

Climate Variation or Change? Trend, Effects, and Implications on Contemporary Igbo Heartland

Ezeonwuka, Innocent-Franklyn O.

Department of History International Studies and Diplomacy
Godfrey Okoye University, Enugu, Nigeria

&

Ani, Uchenna S.

Department of History and Strategic Studies,
Federal University, Ndufu-Alike, Ikwo, Nigeria

Abstract

The world is not only globalised econo-technologically, but equally on all aspects of the emergent fallouts and realities of climatic change. Since much of Africa's problems are not only identifiable; but replicated in Nigeria, by implication and choice, an area proven to have been extensively exposed to detailed human use and actions for a very long time is the Igbo heartland. This relatively small chunk of the Nigerian environment, in its ever-growing high population density, not only bore the brunt of the persistent 3 years army bombardment during the 1967 - 1970 Nigerian-Biafran War, but has speedily and helplessly degenerated into an environmental catastrophe. Building collapses, road washouts, flooded habitations and farmlands, gullies and highly unpredictable weather variations have continued to adversely challenge the Igbo nation in its age-long habitat. For long, individual efforts, community contingency responses, coupled with comparatively skeletal governmental assistance cumulatively appear insignificant, un-sustained and counter-productive. Quite aware of an inundated catalogue of literatures from ecological experts and geo-morphologists on this subject and with due reference to this area, it may be observed that none has ventured to understudy this problem from the stable of environmental history. Since this study has ventured into the depth of these phenomena, detailed constructive nature-friendly behavioral change is advocated, after all, the defense of the earth is the defense of life. Primary and secondary sources constitute data for historical reconstruction; available data will be analyzed historically.

Keywords: Environment, Ecology, Erosion, Hydrocarbons, History

Introduction

Just as the world is speedily advancing, technologically, propelled by the complexities of the fourth industrial

revolution, pointers to the looming dangers and cataclysmic repercussions on human life and the natural environment continue to emit dangerous signals. The

impending ecocatastrophe is buttressed by the fact that the earth is simply one, and completely subsists on the interdependence of Global Life-Support System. Deliberately avoiding extinction concepts and rhetorics vis a vis the proven maladies accompanying such geomorphological upheavals in history, this study while in tandem with the diagnosis of evidence-based climatic changes in the Nigerian nation, is apt to succinctly expose and evaluate the possible causes and consequences of this to the Igbo heartland environment. Distressed history is often accompanied with fire of alarms to aid evacuation time.

Extreme fallouts from global population explosion, coupled with the depredations of the fourth industrial revolution spanning the 21st century have continued to cumulatively challenge nature and its endowments negatively. Environmental journalists have lent their voices to space/weather scientists in not only creating awareness, but alerting the world on this dangerous drift. Pointers to the reality of such warnings include, life-threatening weather and environmental changes and conditions, the uncontrollable wild fires, rising sea levels, devastating hurricane blizzards, high-impact tornadoes, smog, rapacious landslides and flooding to evidence-based proofs of drastic global warming and desertification. In its present momentum, it appears to have defied human tact, solution and technological containment. No part of the world is spared, hence Africa with its beleaguered identity, definitely lies immersed in this human-instigated

climatic and environmental squalor.

The dimensional increase in environmental toxic emissions, stemming from complex agro-based pesticides/repellants, carbon monoxide fumes from machines, vehicles and plastic combustions undoubtedly add to the deliberate deforestation and random cutting of trees still being witnessed in the Southeastern part of Nigeria. Much of this anomaly is traceable largely to human factor and activity. Besides, apart from an apparent long-standing ignorance in land/environmental management, coupled with the many challenges of waste disposal, incipient condiments of urbanization, and town planning, improved lifestyles and poor agricultural practices have among others added as a monumental drag to the Igbo nation and environment. The geometric increase in cases of building collapses, and other environmental maladies sequel to adverse unpredictable weather variations have continued to deeply challenge the Igbo heartland in its natural habitat. Contemporarily evidence-based surveys and investigation have implicated and identified active erosion and gully sites in the following South Eastern towns - Nanka, Oko, Agulu, Enugwu-Ukwu, Oba, Orlu, Alor, Umunze, Ekwuluobia, Urualla, Okwudo, Adazi, Nnewi, Nnobi, Enugu-Ngwo, Nsude, Amaeke-Ngwo among others. Though Anambra, Imo and Abia States appear to be mostly affected, it should be observed that most of the above-mentioned towns lie within what Afigbo referred to as the Awka-Orlu cuesta, the epicenter of Igbo heartland

