantly reduce greenhouse gas (GHG) emissions from certain industrial processes involving fossils such as coal, oil and gas in economies yet to start, or still in, transition ...

Morgan K Orioha, +447495668994, Reading, UK

Contents

| | |
|---|----|
| Abstract:..... | 2 |
| Introduction | 4 |
| Climate Reality in The Niger Delta Region. | 5 |
| Climate Reality in the Sahara Desert and the entire Sahel Region of Nigeria | 7 |
| Climate Reality Solutions and Policy Recommendations..... | 9 |
| Promote Sustainable Development to Slow-Down Climate-Change:..... | 9 |
| Devolve Energy Power to Drive Transition and Economic Empowerment at Grassroots | 10 |
| Build Smart Cities and Resilient Communities to prepare for Population Explosion | 11 |
| Slow-Down Climate Change via Clean Energy and Sustainability in Sahara and its Sahel..... | 12 |
| Take Action with Climate Finance..... | 13 |
| Conclusion:..... | 15 |
| References | 17 |
| | |
| Figure 1: Untarred historic “Umuezukwe Road”, a flood channel to pollution of Njaba River, Umuezukwe, Awo-omamma | 7 |
| Figure 2: Njaba River from Umuezukwe waterfront showing gully erosion in opposite Ngbelle Community of Oguta..... | 8 |
| Figure 3: Understanding Nigeria’s Changing Climate: Source [18] | 13 |

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

Abstract:

This work takes a look at climate reality in the Niger Delta region in particular, and the entire Sahel Region of Nigeria in general, to draw insight into climate reality in Sub-Sahara Africa. From demonstrating the need for resilient communities to withstand the effects of environmental degradation on roads, it recommends sustainable development across the Lake Chad basin economies. Whilst it encourages transition to renewables, it references Carbon Capture technology as the technology that can significantly reduce greenhouse gas (GHG) emissions from certain industrial processes involving fossils such as coal, oil and gas in economies yet to start, or still in, transition. The work makes it clear that the climate problem of Lake Chad basin demonstrates the effect of unsustainable and neglected human practices within the basin economies. The problem actually calls for urgent action to adopt sustainable, and controlled human, activities in environments and communities in the Lake's basin in order to arrest, carefully slow-down and perhaps reverse the damage done and pass on safer environment to next generation.

Therefore, it recommends that central governments in the Sub-Sahara devolve energy power to States in support of energy transition, energy poverty eradication, and implementation of sustainable actions against climate-change at the grassroots especially in States facing serious environmental challenges from encroaching Sahara Desert. Devolving power further to Local Governments creates more opportunities and openings for emergence of climate advocates and energy efficiency auditors to ensure that Nigeria and other countries in the basin do justice to their changing environment through decarbonization and significant commitment to green growth going forward. Therefore, this work recommends that environmental policies and regulations be reformed to increase advocacy for, attraction and implementation of, sustainable development (or

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](https://twitter.com/MorganOrioha)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

climate-change projects) finance to be enforced across States at grassroots. The strategy discussed in this work would create jobs, successfully move Nigeria to significant reliance on renewables, and slow-down global warming whilst increasing productivity and private-sector participation in growth of rural economies and job creations needed to fight poverty in the continent.

The work makes it clear that energy efficiency policy that anchors on air quality improvement, emissions control, and delivery of sustainable energy solutions in communities and cities will drive down GHG emissions and improve human health in line with UN SDGs. Phased removal of fossil fuel subsidy on imported refined products and simultaneous introduction of same on renewables – would also incentivise shift to green transport infrastructure over time.

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

Introduction

Climate change is emerging as a potent driver of internal migration. According to World Bank Group, climate-change will intensify environmental degradation and natural hazards in many regions, [1] and there could be tens of millions of internal climate migrant by 2050. Flooding and human activities drive changes on roads and rivers that degrade the environment in countries such as Nigeria. Apart from effects of gas flaring and carbon intensive fuels, very often, rainfall uses dusty and untarred roads and excavations as flood channels to create environmental issues such as gullies in many places in Sub-Sahara Africa, where around 25-45% walk to work (or markets) due to lack of affordable transport and accessible roads [11]. Climate reality is visible in many communities and cities in Nigeria where flooding, erosion, desolation, over-reliance on carbon-intensive energy, unsustainable farming and agricultural practices, and poor (or zero implementation of) environmental regulations and policies are inimical to economic growth, peace, health and environmental justice.

