



**NASARAWA STATE UNIVERSITY,
KEFFI, NIGERIA.**

Inaugural Lectures Series

Volume 1

**Edited by
G.S. Omachonu**

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Preface

An inaugural lecture, even from its very beginning at the University of Oxford, England where it originated as far back as 1623 (Omole as cited in Folorunso 2016:9), is meant to serve, at least, three major but purely academic purposes: (1) an account of the professor's stewardship in the academia and to inform the audience of the essence of his/her work to date, including current research, (2) stating his/her future plans especially the scheme of research which the professor proposes to do while occupying the chair, and (3) to talk about the state of the discipline; charting its progress, discussing its current health and problems, as well as examining its intellectual outputs which justify its inclusion in the university academic curriculum.

In line with the tradition, an inaugural lecture is a public presentation at which the professor is expected to tell the world what he/she professes in a language that is devoid of professional jargons and esoteric registers. The simplicity of language is important because an inaugural lecture provides the professor with the opportunity to address three blocks of audience simultaneously: his/her professional colleagues, the entire university community and the general public. With eighteen (18) of such lectures in a series in our university, one can attest or speak of an established tradition of inaugural lectures in Nasarawa State University, Keffi. The contribution(s) of each of the lectures is clear but the decision to edit into volumes (ten lectures in one volume), is informed by the desire to preserve the pieces of information contained in the lectures in one piece for unity of purpose, uniformity of preservation format and best practices. It is to allow the pieces of information to hang together rather than hanging separately; the more the merrier.

Of the eighteen (18) inaugural lectures presented so far in the series, this volume contains the first ten lectures in the series comprising three from the Faculty of Agriculture, two from Arts, another two from the Faculty of Natural and Applied Sciences, and one each from the faculties of Administration, Environmental Science and Social Sciences. These are inaugural lectures presented from 26th March, 2008 when the first of such lectures in the university entitled 'Soil Husbandry: Lifeline for National Food Security and Economic Empowerment' was presented by Prof. Olusola O. Agbede of the Faculty of Agriculture to 18th November, 2015 when the tenth Inaugural Lecture was presented by Prof. Folorunso A. Ajayi of the same faculty.

Agbede's lecture which is the first both in the series and in this volume, concerns itself with how our soils must be carefully and wisely used to attain food security in Nigeria. The second in the series and in the volume was presented by Prof. Obaje of the Faculty of Natural and Applied Sciences. Obaje's lecture entitled 'Geology and Mineral Resources of Nigeria: Development Options for Economic Growth and Social Transformation' (13th August, 2008) presents options that will enhance optimal exploitation of the mineral resource wealth of the nation for its economic growth and socio-political transformation. 'Before we Set the House Ablaze: Let Us Consult Our Oracle (History)' presented by Prof. Olayemi Akinwumi of the Faculty of Arts on 11th December, 2009 is

the third in the series. It was an eye-opener to the fact that if Nigeria is to be truly a great nation, we must go back to our sense of history; for the nation suffers which has no sense of history. This was followed by the fourth, 'Farm Production Efficiency: The Scale of Success in Agriculture' by Prof. Abdul Rahman of the Faculty of Agriculture presented on 26th June, 2013. Its major preoccupation was to describe farm as a system that produces agricultural commodities under certain restrictions as well as the interrelated factors that determine success in the entire agricultural sector of the national economy. The fifth in the series and in this maiden edition was MAINOMA (Most Acceptable Index Needed of Measuring Accountability) presented by Prof. Mainoma of the Faculty of Administration on 8th January, 2014. It seeks to provide the most acceptable model or index for measuring accountability.

'Researching Criminal Justice and Security Administration in Nigeria: Issues, Challenges and Opportunities' is the sixth in the series. It was presented on the 12th March, 2014 by Prof. Sam O. Smah of the Faculty of Social Sciences. The focus of the lecture was to draw attention to the fact that inaccuracy of available data due to lack of expertise by statistical officers, weak or poorly framed information gathering techniques and instruments, poor documentation attitude, inadequate analysis and storage are the banes of effective and efficient criminal justice and security administration in Nigeria. The seventh and eighth in the series were presented by Prof. Kwon-Ndung of Natural and Applied Sciences and Prof. Zaynab Alkali of the Faculty of Arts on the 17th September, 2014 and 17th December, 2014 respectively. Whereas the former shows how the presenter's research works in Plant Genetics and Breeding have contributed in the search for national and global food security, the latter dwells on the relevance of Gender Studies in Nigeria's Higher Institutions of Learning. The ninth Inaugural Lecture entitled 'Habitats and our Habits, Ecological Community and Common Unity' was presented by Prof. H. K. Ayuba on the 22nd April, 2015. It draws attention to the manifestations of unfolding economic, social and environmental catastrophes, which were largely due to pressures from human activities and economic necessities. It suggests a paradigm shift towards sustainable environmental management. The tenth in the series and the last in this volume was presented on 18th November, 2015 by Prof. Ajayi of the Faculty of Agriculture. The lecture entitled 'Insects, Plants and Humanity: The Organic Agriculture and Stored Products Protection Axis' is essentially an overview of the interplay between man and insects, highlighting that much of the crop harvests are lost to obnoxious insect pests during storage. It enunciates the factors that can enhance food security through better management of postharvest losses, propagating the use of traditional plant products as a means of protecting stored produce. In all, the divergent views and the varying thematic preoccupations of the lectures notwithstanding, one is left with the impression that though celebrations may vary from one place to another, true politeness is everywhere the same. In other words, methodology and approaches may vary but truly good scientific research is so recognized in every discipline.

Editing inaugural lectures which appear somewhat like finished products from seasoned professors who are authorities in their own rights was a daunting task. What we did was more of language editing to minimise grammatical and typo errors wherever found.