from which the Igbo dispersed to their different present habitations.¹

Simply identifying the culprit to this trending phenomenon may not be the only objective of this study, but equally seeking plausible effects, implications and solutions that could bring succor and solace. To actualize the foregoing, this paper is divided into four sections and a conclusion.

Explanation of Terms

Climate Variation

Unsteady frequency changes in climatic variables with regards to rainfall, temperature, wind pattern, humidity, among others, which has persisted for not less than fifty years; more so, noticeably contrasting in proceeding predictable ordinance could well explain the condition of climate variation.² The emphasis is on the irregularity or incessant changes in temperature, pressure, humidity, rainfall, wind patterns and cloud covers, which could give rise to inconsistency in rainfall patterns, erosion, epidemic outbreaks, severe drought, heat waves, floods, extreme storms among others;³ the variables of one or a combination of the already mentioned, however, have gradual and insignificant effects on the environmental balance of the ecosystem.⁴ Climate variation refers to shorter term (daily, seasonal, annual, inter-annual or several years) including the fluctuations associated with both dry and wet events.⁵ In furtherance of this view, Savitsky specified that these multi-seasonal show shorter-term fluctuations may not bring about the long term average change, since

its time periods could range from months to as many as thirty years.⁶ Because of the complexities and the non-linear reactionary way climatic issues appear, reconciling climate variability and climate change may not be easy, since both could actually occur simultaneously.

Climate Change

This refers to the alterations in the earth's atmosphere which occur over much longer periods, decades to millennia, caused by natural processes (volcanic activity, solar variability, plate tectonics, or shifts in the earth's orbit) and human activity (increased greenhouse gas emission). The latest (fifth) Assessment Report from Intergovernmental Panel on Climate Change (IPCC) for example found that on the average, global temperatures increased about 0.850c from 1880 to 2012, and concluded that more than half of the observed increase in global average temperatures was caused by elevated emissions of carbon dioxide and other greenhouse gases.⁷ Weather describes current atmospheric conditions such as rainfall, temperature and wind speed at a particular place and time. It changes from day to day. Climate is the average (or normal) pattern of weather for a particular place over several decades, hence changes in climate are hard to detect. For long, historians have spent time looking for the origins of contemporary global environmental problems. Taking into cognizance the constant changes and reshaping of the earth's surface (geological, climatic, biological and human forces), historians thought it wise to deploy the tools of

ecology and geography first, and later archaeology and anthropology in a bilateral survey of not only how the natural environment affects man, but equally how man influences it. Not limited to human exploitation of the natural world, unmasking misconceptions, myths and false perceptions of the past is appropriately important, in order to understand modern notions of sustainability, equilibrium systems and biodiversity. Since the present and its problems would always be influenced by how the past is perceived, the historically defined character of the values and ideas in sources used must be recognizable.

On the other hand, it must be stressed that beyond the many major critical theories and observations centered on ecological degradation and social change, communicative action and the social order subsists the social dynamics of environmental degradation, social learning for ecological sustainability, Hoffmaister argues that since the problem of climate change poses the tendency of jeopardizing future generations, and more so operating under the manipulative ambit of pro-growth strategies of rich or poor countries, it is simply an issue of international justice, since criminal human actions are involved⁸. Theorizing and approaching underlying issues and possible fallouts of climate variations and change as it concerns the human society holistically from the pedestal of immediate econo-selfish gains and losses may only be rationally plausible if there is abject convincing evidence disproving many

scientific impending environmental maladies steadily closing in on the human race as a by-product of prolonged periods of deliberate stereotype behaviours against nature and its corollary.