In addition to issues such as energy and education, climate change is another obstacle to eradicating poverty in Africa [5]. As the need to fight energy poverty increases, managing climate reality is essential. Global warming is already noted as one of the key drivers shaping energy supply and usage currently [3], and it can even shape energy demand in no distant time as oil producing communities become more and more aware of effect of GHG. No wonder countries holding on to fossils are already pursuing decarbonization by cleaning up fossil fuels in their business operations. For example, Carbon Capture technologies are keeping coal plants in operations - contributing to global clean energy goals - whilst economies complete their transitions. According to World Energy Council, although coal still provides around 40% of the world's electricity, climate

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

change mitigation demands, transition to cleaner energy forms and increased competition from other resources are presenting challenges for the sector [2]. According to FAO, the environmental costs per unit of livestock production must be cut by one half, just to avoid the level of damage worsening beyond its present level [12]. Thus, the advocacy to manage greenhouse gas emissions from fossils, and other unsustainable emissions releasing and environmental degrading activities, have been created and is expanding to do justice to our environment. Rather than deny climate-change in this era, every economy could pursue Environmental policy emphasizing the effects of human and natural activities on the environment and their mitigations.

Anchoring on 2015 Paris Accord, article 2 of the Agreement defines the three purposes of the instrument: to make mitigation effective by holding the increase of temperature well below 2°C, pursuing efforts to keep warming at 1.5°C above pre-industrial levels; to make adaptation possible for all parties; and to make finance available to fund low carbon development and build resilience to climate impacts [2].

Climate Reality in The Niger Delta Region. It is well known that the most vulnerable part of the Niger Delta, that semi-arid Sahel, is the Inner (Core) Niger Delta [6]. Nevertheless, sustainability of every part of the entire Niger Delta – the whole region largely known for oil palm, fishing and small-scale agriculture and its vulnerability to man-made climate change (mostly from GHG) such as caused by oil and gas operations, nature and flood - is a concern [7]. The region's watery wealth is known to have a profound impact on the landscape and its people. For example, people engage in washing on the banks of Njaba and Orashi rivers. There are also fishing activities in the rivers from communities on both sides of their banks. Communities farm on arable lands on both sides of the banks. Oil Palm trees form part of the green vegetation of these communities.

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

Very often, human activities release chemicals from detergents and from those used in agricultural lands surrounding the rivers into water during rainfall [8]. Similarly, as with many other areas of the delta region and their surrounding communities, the continuous flaring of gases at flow stations constitutes a threat to ambient air [9] due to greenhouse gas emissions (GHG). The rising temperatures in the region could destroy livelihoods, threaten the Malian economy and turn more people towards escape routes – whether to urban slums, migration routes north to Europe or the ranks of AQIM [6]. Therefore, the Outer Niger Delta as with other Niger Delta regions such as the Inner Niger Delta are found to be ground zero for climate change. The entire region and their immediate surroundings are not exempted from GHG emissions and rising temperature. What happens there will also affect what happens in Europe [6]. Across every community, erratic electricity supply is causing over-reliance on carbon-intensive diesel generators or use of lamps - increasing reliance on fossils and releasing emissions. Untarred and poorly developed roads lead to flooding, soil erosion, gullies and pollution of marine environment as well as loss of soil fertility in the entire lower Niger River area known for forests, and network of rivers and lakes. There are a handful of wildlife in the region's largely oil palm vegetation. Umuezukwe's specie of monkey is a typical example of them [10].

Figure 1 is a diagram of lowland portion of untarred “Umuezukwe Road” in the OML 124 of the Niger Delta region Southeastern Nigeria. Due to the untarred condition of the entire road, usually every rainy season, the villagers do not use the road and artificial waterbodies form along as surface run-off water tries to find its way to Njaba stream. Economic activities in the community is restricted as the other end of the road is without a river-crossing (bridge) at Njaba River to unlock the economy of the communities.