Even as it is, we do not guarantee uniformity in styles of content presentation and referencing but we have done the best that is possible given the circumstance in which we have found ourselves. I wish to thank all who had assisted in one way or the other in the editing and/or proofreading of the manuscripts.

I wish to use this medium to thank the Vice-Chancellor of our great university, Prof. M. A. Mainoma, and his Management Team for the all-round support and encouragement we have received from them since we came on board as the University Inaugural Lecture Committee, especially the provision of the fund for this publication. I thank the Inaugural Lecturers whose lectures have been published in this maiden edition of the NSUK Inaugural Lectures Series for the permission to do so. Congratulations! I thank the Information and Protocol Unit under the leadership of Abraham Ekpo who had been very helpful in organizing the University Inaugural Lectures Series. Thank you all.

Prof. G. S. Omachonu, PhD, FAvH, FICSHER
Editor/Chairman, Inaugural Lectures Committee
Keffi, 3rd July, 2018.

Foreword

Nasarawa State University, Keffi is known for upholding core University Academic Traditions, one of which is the Inaugural Lectures series. As many of us are aware, inaugural lecture provides an academic an opportunity to tell the world what he professes. It is a moment to celebrate excellence and breakthroughs with family, friends and colleagues. It is a testimony of one's contribution to the body of knowledge and his identification of his own building blocks in the system. It also affords the larger society opportunity to know researches that were carried out, those ongoing and the future plans. It also provides an opportunity to share with the audience how he/she used the knowledge of his/her chosen profession to advance the cause of the society especially in problem solving. To my mind, besides their contributions to knowledge, what Professors in NSUK have done thus far, presenting their inaugural lectures, is to really address societal problems using the insights and knowledge from their respective disciplines or professions.

The Nasarawa State University, Keffi Inaugural Lecture series Vol. 1 presents an opportunity to put together the first 10 inaugural lectures that were presented in the University. These are:

S/N	Presenter	Title of Lecture	Date
1	Prof. Olushola O. Agbede, Professor of Soil Science	Soil Husbandry: Lifeline for National Food Security and Economic Empowerment.	26 th March, 2008
2	Prof. Nuhu G. Obaje, Professor of Geology	Geology and Mineral Resources of Nigeria: Development Option for Economic Growth and Social Transformation.	2 nd February, 2009
3	Prof. Olayemi D. Akinwumi, Professor of Inter-Group Relations	Before we Set the House Ablaze, Let's Consult the Oracle (History)	11 th December, 2013
4	Prof. Shehu Abdul Rahman, Professor of Agricultural Economics & Extension	Farm Production Efficiency: The Scale of Success in Agriculture.	26 th June, 2013
5	Prof. Muhammad Akaro Mainoma, Professor of Accounting and Finance	Most Acceptable Index Needed Of Measuring Accounting (MAINOMA)	8 th January, 2013
6	Prof. Sam O. Smah, Professor of Criminology Studies	Researching Criminal Justice and Security Administration in Nigeria: Issues, Challenges and Opportunities.	12 th March, 2014

7	Prof. Emmanuel Hala Kwan-Ndung, Professor of Plant Genetics and Breeding	Unlocking Genetic in Search of Food Security	17 th September, 2014
8	Prof. Zaynab Alkali, Professor of Literature and Literary Studies	The Relevance of Gender Studies in Nigeria's Higher Institutions of Learning: Why Gender Studies?	17 th December, 2014
9	Prof. Haruna Kuje Ayuba, Professor of Biogeography and Environmental Science	Habitat and our Habits, Ecological Community and Common Unity	22 nd April, 2015
10	Prof. Folorunso Abiodun Ajayi, Professor of Agricultural Entomology/Crop Protection	Insects, Plants and Humanity: The Organic Agriculture and Stored Products Protection Axis	18 th November, 2015

This publication is intended to provide easy reference material to the academic community, policy makers and the general public. It is hoped that we shall continue with this tradition with subsequent editions.

While congratulating those that are part of this publication, I recommend this publication, to the professional colleagues of the inaugural lecturers, University community, policy makers and the general public.

Professor M. A. Mainoma
Vice-Chancellor

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HABITATS AND OUR HABITS, ECOLOGICAL COMMUNITY AND OUR COMMON UNITY

PROFESSOR HARUNA KUJE AYUBA

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Professor of Biogeography and Environmental Science;
Department of Geography and
Deputy Director, Research and Publications Directorate
Nasarawa State University, Keffi

22nd April, 2015

Protocol

The Vice-Chancellor, Deputy Vice-Chancellor (Administration), Deputy Vice-Chancellor (Academics), Registrar and other Principal Officers, Dean of the Faculty of Social Sciences, Deans of other Faculties and the Postgraduate School, Heads of Department, Distinguished Professors and other members of Senate, Fellow academics, our dear students from all faculties, Members of the Press, Invited Guests, Distinguished ladies and gentlemen. It is an honour for me to deliver this inaugural lecture in your presence entitled: HABITATS AND OUR HABITS; ECOLOGICAL COMMUNITY AND OUR COMMON UNITY

1.0 PREAMBLE

I give glory, honour and gratitude to God Almighty for giving me this once-in- a lifetime opportunity and rare privilege to deliver the 9th Professorial inaugural lecture in Nasarawa State University, Keffi. This is the 2rd Inaugural Lecture in the Faculty of Social Sciences and the 1st in the Department of Geography. Ordinarily, an Inaugural Lecture is an occasion when a scholar who is elevated to the position of a professor, publicly accepts his appointment by making a public presentation in his field of study. In effect, such a lecture is meant to mark the inauguration or installation of a new professor to the chair of the subject he professes. In my own case, I got my professorship in 2007 from the University of Maiduguri. The University of Maiduguri, being a second generation University established in 1975, has a lot of Adult, Middle-aged, Old-aged and Geriatric Professors (See Table 1), who are yet to present their Inaugural Lectures, thus, making it difficult for me to jump the gun.