Devoid of sentiments, and quite fully aware that much of the global environmental damage were effected sequel to both large scale ignorance and the enjoyable frenzy of technological advancements, this study found it worthy and scholarly to effectively streamline its research through the binoculars of basic environmental history which oscillates on the concept of positive and negative radioactive forcing on the one hand, and the problem of natural phenomenon, hence internal and external variabilities. While increasing concentrations of green house gases and carbon dioxide tends to warm the surface (positive radioactive forcing), an increase in some types of aerosols (microscopic airborne particles) tends to cool the surface (negative radioactive forcing). Natural factors such as changes in solar output or explosive volcanic activity can also cause radioactive forcing. The characterization of these climate forcing agents and their changes overtime is required to understand past climate changes in the context of natural variations, and to project what climate changes could lay ahead. Climate is what one expects, while weather is what one actually gets. The difference between weather, climate variability and climate change is in their time scales.

Environmental Imbalance/Challenges

In the world, the ecosystems through a wonderful bionetwork create and maintains by default global environmental balance. Anything which alters this sequence affects life on earth; for example, carbon gas, in the atmosphere of 1 percent causes environmental imbalance, while less than 1 percent causes deficiency of oxygen to animals, just as above 1 percent causes death of plants. While there is an accurate balance between what the human gets from oxygen and between the amounts of released oxygen by plants, there is another balance between the released amount of carbon gas by human and the amount of carbon taken by the plants. Whether ecological or environmental imbalance, the destruction of agricultural lands, atmosphere, vegetation and water bodies, the inclusion of certain gases (pollutants and contaminants) into the atmospheric environments, the alteration of the physics and chemistry of the place triggers positive and negative reactions in consonance with in-coming and out-going radiation. Plant nutrients, water, the functioning and permeability of soil type could through the ensuing imbalance create erosion, floods, increased rainfall patterns and environmental challenges to the ecosystem.⁸

Natural and anthropogenic factors or forces most times cause majority of the environmental challenges, hence the nature of heat energy, soil type and rainfall pattern remain key elements. In the Eastern part of Nigeria, the fast rate of socio-economic activities has led to severe

urban challenges and deteriorations. Increased levels of urban population have continued to create ecological challenges.

The Igbo Heartland and its Environment

Quite aware of the presence and importance of both the oriental hypothesis and Niger/Benue Confluence theory with regards to the origin and migration of the Igbo, this study is deliberately attracted to the Igbo Homeland hypothesis, which trace early Igbo homeland to certain primary core settlements of Nri, Awka, Orlu, Owerri, Okigwe, Aguleri axis. From this heartland, people migrated to various present day Igbo location.⁹ The migration from this core area took many directions; southwards to the east, south east into Ngwa land, onwards to Ikwere, east into Umuahia area, and then to the Ohafia-Arochukwu ridge, blunting and recoiling northwards to Ehugbo, Ezaa, Ikwo, Izzi (North-eastern Igbo) from Neni/Awka/Orlu area to westwards to establish the west Niger settlements across the Niger.

Stubborn evidence of prolonged human activity and habitation in these core areas, have equally been buttressed by the proven evidence of the conversion of the natural vegetation of the region from rain forest to derived savanna. This protracted utilization gave rise to greater deterioration of the soil than most parts of Igboland, except the river valleys. Again, the antiquity of these sites could be inferred from extant migration accounts streaming from their oral traditional, few from their immediate

environment. Thurstan Shaw's Igbo ukwu excavations within the Awka/Orlu cuesta have revealed a high degree of sedentary settlement with very strong socio-political organization which must have taken centuries to achieve before 1000AD.¹⁰ Moreover, from linguistic evidence, the speaking of Igbo language in this ecological location has a great time depth and must have lasted thousands of years.¹¹