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018



Figure 1: Untarred historic “Umuezukwe Road”, a flood channel to pollution of Njaba River, Umuezukwe, Awo-omamma

Source: Wikipedia - Awo-omamma within OML 124

Climate Reality in the Sahara Desert and the entire Sahel Region of Nigeria

As ecosystems are lost to deforestation and traditional unsustainable farming activities [12], the rate of desert encroachment from the Sahara through the Sahel region to the green coastal regions of countries like Nigeria is high. Therefore, uncontained greenhouse gas emissions (such as ammonia) from these human activities are pollutants just as are those from oil and gas operations [12]. Air pollution from carbon-intensive fuel vehicles is also affecting cities and communities. Congested cities such as Lagos, Kano, Port Harcourt, Onitsha, Ibadan, Kaduna, Uyo, Jos, Aba, Benin, Makurdi et al and their nearest rural settlements are at risks of effects of poor air quality and environmental degradation due to overreliance on fossil-fuel vehicles, electric generators and unsustainable agricultural production and consumption activities. For example, it has been noted that the livestock sector generates more greenhouse gas emissions as measured in CO₂ equivalent – 18 percent – than transport. It is also a major source of land and water degradation [12]. In fact, agriculture is a major source of significant ammonia emissions in many countries. No wonder the desert is encroaching to the coastal regions of Nigeria.

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](https://twitter.com/MorganOrioha)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

Now take a look at figure 3. As Sahara encroaches due to our unchecked human activities that have gone on for ages, we are not only losing arable lands and warming the globe, but we are prone to conflicts between indigenous crop farming communities and the grazing livestock farmers for land and natural resources. If the change in climate is not slowed-down and desertification possibly reversed through sustainable practices and any form of re-forestation, it is only a matter of time before Nigeria loses its entire landmass to desert due to unchecked unsustainable human practises.



Figure 2: Njaba River from Umuezukwe waterfront showing gully erosion in opposite Ngbelle Community of Oguta

Source: Wikipedia – Awo-omamma within OML 124

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](https://twitter.com/MorganOrioha)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

Climate Reality Solutions and Policy Recommendations

Promote Sustainable Development to Slow-Down Climate-Change:

The mitigation of potential, and/or, arrest of real, environmental hazards and changes goes beyond advocacy [17] to implementation of ideas, policies and established Sustainable Development Goals (UN SDGs). Efforts must continuously be made and increased to slow down man-made climate change in the entire region [6], across all regions and communities in Nigeria. And changes driven by nature could also be slowed-down through adoption of global best practises. Sustainability strategy should focus on discouraging inefficient and unsustainable practices through development and implementation of sustainable development policies, regulations, and attraction of sustainable investments and projects where applicable, into the regions. Therefore, environmental laws should be developed (where none exists) and implemented, to educate and enforce sustainability across communities and businesses operating in the Oil producing States and, in fact, across Nigeria's 36 States. Environmental laws could be replicated across Local, State and National Governments and countries in the entire Sahel region where applicable. This strategy does not only call for awareness and doubling of efforts towards managing climate change reality but it demonstrates clearly, the need for implementation of UN's sustainable development goals in the entire Oil producing states, Nigeria and the Sahel region. The approach is also an opportunity to revive governments at grassroots using environmental laws, advocacy, regulations and projects to slow-down the changing climate and improve economic opportunities needed to manage permanent migration.

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; orioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

Devolve Energy Power to Drive Transition and Economic Empowerment at Grassroots

Well-structured energy-mix policy is one of the drivers of planned transition. It is also a sign of commitment to delivery of access to affordable energy in rural communities without energy access. Solar and wind farms and their storage systems will continue to play important role to delivery of clean and reliable electricity to many in line with Sustainable Development Goals 7 and 13 targets. Economies in the Sahara, such as Nigeria, struggling under inadequate on-grid electricity infrastructure, could, therefore re-strategize as part of power reforms, to develop and seriously pursue green growth strategies over fossils in support of decarbonization, slowing-down of climate effects around Lake Chad, and eradication of electricity poverty. Through renewables microgrids with storage systems, the strategy would promote delivery of reliable and stable clean electricity in off-grids to communities instead of extending, often costly, conventional power grids. This strategy might require devolution of energy power from the centre to States. States nearer the desert with adequate sunlight can utilise their renewables potential to save the environment and drive economic growth. Deployment of off-grid microgrids can drive the building of new smart cities to help decongest existing and largely unplanned big cities in preparation for the 2050 population explosion. This sustainable development strategy anchored to energy transition would foster communal living, promote democracy at local governments through their active participation in environmental regulations and policy governance. The strategy could also spur economic activities in Nigeria's real estate and clean energy sectors – creating room for more private sector participation in housing development - at the grassroots. Therefore, managing greenhouse gas emissions through sustainable energy and energy efficiency measures in these

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

States will certainly help in slowing-down the rate of warming and in achieving clean energy-mix whilst increasing economic activities.