It has therefore taken me eight (8) years after my elevation to the post of Professor to deliver my own inaugural lecture, this time, not in Maiduguri, but in my own State University (The Nasarawa State University, Keffi).

Table 1. Professorial Milestones by age (in years)

Years as a Professor	Description
< 1yr	Infant Professor
1-5yrs	Toddler Professor
6-10yrs	Adolescent Professor
11-15yrs	Adult Professor
16-20yrs	Middle-aged Professor
21-25yrs	Old-aged Professor
>26yrs	Geriatric Professor

Source: Professor Oladele O. Kale. University inaugural Lecture 2002/2003

Based on Professor Oladele Kale's 2002/2003 classification, I am still an adolescent Professor. My Vice Chancellor sir, I thank you for making this historic event possible. The timing of my inaugural lecture does not in any way diminish the sense of fulfilment which I feel on this occasion.

1. THE JOURNEY SO FAR: MY INTEREST IN ENVIRONMENTAL SCIENCE

A man who has lived in many places is not likely to be deceived by the local errors of his native village- C S LEWIS Learning in wartime (1939) My interest in Environmental Science started as a peasant farming boy growing up in the little village called Amaha in Kokona Local Government Area, Nasarawa State, Nigeria. Those early days, we would leave the house and spend several days in farmsteads to scare animals that would normally destroy farm produce. I saw and admired the trees, beautiful flowers, streams, blue skies, birds, monkeys amongst others. I concluded then in my mind like Louis Armstrong what a wonderful world we live in! Permit me Mr Vice chancellor sir, to read the lyrics of the song What A Wonderful World sung by Loius Armstrong (Songwriters: GEORGE DAVID WEISS, GEORGE DOUGLAS, BOB THIELE)

I see trees of green, red roses too
I see them bloom for me and for you
And I think to myself what a wonderful world.

I see skies of blue and clouds of white
The bright blessed the day, the dark sacred night
And I think to myself what a wonderful world.

The colors of the rainbow so pretty in the sky

Are also on the faces of people passing by
I see friends shaking hands saying how do you do
But what they're really saying is I love you.

At the age of six, I came to Keffi for my primary education. It was a totally different environment. While in Keffi, I enjoyed climbing the Maloney Hill and sliding down the hill. This natural rocky slide was called matanlele then by the children. It was great fun! We would often sneak from home just to enjoy the matanlele. A challenging feature about Keffi then was scarcity of water for human consumption. As children, we had to trek from Angwan Mada to Antau River everyday to fetch water before and after school. It was an interesting expedition for us as children because it accorded us opportunity each time to scavenge from the delicious food served students of Government Teachers College, Keffi.

From the Guinea Savanna, I went to Kano in the Sudan Savanna of Nigeria for my first degree. For the first time, I experienced the harmattan dust and it was a strange experience. I would normally laugh when I see people with grey hairs and dry skin after the dust had settled on them. On completion of my Degree programme in Kano, I was posted to Maiduguri, Borno State for the one-year National Youth Service Corps (NYSC) in 1989 and I served in the Department of Geography, University of Maiduguri, Borno State. Less than 3 months after the NYSC, I was employed in the same Department. There, I also experienced the harmattan dust in greater measure. I saw sand dunes submerge settlements. For the first time, I saw camels and donkeys being used to fetch water from very deep wells in some villages. You will do well not to request for water in such communities. Water is such a scarce resource in those communities that the inhabitants are toughened by the realities of harsh environmental conditions. Yet, they have adapted to these harsh environmental conditions for centuries.

Then, I spent four years in Ibadan, Oyo State (the Forest ecosystem) for my postgraduate trainings and the environment was totally different. The forest environment had a variety of plants and animals that were very fascinating to behold. I was particularly scared of the earthworms that were as big as snakes. Nevertheless, I had a beautiful time.

Through my participation in various researches and conferences, I got exposed to a variety of environments, habitats and communities of different nations of the world: From montane to monsoon, from the hot climate to temperate environments, from harmattan dust to snow. I came to one conclusion, Mr Vice Chancellor: That there are many lessons human beings can learn from the varieties of environments, habitats, and ecological communities.

These include, but not limited to, lessons of survival, sharing, adaptation,

perseverance, tenacity, courage, skills, hygiene and sanitation, teamwork and unity, all of which if properly mainstreamed into national development, can make our world a better place to live in. It can indeed be a beautiful world for you and for me if we are ready to learn the lessons that the environment teaches us. Although, the main thrust of my lecture shall be ecological, I shall draw lessons therefrom, that we all can learn and apply to our various communities so that we can have a better world. I have thus tagged my inaugural lecture: HABITATS AND OUR HABITS; ECOLOGICAL COMMUNITY AND OUR COMMON UNITY. This topic is of great concern to all of us because it touches on the very survival of the human race in an environment that is bedevilled by more subtle, persistent and increasingly distressing problems. The topic will prompt us to conceptualize the manifestations of unfolding economic, social and environmental catastrophes, which are largely due to pressure from human activity and economic necessity, with a view to fostering a paradigm shift towards sustainable environmental management. It is my sincere hope that this lecture will throw some light on the current predicaments faced by humanity in order that we (individually and collectively) may take a far more active role in devising ways and means of reducing and/or eliminating the limitless frontiers of environmental upheaval, since the cost of managing a degraded environment is formidable.

2. A THREATENED EARTH'S ENVIRONMENT

In the history of western thought, men have persistently asked three questions concerning the habitable earth and their relationship with it: First, is planet earth a purposefully-made-creation or a result of chance? Second, in what manner has man changed the earth from its pristine conditions? Thirdly, has its environment (climate, relief, configuration of the continents etc), influenced the moral and social nature of individuals or even moulded the character and nature of human culture? (see Glacken, 1967). I shall try to gloss over the last two questions in this inaugural lecture. This is because the environment is such a complex and multidimensional phenomenon that it would be difficult to do justice to every component within the limited time I have.