According to Anene, there is no doubt that the history of an area is written clearly in its geographical features.¹² The Igbo heartland, which is the subject of this study lies between latitudes 4045N and 7005N, which puts it firmly within the tropics, and only some 530km away from the equator.¹³ In its experience of annual high temperature, (above 850F), generally both mornings, evenings and nights are cooler than noon periods.¹⁴ Just like other areas in the rain forest zone, two seasons (rainy and dry) supersede, dictated by the South west and North East trade winds. While the rainy season operates between the months of April and October, interrupted by a short dry spell (August break), the dry season lasts from November till March (Harmattan). This area possesses a mean annual rainfall of between 60 to 80 inches,¹⁵ and a largely upland relief undulating into natural valleys in some areas, providing for pockets of streams, rivulets and water reservoirs, abjectly denying some others of even earlier access to well water. Two soil samples are predominant in this zone- humus which is very acidic, leading to high decomposition rate and average loss of water to the atmosphere,

hence auguring well for the provision of soil nutrients which very much need non-organic matter,¹⁶ clayey laterite which is less coarse and possesses more textural capabilities of water retention but low decomposition rates.

Land is of utmost importance to the Igbo of this area, sequel to its long standing religious and economic impact. The strategic importance and part played by the earth goddess transcends every aspect of Igbo culture, hence the all important agricultural practices. Predominantly farmers, the people cultivate more of yam, cocoyam, vegetables and fruits. Soil erosion however, has overtime become a challenging phenomenon in several parts of this heartland, crisscrossing Anambra, Abia and Imo states. In explaining what was, this study hopes to easily and clearly draw a line on what is, hence identifying both the problems and their effects.

Contemporary Phenomenal Changes

Reflecting on recent climatic and environment developments in the Igbo heartland would succinctly contain both the many challenges and the decadent fallouts inherent. Weather and climate have always been part of the physical environment in which the human society thrives. Man depends on the environment for existence and sustenance; hence man's life is shaped by his environment. Understudying the Igbo heartland temperature, atmospheric wind pressure, rainfall rhythm and vegetation first, before examining the settlers land engagements, appear more plausible.

Temperatures within the Igbo heartland are the result of its locations near the equator and the high solar radiation. They are however controlled by the passage of the overhead sun, as well as the presence or absence of cloud cover and harmattan dust haze. From February to April insolation increases, making it the hottest months of the year due to space cloud cover, with temperatures typically above 270C. August, the middle of the rainy season with high cloud cover, low receipt of insolation and a typical temperature of around 240C used to be the coolest month.¹⁷ One may not out rightly overlook the December to January harmattan dust haze which is always cooler and scorchy. The contemporary caveat witnessed for some good number of years now include; the short dry season (August break) is being experienced in July as against its occurrence in the month of August prior to the 1970s. In the same vein, the South-west winds (Monsoon) and the North-East winds (Harmattan) which are seasonally exerting atmospheric pressure over this area, appear to manifest mean pattern regulations, due to certain synoptic disturbances equally noticed, hence some expected harmattan periods may even pass either unnoticed or not actually there. Heavy clouding, including long belt of isolated thunderstorm previously witnessed at the closing periods of the rainy season, have even deviated into June.

Apart from the many small patches of natural water springs, streams and small rivers, in this topographically undulating

Awka-Orlu-Okigwe and Aguleri axis, special mention must be made of some important Niger- tributaries and distributaries - Omambala, Otamiri, Imo and Ulas rivers, which split and form an integral part of the Niger drainage basin. The rainfall pattern, available rivers and water points, including water balance, interact with the existent relief, drainage and land forms to interject the most valuable asset in the Igbo heartland-land. Attachment to it stems from religious-aesthetic consciousness/ sustenance of all life to agricultural source of wealth.

Way back in history, the inhabitants of the Igbo heartland have lived and ordered their lives' centered on land, hence agriculture particularly, food production remained the main stay of their economy and as well the highest employer of labour. Densely populated and prospectively increasing, land overuse/poor management and deterioration/ deforestation triggered off soil erosion. Land is a non-renewable resource, more so, the soil structure within the Igbo heartland is not only hydromorphic, but its morphology is influenced by seasonal water logging and erosion, which remained a constant phenomenon.¹⁸ Both natural and anthropogenic (human) factors trigger and sustain climatic, soil and environmental degradation. Giving more credence to this, Agbebaku alludes that, frequency changes in the climatic variables of rainfall, temperature, wind pattern and humidity or any one of them as being recorded in the Nigerian environment, continues to alter the