Build Smart Cities and Resilient Communities to prepare for Population Explosion

As Africa prepares for doubling of its citizens from 1.1 billion to 2.2 billion by 2050 [11], through careful planning, Sub-Sahara Africa can lead the building of new smart cities to distribute the projected population and avert the creation of slums. For example, Nigeria's inadequate transport network offers opportunity for adoption of modern and green transport network system over conventional network system that advanced economies are transitioning from. According to World Bank Group, climate migration in Sub-Saharan Africa can have substantial development implications and the stakes are high. Achieving a resilient society — where people can either adapt in place and thrive or migrate with dignity toward areas of higher opportunity — is an important part of meeting national development goals [1]. In the case of farming, developing and implementing sustainability policies would not only reduce greenhouse gas, but it would improve health, farmer's productivity, living conditions, increased economic activities, reduced internal conflicts and migration, between communities.

The goal of such sustainable development policy in the Sahel region would be to discourage traditional unsustainable practices in farming that are attracting desertification, causing conflicts and leading to economic losses and food insecurity in States. Sustainability policy would promote practices including adoption of clean energy generation, supply and use when easily at reach to boost their internally generated revenue and economic prosperity. Promoting re/forestation over deforestation is also vital to slowing-down climate change, preventing flooding and conserving the environment. Developing and linking deplorable rural roads such as the historic Umuezukwe road

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](https://twitter.com/MorganOrioha)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

(see figure 1) and their likes, constantly affected by flooding, to their nearest cities and other communities would contribute to averting climate migration by spurring economic activities and raising smart cities from what hitherto were rural communities.

Slow-Down Climate Change via Clean Energy and Sustainability in Sahara and its Sahel

It is currently being proven that Sahara Desert which is capable of serving as, energy bank of Africa, Europe and Middle East and, motivator for sustainable development in its Sahel region is capable of increasing rainfall and improving vegetation of the desert when solar and wind farms are installed in large quantities [4] [5]. This could be the most serious action to slow-down climate change, encourage modernisation and inclusive growth through sustainability and economic empowerment over traditional and age-long unsustainable ways of living around the Sahel regions. As climate migration looms, when research is completed, taking such action to reduce emissions, improve rainfall and the desert's overall environment, can avoid disrupting the lives of millions in the communities in the region and provide significant economic opportunities – while safeguarding the planet we call home [3]. Therefore, in efforts to save Lake Chad from desertification [14], this work recommends that Nigeria and rest of the 7 countries within the Lake's Basin adopt sustainability (or climate) policies anchored to green growth and be ready to explore reforestation of Sahara Desert. These policies should spur setting up of targets to decarbonization and implementing energy efficiency measures to reduce emissions at State levels. Nigeria's federal government could devolve energy power from the Centre Government to States - supporting those nearer the Desert to adopt, implement and manage, effectively, transition to renewables needed to improve rainfall in the region and potentially reforest the deforesting environment whilst increasing economic activities.