The environment, derived from the French word *environner*, means to encircle or surround. It is the sum total of all factors/circumstances/conditions that encircle/surround/affect/influence the life of any living organism or group of organisms. The environment could also be seen as the complex of social or cultural conditions that affect an individual or community (see Cunningham et al., 2007; Enger and Smith, 2006). It is the life support system for human existence and survival. It also provides the physical milieu and the raw materials required for socio-economic development.

Humans have always lived on two worlds. The first world is the natural world

consisting of plants, animals, land, minerals, water, amongst others. This first world preceded man. In fact, it was after God put the natural environment in place that He created man to subdue and have dominion over it (Genesis 1: 28). The second world is the world of social institutions and artefacts that man has built using science, technology and political organization. Both worlds are essential to our lives and can be further subdivided into four interrelated components (Fig 1, 2 and 3)

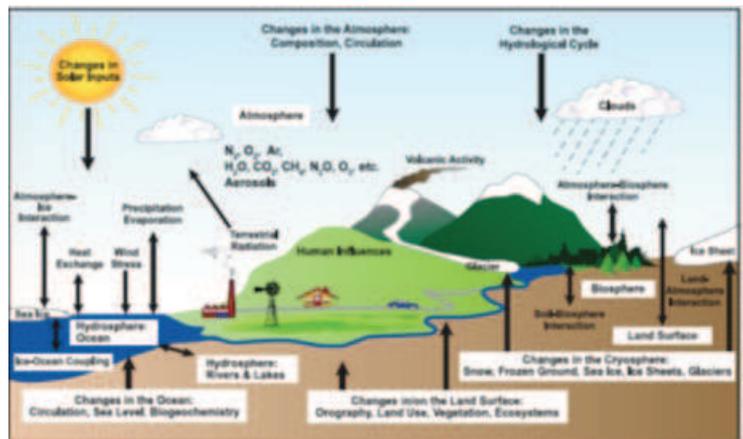


Figure 1 Schematic diagram of the interaction between the various components of the environment system (IPCC, 2007, p.104)



Figure 2. The Built Environment (Photo by H K Ayuba, London, 2010)

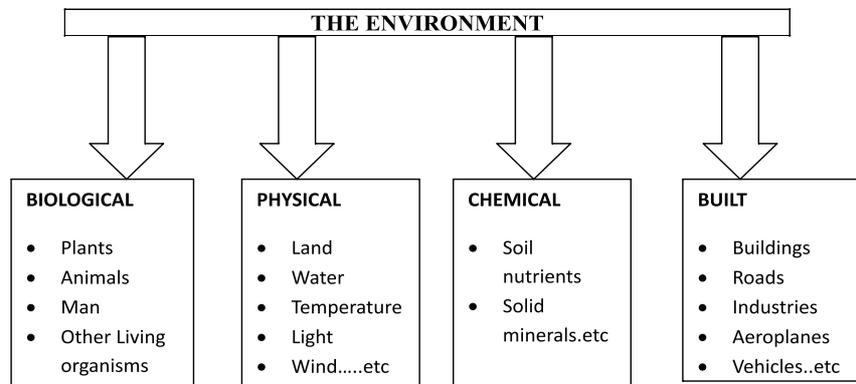


FIG. 3. Components of the Earth's Environment (Drawn by H K Ayuba, 2014)

If all four components are properly managed, they can provide the goods and services needed to meet our socio-economic, cultural, educational, scientific, technological and environmental needs. Conversely, if poorly managed, the environment could easily become hazardous and threatening to rapid socio-economic development and human survival (Figs 4). It is the difficulty in effectively integrating the various components of the environment that causes enduring tensions. Where ancient hunters and gatherers had limited ability to alter their environment, today we have power to exploit and consume resources, thereby generating wastes that modify our world in ways that threaten both our continued existence and that of many other organisms with which we share the planet Earth together. To ensure a sustainable future for ourselves and posterity, we must understand how our environment works, what we are doing to it, and what we can do to protect and improve it.

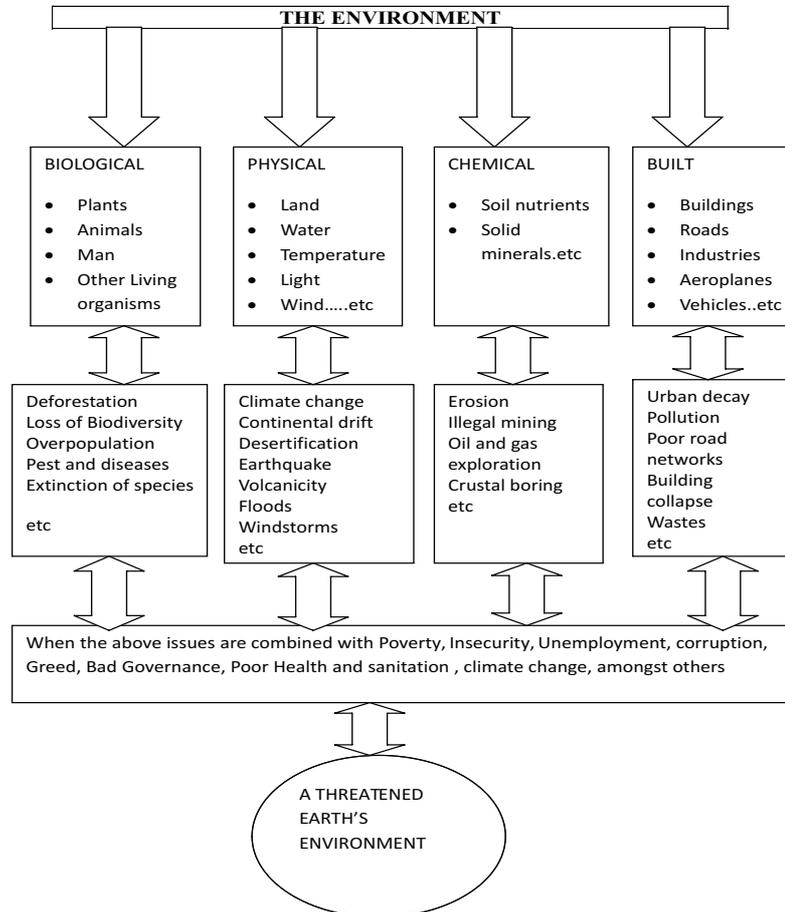
Man interacts in different ways with the earth's environment: This interaction could be symbiotic, parasitic, amensal or commensal. The relationship is described as symbiotic if two organisms mutually co-exist together and benefit from each other. Although, both organisms can exist separately, they are more successful and effective when they are involved in a mutualistic relationship. A relationship is commensal if one organism benefits and the other is not affected. It is amensal if one organism is harmed and the other is not affected. If one organism (the parasite), lives on and derives nourishment from another organism (the host), that relationship is described as parasitic. The interaction between man and these components of the environment is most of the time parasitic-we take from the environment without a commensurate replacement thus resulting in myriads of environmental problems today. It is the parasitic interaction with the environment that exacerbates further environmental problems. Today, the dismal litany of environmental problems facing us seems overwhelming.