ecosystem balance.¹⁹ Stern, on the other hand avers that between 1850 and 2005, the average global temperatures have increased by 0.760C,²⁰ while other inclusive statistical tools (Histogram, trendline and time series) deployed to analyze data for a period of 105 years showed that in the Nigerian environment, temperature increased by 1.10C, rainfall increased on the coastal areas by 81mm, hence drying up surface waters and small rivers. This led to shifts in crops cultivated overtime; just as the areas experiencing maximally double rainfall continues to shift south wards.²¹ Moreover, the length of time it takes these changes to manifest matters, though the level of deviation from the normal and its impacts on the ecology are most paramount. This prompted Ayoade to state that secular variations in climate occurring over a period of 100 to 150 years may not qualify as a climate change, in that conditions could quickly reverse later, hence an actual change in climate could be adopted when it has spanned at least 150 years accompanied with clear/permanent impacts on the ecosystem.²² Beside, numerous texts and conclusive research evidence abound which give proof to global warming, climate change and accompanying environmental problems. Since the reality in Nigeria is not under contention, drawing from and standing on existing data, this study contends that the ecocatastrophe trending for long on the Igbo heartland is nothing but a ticking time bomb. Climatic changes/variations, water crisis, deforestation, biodiversity loss, nascent resource community wars,

flooding, erosion, deep gully and landslides, environmental refuges/justice, migrations and food shortages are just part of the many compelling challenges facing the Igbo heartland today. Whether it is climate change or variations, the continued effects/ implications on this area is enormous.

Over dependence on firewood for cooking has continued to strip a greater part of this area of its vegetative cover, including the expected natural emissions and control played by trees in balancing environmental/ atmospheric gases and solar effects. Soil erosion in this area is not a new thing,²³ having grown from a localized problem aided by human over activity, to an alarming status. Usually, starting from sheet erosion (much more pernicious and detrimental to farming) inadequate knowledge of the environment by the local inhabitants, coupled with their exploitative excesses, all add towards speeding up the crescendo. The following towns and communities in this area harbour more than their fair share of active gullies and erosion sites-Agulu, Nanka, Oko, Obioma, Anucha, Urualla, Alor, Nnobi, Nnewi, Orlu, Ozuitem, Abiriba, Ohafia, Umuahia, Okigwe, Enugwu-ukwu, Awka, Mgbakwu, Ngwo, Okpuno, Nsude, Bende, among others. They have among other challenges historically recorded many sessions of destructive landslides, which did not only take a toll on human casualties, but ended up separating and distancing paternally connected families, kindred's and villages from one another. Fear and anxiety have

finally accompanied these people, most especially during rainy seasons. Undeniably, the Igbo heartland houses the highest concentration of severely functional gully erosion in Nigeria, with the famous Agulu/Nanka/Okoro erosion site blazing the trail, occupying an average of 110 kilometers, it is reputed to be deeper than the Grand Canyon in the United States.²⁴

More incriminating evidences with regard to environmental degradation and climatic changes point to the anthropogenic factor (man). However, unfolding rapacious and ravaging effects of flooding and its features in the zone appear to harbor some issues with the natural terrain and topography in some cases. Along this pedestal, Ofomata contends that this zone (the Igbo heartland) is largely of weakly consolidated sediments of the tertiary to cretaceous lignite formation, clay shale groups and false-embedded sand stones.²⁵ On the other hand, another side of the bitter irony of the subject matter lies on the side of the climatic variations which clearly identify the developed nations mostly as the culprits who would end up suffering less compared to the undeveloped, whose challenges would always be more. Within the Southern fringes of the Igbo heartland is the notorious Niger Delta region, where engrossed with oil drilling, representatives (multinational companies) of these developed nations carelessly flare gas and spill oil, all to the cumulative detriment of the environmental ecology, which by implication extends and affects the area

of study.