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

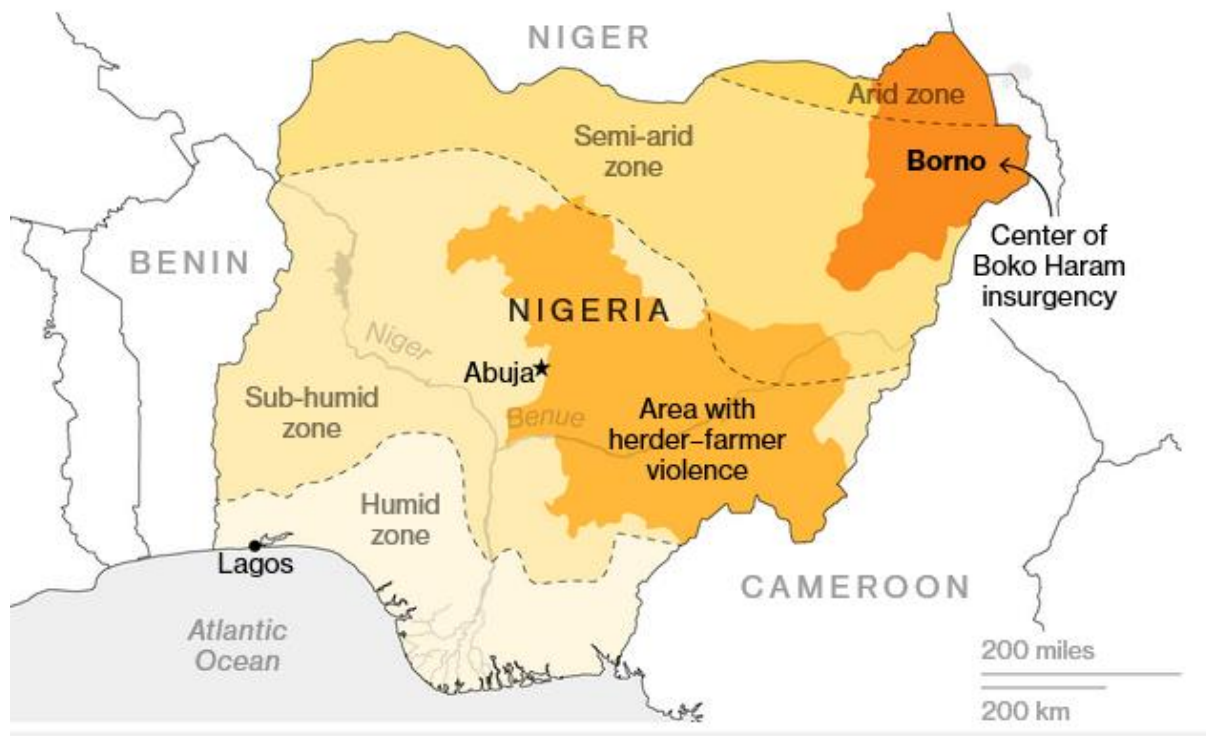


Figure 3: Understanding Nigeria's Changing Climate: Source [18]

Take Action with Climate Finance

There are indications that the global community is already prepared to finance climate projects and provide sustainable investment support. It is recognised that scaling-up and shifting financial flows to low-emissions and resilient infrastructure investments are critical to delivering on the objectives of the Paris Agreement and the 2030 Agenda for Sustainable Development [16]. And the World Economic Forum projects that by 2020, about \$5.7 trillion will need to be invested annually in green infrastructure, much of which will be in today's developing world [15].

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; orioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](https://twitter.com/MorganOrioha)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

Climate Reality Management

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

Conclusion:

The sustainable development strategy discussed in this article would support efforts to reduce risky economic migration from citizens of countries in the Sahel region via the Mediterranean. For example, when living standards in rural communities are improved through resilient infrastructure such as road and reliable electricity, such that people are able to commute on motorable (tarred) roads, access electricity when needed, and rest in assurance of basic amenities such as broadband, water, education, healthcare and housing around them, the rate of permanent migration would naturally drop. Healthcare of rural dwellers and other road users would also be improved when driving on tarred roads having pedestrian walkways. Through improvements in infrastructure, economic opportunities are created within these communities - putting people into gainful employments or living them to create opportunities themselves. People would therefore be more inclined to short term movements for trade and exchange of goods than permanent migration in search of economic opportunities.

Due to climate change reality, sustainable new city(ies) development strategy that gradually includes adjacent rural communities would build resilient economies - slowing-down the change, saving the environment, improving water quality and marine lives. This work has articulated measures needed to demonstrate some of the great yet simple ways to drive reduction in greenhouse gas emissions whilst transforming communities and taking actions against global warming. This work has, discussed how and, promoted climate advocacy, to tackle flooding, lack of opportunities, and other man-made and natural environmental issues that are driving climate-change in Sub-Sahara by promoting sustainability, functional governments at grassroots, flood resilient roads, energy transition in the communities of countries in Lake Chad basin using Nigeria.