These are represented by certain concepts: ENVIRONMENTAL INSULTS (what we do to the environment); ENVIRONMENTAL RESPONSE (How the environment reacts/responds to what we do); ENVIRONMENTAL COST (the price we pay for our actions/inactions). Example: if we build in floodplain areas (Insult); the environment will bring flood (the response); and people are displaced, lives are lost, properties destroyed and then we spend more on relief materials and reconstruction (the cost).

There are basic issues to note about environmental problems. They are complex, interacting and multidimensional. For instance, some are interlinked with health, water supply, poverty, nutrition, unemployment, population density, etc., and cannot be solved independently; Their effects are long termed, spanning generations; long-term issues are often neglected at the cost of short-term gains; Their consequences can be irreversible; Impact is usually spread over a large number of subjects (you need Foresters, Psychologists, Sociologists, Biologists, Medical personnel, Geographers, and a host of other specialists to solve the problem).

Environmental science as a relatively new field, therefore, tries to study the impact of human activity on the environment. It is the systematic study of the environment and our proper place in it. The environmental scientist seeks to understand and solve environmental problems. He accomplishes this goal by focusing on how human beings use the natural resources of the environment and on how human actions alter the environment. Environmental science is an interdisciplinary science that covers both applied and theoretical aspects of human impact on the earth's environment. Environmental science is thus a mix grill of traditional, applied and behavioral science including individual's actions, societal values and politics.

Fig. 4 A threatened Earth's Environment (HK Ayuba)



3. LESSONS FROM THE EARTH'S ENVIRONMENT FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

The most amazing feature of our planet earth is the rich diversity of life that exists in it. There are millions of beautiful and intriguing species on earth that help sustain a habitable environment. This vast multitude of life creates complex, interrelated habitats and communities where tall trees and huge animals live together with, and depend upon, tiny life-forms such as viruses, bacteria and fungi. Together all these organisms make up delightfully diverse, self-sustaining habitats and communities, including dense, moist forests, vast savannas, dry and dusty deserts, aquatic communities with richly colourful coral reefs, and beautiful mountainous regions. In a nutshell, there is unity in diversity!

From this diversity, we see that everything is connected to another. The tall and the short, the large and tiny organisms all depend on one another for mutual survival. What lessons can we learn from the complex yet interrelated environment in which we live? What should we do to protect the irreplaceable habitats and environment that support us?

Today, we live in an environment of haves and have-nots; a few of us live in increasing luxury, while: a vast majority lack the basic necessities for a decent, healthy, productive life. The World Bank estimates that more than 1.1 billion people-about one-fifth of the world's population-live in extreme poverty with an income of less than USD1 (less than N200) per day. These poorest of the poor often lack access to adequate nutrition, decent housing, basic sanitation, clean water, education, medical care and other essentials for a humane existence and a healthy, productive life.. The poorest people are often forced to meet short-term needs at the cost of long-term sustainability. In their desperation to survive, they destroy virgin forests or cultivate steep, erosion-prone or flood-prone areas. Some migrate to crowded slums and ramshackle shanty settlements that now surround most major cities. With no way to dispose of wastes, they throw them anyhow. For instance, in Nigeria, we now have mountains of refuse that dot most major cities in Nigeria, which further pollute the air we breathe and the water we drink.

The cycle of poverty, illness, and limited opportunities is becoming a self-sustaining process that passes from one generation to another. Faced with immediate survival needs and few options, the poor often have no choice but to continually exploit the natural resources. In so doing, they not only diminish their own options but also those of future generations. It is becoming clear that poverty, disease and environmental degradation are the true axis of evil. The dangerous interplay among poverty, hunger, disease, unemployment, environmental degradation, rising resource competition and the recent insurgents' attacks (together with the reactions they provoke) must be seen as symptomatic of underlying sources of instability for Nigeria.

Our policy makers must understand that eliminating poverty and protecting our common environment are inextricably interlinked. Tackling poverty and protecting the environment must be their major policy thrusts. Failure to address these issues could plunge the country and in deed the world, into a dangerous downward spiral in which instability and radicalism will increase. Our policy makers must take concrete actions that promote equity in the management of resources and environmental sustainability. Otherwise, we will continue to face an uphill task of dealing with the consequences of resource conflicts and terrorism, especially managing Internally Displaced Persons who are spread all over the country today. Failure to address these issues may also make it difficult for the haves to live in safety in their comfy homes.