At this juncture, one may have to recall that the same heartland was precisely targeted with unimaginable types of military bombardments during the three years Nigeria/Biafran War. It must be said that the momentum of gully erosion ogre in this zone has been highly progressive since the end of the war. Apart from the observed massive detonation of explosives and bombs here, the indiscriminate digging of trenches by soldiers did not help the environment. These unsavory developments, added to the cumulative complicating effects of apparent chemical emissions on both human and environment are rather imagined than felt. Primordial sacred groves easily identified with clusters of old large and tall Oji trees (*Chlorophoraescondida*) including camwood trees have systematically disappeared overtime, leaving patches of African pear, breadfruit, African star-apple, Ogbu (*FicusSPP*) and biologically reengineered palm trees. The deleterious effects of strong raindrops, solar radiation, low oxygen supply and carbon build up in an area naturally endowed so to say, with a fragile soil & structure vis a vis a high population density of uninformed farmers and unguided property development, is alarming.

They sustained Fulani Herdsmen invasion of this area for pasturing is not without severe climatic and soil challenges. Environmental Scientists have proved that apart from the overwhelming consequences of over grazing, the hooves of cattle, most especially in any fragile soil environment pulverize the soil as

they move and render it susceptible to both wind and water erosion.²⁶ Apart from herding, other human activities such as bush burning, poor agricultural practices, massive property development and unguided construction works have greatly modified the natural vegetation in this area, hence contributing to climatic inconsistencies and gully erosion challenges that are subsisting. On the other hand, there appears to be a somewhat correlation in the seismic and geological factors, connecting and constantly feeding some of the major gullies located in this zone. One may observe that the Agulu-Nanka-Okoko gully phenomenon share geographical boundaries at a stretch, beginning from Agulu. The trio posses powerful underground water, hence energized by the actions of and nature of flood at the bottom slopes. Largely criss-crossed near these gullies are significant land cracks which added to some nearby land cultivations, trigger off landslides, due to inadequate drainage channels. Climatic variations have continued to alter all aspects of the hydrological cycle ranging from evaporation through precipitation, run off and discharge.²⁷ The unfolding environmental warming and decreasing rainfall, together with the erratic pattern of rainfall in the Igbo heartland produce a minimal recharge of groundwater resources, hence wells sunk here and there, lakes and small tributary rivers located in this area are reported and observed to sometimes dry up completely, or becoming more seasonally navigable. Worsening conditions of extreme weather events like drought,

flood, rainstorms, windstorms, thunderstorms, high environmental temperatures/solar radiation and landslides are of increasing frequency and intensity in this area, leaving on their trail enormous damages in human lives and properties. Added to the health hazards, frequent droughts and lesser rains have started shortening the growing season, leading to crops failure and food shortage.

Though seriously experiencing a litany of these maladies, it is not really without accruable reasons. A high degree of environmental pollutants and contaminants (greenhouse gases-GHGs) remains active in the Igbo heartland atmosphere. This comes from a variety of sources-machines, automobiles, bush burning, waste, fertilizer, farm and home insecticides, among others. The amount and nature of these gases in space determine the environmental balance and climate change of a place.²⁸ The Igbo heartland has continued to witness gradual and consistent depletion and heating of the ozone layer, environmental imbalance, hence the unfolding consequent effects on climate change and environmental degradations. Deforestation for whatever purpose have added to greenhouse effect in two ways; fewer trees capture less carbon dioxide back into the atmosphere in an accelerating rate.²⁹ Though as has earlier on been stated, the natural terrain and topography aids environmental degradations, the variations in the amount of insulation from place to place, at given periods are factors determining and influencing the environmental

balance of a place.

Conclusion and Recommendations

Drawing on existing and emerging trends, this study believes that the world is in dire need of objective information, caution and awareness based on clear cut histogram, trendline and time series, and environmental history is simply that witness. Climate change and climate variations all depend on the variable of time, hence the depth of impact on the ecosystem, ecology and environment. Disruptions and challenges have stemmed from unbelievable losses in economic, health, environmental and human subsistence in the Igbo heartland. However, it may be observed that the most contemporary problem in this area is a growing atmosphere of anxiety and fear on the inhabitants due to the growing rapidity of this saga (most especially the gully landslides and the developing magnitude of many new erosion sites) vis a vis the apparent unperturbed attitude of the state and federal governments.