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](https://twitter.com/MorganOrioha)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

Climate Reality Management

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

References

[1]. World Bank's Group. Preparing for Internal Migration. GROUNDSWELL; POLICY NOTE #1; 2018

[2]. World Energy Council; World Energy Resources 2016. https://www.worldenergy.org/wp-content/uploads/2016/10/World-Energy-Resources_SummaryReport_2016.pdf

[3]. Felipe Calderón; World Resources Institute; The Human Cost of Climate Change; July 02, 2018

<https://www.wri.org/blog/2018/07/human-cost-climate-change>

[4]. Matt McGrath; Large-scale wind and solar power 'could green the Sahara'; <https://www.bbc.co.uk/news/science-environment-45435593>

[5]. Jonny Bairstow; Researchers suggest solar panels and turbines could kickstart a cycle of increased precipitation; Could desert-based renewables bring rain to the Sahara?

<https://www.energylivenews.com/2018/09/11/could-desert-based-renewables-bring-rain-to-the-sahara/>

[6]. Kitty van der Heijden; Why Climate Change is a Security Matter; July 06, 2018; <https://www.wri.org/blog/2018/07/why-climate-change-security-matter>

[7]. The effect of crude oil spill at Izombe, Imo State, Nigeria on plankton diversity and abundance; Emmanuel M et al ; Department of Biological Sciences, Cross River University of Technology, Calabar, Nigeria Australian Journal of Basic and Applied Sciences, 7(6): 178-183, 2013 ISSN 1991-8178

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; morioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

- [8]. Akubugwo E. I et al. Water Quality Assessment of Njaba River, Nigeria; IOSR Journal Of Environmental Science, Toxicology And Food Technology (IOSR - JESTFT) e-ISSN: 2319-2402,p- ISSN: 2319- 2399.Volume 4, Issue 6 (Jul. -Aug. 2013), PP 33-37www.Iosrjournals.Org ; <http://www.iosrjournals.org/iosr-jestft/papers/vol4-issue6/F0463337.pdf>
- [9]. Njaba River; Wikipedia - https://en.wikipedia.org/wiki/Njaba_River
- [10]. Umuezukwe; Wikipedia: https://en.wikipedia.org/wiki/Umuezukwe#Tourist_Potentials
- [11]. Robert Muggah; Katie Hill; African cities will double in population by 2050. Here are 4 ways to make sure they thrive; 27 Jun 2018; <https://www.weforum.org/agenda/2018/06/Africa-urbanization-cities-double-population-2050-4%20ways-thrive>
- [12]. Christopher Matthews; Livestock a major threat to environment - Remedies urgently needed; 29 November 2006; <http://www.fao.org/newsroom/en/news/2006/1000448/index.html>
- [13]. T&T CHAM-BER OF IN-DUS-TRY & COM-MERCE; The issue of flooding; June 29, 2011; <http://www.guardian.co.tt/business-guardian/issue-flooding-6.2.445398.200849b76f>
- [14] Kingsley Jeremiah and Joke Falaju; Why Lake Chad requires urgent attention; The Guardian; 26th February 2018; <https://guardian.ng/features/why-lake-chad-requires-urgent-attention/>
- [15]. Climate Finance; World Resources Institute; <https://www.wri.org/our-work/project/climate-finance>
- [16]. Financing Climate Future – Rethinking Infrastructure; High-level discussion on Financing Climate Futures; <http://www.oecd.org/environment/cc/climate-futures/agenda-financing-climate-futures-event-september->

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; orioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](https://twitter.com/MorganOrioha)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018

[2018.pdf?utm_source=Adestra&utm_medium=email&utm_content=Event&utm_campaign=Climate%20change%20%282nd%20edition%29&utm_term=demo](#)

[17]. Udoka U. P. et al. Morphometric Analysis of Sub- watersheds in Oguta and Environs, Southeastern Nigeria Using GIS and Remote Sensing Data; Department of Geosciences, Federal University of Technology, Owerri, Nigeria; <http://www.sciepub.com/reference/149093>

[18]. Paul Wallace; Nigeria's Horrors and Hopes; First Published on April 16, 2015; Republished on August 22, 2018; <https://www.bloomberg.com/quicktake/nigerias-breaking-point>

About the Author. Morgan K Orioha is an Energy Consultant and Climate Advocate. mko@morganorioha.com;

mkorioha@yahoo.com; orioham@gmail.com or morgan.orioha@mijtok.com. [@MorganOrioha](#)

(Twitter) and Morgan K Orioha (Facebook). First published at www.morganorioha.com on

13/09/2018; Revised and re-published on 21/09/2018