Another lesson is that we must improve human welfare within the limits of the resources we have. Because we are dependent on nature for food, water, energy, fibre, waste disposal, and other life-support services, we cannot deplete resources or create wastes faster than nature can recycle them, if we hope to remain in planet earth for a longer time. Development simply means improving people's lives. Sustainable development then implies progress in human well-being that can be extended or prolonged over many generations rather than just a few years. To be truly enduring, the benefits of sustainable development must be felt by all rather than just a handful of privileged individuals in the society.

4. HABITATS AND OUR HABITS

In ecological term, habitat is the space or location where an organism, species or a community lives. It is the address of the organism. Our planet earth is an extraordinary mosaic of land, sea, weather, and life forms. No two places are identical in time or space—we live in a complex and dynamic tapestry of habitats. Despite the vast variability that may exist from one place to the next, there are general habitat types that can be described based on shared climate characteristics, vegetation structure, or animal species. These habitat types help us to understand the wildlife that inhabits them and better protect both the land and the species that depend on it. Habitats can be classified into many genres—grasslands, forests, deserts, woodlands, mountains, ponds, streams, marshlands, coastal, wetlands, shores, oceans and so on. In Nigeria, these habitats fall within the different ecological zones ranging from the Sahel savanna in the north to the mangrove/swamps in the south (Figure 5). See Figures 6-15 for different types of habitats.

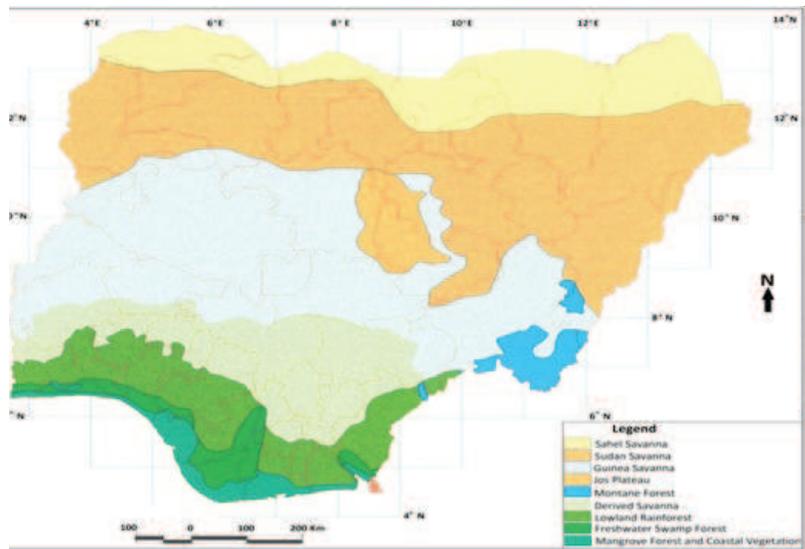


Fig. 5 Nigerian Ecological Zones Source: Adapted after FORMECU, 1995



a. Sand Dune Presence at Tuluwa

b. Observing sand dune formation



c. Hardy Plants, *B.aegyptiaca*

d. Threatened Oasis at Kaska

Figure 6(a-d): Different habitats in the Sahel savanna of Northern Nigeria
Source: Gadzama and Folorunso, 2011



Fig. 7 Cattail-choked shores of the Hadejia-Nguru wetlands .
(Photo by Pat Foster-Turley)



Fig. 8. Part of The Sudan savanna (Nigeria)
Photo by H K Ayuba



Fig. 9 Elephants in the Guinea savanna of Nigeria (<http://www.wcsnigeria.org/> accessed 9/6/2014)



Fig. 10. An endangered Nigerian Chimpanzee at the Drill Ranch, Cross River State.
(Photo by Pat Foster-Turley)



Fig. 11. Nigerian forests contain an extraordinary number of butterfly species.
(Photo by Pat Foster-Turley)



Fig. 12. Mangrove/swamp habitats affected by oil pollution in the Niger-Delta region of Nigeria (Anon)



Fig. 13. Fallen coconut trees on the Lagos coastline (<http://weircentreforafrica.com/ accessed 14/6/2014>)



Fig. 14. A mountainous habitat (Tanzania)
Photo by H K Ayuba



Fig 15: Snow in Bradford (Photo by H K Ayuba)

Within nearly every type of habitat there exist organisms or species that have adapted to a particular habitat, ranging from the deep ocean floor to the mangrove/swamps, from the desert areas to the polar ice caps. The implication is that these organisms or species can survive in one type of habitat but not necessarily in another. Organisms that are free to move about can choose which habitat they will live in, and these choices are made based on the costs and benefits of each place. It is important to note that what is considered a good environment to one organism, such as the middle of the ocean for a shark, may not be good for another, such as a desert-dwelling lizard. Thus, classification of habitats is necessary.

Habitats can be classified according to their temporal or spatial scope; or by their effects on the growth and life history of the species in question or even according to their measurable characteristics. Temporal Classification of habitats suggests constancy or seasonality or unpredictability in the environmental conditions necessary for the survival of an organism. That is, over time a habitat may be constant, with little change from the viewpoint of a

particular organism, or it may be seasonal, where there is a predictable pattern of favorable and unfavorable periods for that organism. An example of a constant environment is a cave. A cave's temperature stays at a constant temperature, within a few degrees of the mean annual temperature of the area; therefore, a bat can find refuge from the extreme high and low daily temperatures. The cave is also a consistent shelter for the bat because there is no rain in an enclosed cave. Habitats can also be unpredictable, alternating between favorable and unfavorable periods for variable amounts of time, or ephemeral, meaning there are periods that are predictably short followed by unfavorable periods of variable, frequently extensive duration. To a water-loving amphibian, ephemeral habitats are intermittent streams that only run after heavy rainfall and dry up to an uninhabitable state between rains.