It may be observed that in the Igbo heartland, sequel to escalated human activity amidst continued population increase, the aesthetic consciousness of land and weather as not only veritable sources of wealth, but a basic sine qua non of human existence, have helplessly continued to dawn on the inhabitants. One cannot divorce the lack of communication between the government and the people, inadequate knowledge of the environment, coupled with the exploitative excesses of the local inhabitants. Forests in this area are fast

disappearing due to anthropogenic factors (bush burning, illegal grazing, over logging and poor land management) which trigger the already challenged natural terrain to abysmally influence and alter climate change linkages. Accruing economic losses include; poverty growth (reduced income opportunities, alteration of regional food security, unpaid labourers/labour migration, drought and water scarcity), detailed health challenges (increase in heat-related ailments like cerebrospinal meningitis, vulnerability to water-borne diseases like cholera, dysentery and typhoid), radiation-prone problems like skin cancer, eye cataracts, among others.

This study strongly believes that the economic value of nature is more than any commodity; hence the economic invincibility of nature has made it that it may be difficult to calculate the losses just like during the 2008 global economic meltdown. Nature continues to provide services through the provision of food and oxygen. In the 21st century, it is continuously becoming obvious that nature is the Eldorado of global interest and focus; hence banks, institutions and sovereignties are attracted to it. Be that as it may, whatever nature tries to provide is free-air, rain, pollination, clean water and diverse animal species. Since the condiments of natural capital are dictated by the trees, ecology and biodiversity, the price put on the environment/natural resources grows by the day, hence the need for an adequate and proactive ecological civilization, propelled by conservation developmental scientific awareness based on protection.

Bush burning, whether for farm clearing, hunting or by herdsmen to facilitate the sprouting of fresh grasses for animals to graze on should be regulated, just as the free movement of animals (pasturage) should not be allowed to disrupt the gains of controlled cultivation. Empowering vulnerable communities through awareness campaign programmes should involve: restricting cultivation and sand excavation and collection at 0.5 kilometers near gully edges; towards protecting and enhancing sustainable terrestrial and marine ecosystem management with regards to carbon sinks/reservoirs to greenhouse gases; the widespread use of low cost solar energy cookers instead of wood-burning devices would limit the current pressure on the forest of this zone for firewood. Furthermore, changes are needed in building and furniture materials, since there is a galloping increase in the wood materials which currently tallies with the vertical growth in property development in the Igbo heartland. Reliance could be made on iron, steel and aluminum for construction and household furniture.

Sequel to the emergent weather, seasonal and climatic variations, and considering its unpredictability as regards volume and duration of rainfall, drought-resistant and short duration high-yield crops should be developed and made available to farmers in this area. Along this pedestal, towards enhancing veritable disaster mitigation, accurate weather forecasts and early warning meteorological signals can only receive operational capacity

strengthening through the establishment of viable branch offices of National Emergency Management Agency (NEMA), Nigeria Erosion and Watershed Management Programme (NEWMAP), and Nigerian Meteorological Agency (NIMET) with equitable capacity to respond to weather induced challenges. There is need for the availability of Seasonal Rainfall Prediction Bulletin (SRPB), Drought and Flood Monitor Bulletin (DFMB) and Agrometeorological Bulletin (AMB) from NIMET, to not only help other sister agencies plan ahead, but equally fore-warn the many vulnerable Igbo heartland inhabitants to be pre-cautions to disasters/risks associated with extreme weather phenomenon.

Climatic change and environmental degradation are developmental issues that should be mainstreamed into various sectors of national, regional and state development plans in Nigeria, since they have contemporarily proved to be realistically relevant to the wider range of the global political economy. This study recommends an urgent need for the review of the engineering standards for designing, building infrastructures and excavation of any sort in the Igbo heartland, considering the present environmental fallouts. Drastic re-forestation is hereby advocated.