Habitats can also be classified spatially, in which case, they can either be constant, with a fairly uniform distribution of resources like food and shelter (eg the Forest or Savanna), or they can be patchy, with resources occurring in small, dense locations that are scattered around an area that is otherwise without any resources (eg oases in a desert habitat). It is easy to see how these different habitats determine the different behaviors, including types of movement and search for scarce resources, among individuals to relay locations of food patches or defend territories.

Habitats can also be classified by their effects on the growth and life history of the species in question. On the one hand, in size-beneficial habitats large individuals have a greater chance to successfully compete and reproduce within their own species. For example, in a forest habitat, the trees may outcompete and reproduce their kind more than the grasses. On the other hand, certain habitats are size-neutral or size-detrimental. In these habitats mortality may occur equally to all individuals, such as when a seasonal stream dries up, all the fish will die..

Another way to classify habitats is according to their measurable characteristics, or parameters. Habitats are as varied as the animals that live in them and each could be infinitely described, but we can also classify them according to their measurable characteristics, or parameters. Examples of habitat parameters, or characteristics, include temperature, moisture, substrate type, nutrient availability, altitude (or depth in water), and amount of light and wind (or current in water). Each of these parameters shapes the organisms that live there or imposes certain habitat requirements that limit the types of organisms that can move in. Consider the cave example again. This habitat has a constant temperature, high moisture, low nutrient availability, and no light. Because of these characteristics, organisms that evolved to live in caves lose the ability to withstand temperature extremes and low moisture but in exchange

gain the ability to withstand long periods with little food, partially by lowering their metabolism relative to their surface-dwelling relatives. Other lost features of cave-dwelling organisms are sight, which takes considerable energy, and pigment, two things totally unnecessary in a habitat with constant darkness. These habitat parameters also restrict the kinds of animals that can successfully move into the cave environment. Raccoons, even though they are not cave adapted, can use the cave because they are nocturnal and accustomed to using their keen sense of smell to find their way through the dark and hunt for food. These examples make it easier to understand the complexity of habitats and their specialized requirements. Because most organisms have adapted to their habitats and may not necessarily survive in another, it is extremely important to maintain habitats in their natural state in order to ensure the survival of the species that live there.

Whatever the classification, ecological habitats have some common features. First, there is mutual co-existence between and among organisms over a limited space and limited resources. No matter where an animal lives in the world, it is always surrounded by other animals that live together in the same habitat, whether they are from the same species or from different ones. These interactions between animals and other species of animals, produce a range of different ecological levels. Starting with the individual (an animal that is independent in finding food), who is part of a population (animals from the same species living in the same area), which is part of a community (different species inhabiting the same area that depend on each other to survive), which belongs to a habitat or ecosystem, which makes up a small part of the biosphere (the collection of all environments on earth). Secondly, temperature and rainfall are two of the biggest climatic factors that help to shape habitats, and changes in these factors can have devastating effects on habitats and animals all around the world (such as the ice melting in the polar regions). Thirdly, in every habitat on earth constant chemical cycles are taking place, as chemicals are transferred from one organism to another. Last but not the least, habitats are constantly changing due to bursting rivers, fires, storms and changes in climate and human factors.

5. LESSONS FROM ECOLOGICAL HABITATS FOR HUMAN HABITATION

Every living organism needs a place called home. It could be a nest, a rock, an anthill, the bark of a tree, a water body, a grassland or forest area but it is still a home or a neighbourhood for the organisms that live in it. There are natural and anthropogenic forces that tend to disrupt the habitats of the world. That is understandable and man is doing his best to address those forces. There are also

government policies that make resettlement of a whole community expedient (like the Federal Capital Territory, Abuja). That is also understandable because the overall national benefits far outweigh the community's interest or comfort. However, it becomes disastrous and life-threatening when human beings driven by greed or whatever reasons try to chase their fellow human beings from their habitats through communal conflicts, insurgencies and wars. That is not acceptable and we must reject and resist every form of communal conflicts, insurgencies and wars.

We all need the basic necessities of life for our corporate existence. An animal needs four things to survive in its habitat – food, water, shelter, and a place to raise its young. Just like you have to go to the store to get food, an animal leaves its "shelter" to get the things they need to live. If the needs aren't met, it will move to a better habitat. In an ecological habitat only the animals can move if these basic needs are not met. What happens to the vegetation? They either adapt to the changes or die. In human habitations, we also need the basic necessities of life (Food, water, shelter and a humane environment). The poorest of any nation are not asking too much if they clamour for the provision of basic amenities like potable water, food, good shelter, employment etc. Yet, year in year out, they are deceived by their leaders. I therefore challenge Governments particularly in developing countries to deliver on their promises to the poorest in the land.

We must work together for the common good. There are many plants and animals that share the same habitat. The animals and plants that live together in a habitat form a community. The community of living things interacts with the non-living things around it to form the ecosystem. Because resources like water and food are limited in supply, these plants and animals often compete with each other for food, nutrients, space and water. The only way they can all live together is for each organism to occupy a slightly different ecological niche. While the habitat is the place or location (ie the address) where an organism lives, its ecological niche is its functional role (profession). For instance, while the Nasarawa State University, Keffi is our address, we all have different roles to play (the academics, non-academics, cleaners, students etc). None can exist without the other. This calls for mutual respect and understanding. This principle could be scaled up to the national level. Although, we all take Nigeria as our habitat (home), everyone must play his role (the farmers, pastoralists, teachers, leaders, politicians etc) in order to build the nation.