Notes

1. A.E. Afigbo, *Ropes of Sand: Studies in Igbo History and Culture*. Nsukka, University Press, 1981, p. 16.
2. Chakrabarti, Ranjan, *Situating Environmental History*, New Delhi, Manohar Publishers, 2007, p.56

3. Rober J. Brulle-Agency, Democracy and Nature, google.com.ng Accessed 27/6/18.
4. Hoffmaister, F. *Understanding Climate Change*, Vol. 4. Cengage Publishers, New York.1994, p.10
5. www.climatekelpie.com.au/understandclimatevariability/climatechange. Accessed 27/6/18.
6. <https://www.pacificclimatefuture.net> Accessed 27/6/18.
7. www.ipcc.fifthAssessmentReporten.intergovernmentalPanel.climatechangeAccessed 27/6/18.
8. W.P Cunningham, and M.A Cunningham, *Environmental Science, A Global Concern*, 12th Edition London, McMill International Edition, Unit 17, Dec. 18th 2012.
9. J. O. Ijoma, "Igboland: A Historical Perspective" in *A Survey of the Igbo Nation*, G.E.K. Ofomata (ed.) Ibadan: Africana First Publishers, 2002, p. 41.
10. T. Shaw, "The Significance of Igboukwu and Future Archaeological Research on South Eastern Nigeria" *Ikenga: Journal of the Institute of African Studies*, Nsukka, 1971p.1.
11. R. E. Bradbury, "The Historian in Tropical Africa" in Jan Vansina, *Kingdoms of the Savannah*, London, 1966 p. 150. Also in C. C. Ifemesia, *Traditional Humane Living Among the Igbo*, Enugu, Fourth Dimension Pub, pp. 127 - 139.
12. J. C. Anene, *Southern Nigeria in Transition: 1885 - 1906*, London: Cambridge University Press, 1966, p. 44.
13. R. N. C. Anyadike, "Climate and Vegetation" in *A Study of the Igbo Nation*, G.E.K Ofomata (ed.) Ibadan, 2002 Africana First Publishers p. 73.
14. I.F. Ezeonwuka, *The Ultimate Account: A History of Amesi People from Earliest Times to the Present*. Awka: Kucena Press, 1991.
15. P.H. Ady, *Oxford Regional Economic Atlas: Africa*, London, Oxford University Press, 1965 p. 55.
16. E. B. Fireman, et al, (eds.) *Soils in Relation to Growth*, New York, Reinhold Group. 165 p. 40.
17. R. N. C. Anyadike, already cited. p. 74.
18. G. E. K., Ofomata, "Soils and Soil Erosion" in *A Survey of the Igbo Nation* G.E.K. Ofomata (ed.) Ibadan: Africana First Publishers, 2002 p. 105.
19. H.U. Agbebaku, "Environmental Challenges and Climate Change: Nigeria Experience. *Quest Journals, Journal of Research in Environmental and Earth Science*. Vol. 2, Issue 4(2015).www.questjournals.org. p. 6.
20. N. Stern, *The Economics of Climate Change*, Cambridge University Press, 2006 p. 10.
21. O.A. Odjiugo, "General Overview of Climate Change Impacts in Nigeria" <http://www.researchgate.net/publication/n/229019531> Jan. 2010. Accessed 20/6/18.
22. J.O. Ayoade. *Climate Change*, Ibadan, Vantage Publishers 2004 pp. 45 - 66.
23. A.T. Grove, Land Use and Soil Conservation in parts of Onitsha and Owerri Provinces. *Bulletin No. 21 Geological Survey of Nigeria*, 1951 p. 4.
24. I. I. Obiadi et al, "Gully Erosion in Anambra State, South-East Nigeria: Issues and Solutions" in *International Journal of Environmental Sciences*, Vol. 2 No2, 2011, p.800
25. G. E. K Ofomata, p. 110.
26. F. O. R. Akamigbo "Land Degradation Types and Magnitudes for Land Use Policy for Nigeria" Paper presented at the Meeting of the National land Use Policy (NLUP) Consultants, held at FAO/NSPFS Office, Abuja, April 5 - 6, 2014, pp. 1 - 10.
27. B. McGuire et al *National Hazards and Environmental Change*, London: Arnold Publishers, pp. 53 - 63.
28. H. U. Agbebaku, "Environmental Challenges and Climate Change...", p. 7.
29. Tella, Ayo. "Climate Change; What You Must Know", 2009, Foreword by Peter Okebukola, *UNESCO Consultant on the Environment*, New York: Iverfoil Printing Press.