We must know that ultimately, we live in a size-detrimental habitat called planet earth. Certain habitats are size-neutral or size-detrimental. In these habitats mortality may occur equally to all individuals, such as when a seasonal

stream dries up, all the fish will die. In human settlements, the problem comes when those born and raised in developed countries think poverty, diseases, hunger is an African problem; when those born and raised in a particular habitat do not know that other habitats exist or when we do not even realize that all habitats are related in some way and we must harness the potentialities of every habitat we live in (from the cold snowy regions to the deserts). If we do not work together to address the myriads environmental problems facing the earth today (eg climate change, floods, earthquakes, volcanic eruptions, pests and diseases, coupled with insecurity, poverty, unemployment, wars etc) , we all will be consumed by the earth owing largely to the consequences of our inaction. But we can and must do something now!

Your habitat determines your habit and vice versa. An organism's habitat determines its habit (environmental determinism). The fish naturally swims, because its habitat is water. The camel can stay for days without water because it is used to the desert environment. But in some cases an organism's habit determines its habitat. Any animal, which habitually leaves the herd, may end up in the stomach of predators like lions, wild dogs or leopards. Similarly any person who leaves the comfort of his home (the natural habitat) and chooses to be an armed robber or a drug addict may end up in prison. A drunkard may end up in the street or gutter when he should be at home with his family. The slums and shanty towns we live in today are a product of our habits. In a more spiritual sense, whether you end up in heaven or hell (the two ultimate kinds of habitats), depends on your habit here on earth. The choice is ours.

Let me use an acronym of the word HABITAT to help us understand my assertion in context.

Your present HABITAT is a function of H + A + B + I + T + A + T; WHERE,

H is History (where you are coming from, your Origin or, Happenstance- whether you find yourself by chance in the midst of dirty or neat people)

A is Attitude (your mental position regarding the environment)

B is Belief system (your convictions about the environment)

I is Impact (the strong effects of your actions on the environment)

T is Technology (the practical application of knowledge in managing or destroying the environment)

A is Affluence (the amount of resources or wealth at your disposal ie your Adaptive Capacity)

T is Tenacity (persistence in holding to your history, attitude, belief system, impact on the environment, technology that degrades or improves the environment and your affluence including those values and ethics about the environment)

If you know your History (Origin), that God created you and placed you on earth for a purpose, your attitude, belief system, impact on the environment, technology, affluence and tenacity will be that of STEWARDSHIP. You will treat the environment with recognition that you will give an account to the Maker someday. In contrast, if your history (origin) is that of an Ape (as in evolution), you will only live in the now (Let's enjoy ourselves now, tomorrow will take care of itself.) There will be nothing like sustainability. There will be nothing like accountability. There will be nothing like development..

6. COMMUNITY IN ECOLOGICAL SENSE AND OUR COMMON UNITY

The term Community in ecological sense, refers to a group of plants and animals living and interacting with one another in a given region under relatively similar environmental conditions. It could refer to the region occupied by a group of interacting organisms. While the definition of a community can depend on a large number of factors, it can be broken down for easier understanding. In simplest terms, a community is an assemblage of populations living in the same place at the same time, interacting with each other and their environment. Examples of communities include a forest - made up of trees, plants, and animals; or a single tree - made up of a community of insects and flora.

Properties of an ecological community and lessons for human communities

Productivity and functional unity. There is biomass production, an indication of solar energy conversion to chemical energy. In every ecological community a small percentage of the available sunlight is captured and used to make energy-rich compounds. Some regions like the tropical forests, coral reefs and estuaries have high productivity levels than the deserts, because they have abundant supplies of resources such as light, temperature, moisture and nutrient availability. Each organism has a particular function it plays in the overall functioning of a given community. The pyramid of energy (Figure 16) depicts the energy flow, or productivity, of different organisms at each trophic level and the functional unity.

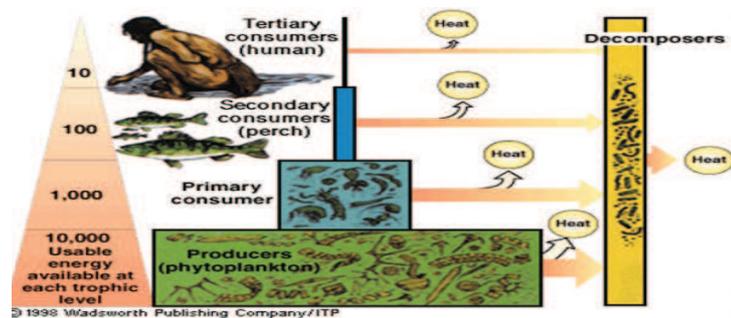


Fig. 16 Energy pyramid

In ecological communities, it is energy from the sun that drives ecosystems. The amount of energy available to the organisms at each trophic level decreases as one moves up the food chain because energy is lost as heat and organisms use energy to sustain themselves. Organisms play three critical roles: some make the food and are called Producers (autotrophs eg plants and algae); others eat other organisms and are called Consumers (heterotrophs); while the last category feed on dead organic matter and are called Decomposers (eg bacteria and fungi). The consumers are further subdivided into three namely herbivores (feed on plants) carnivores (flesh eaters) and omnivores (plants and animal eaters).

Due to the Laws of Thermodynamics (energy moves from a level of higher concentration to a level of lower concentration), each level up the ladder must be smaller than lower levels, due to loss of some energy as heat (via respiration) within each level (see Figure 16).

The general rules about ecosystems while discussing productivity are:

- It is energy from the sun that drives ecosystems
- The amount of energy available to the organisms at each trophic level decreases as one moves up the pyramid since energy is lost as heat and organisms use energy to sustain themselves
- Because the amount of energy decreases at each successive trophic level, the number of organisms also decreases
- Only approximately 10% of the energy is transferred to the next trophic level.
- Ecosystems cannot support large numbers of top consumers

So, we have more producers than consumers in natural ecosystems. In human communities (especially Nigeria), we must ask ourselves the following questions: What drives our economy (Science, technology and innovations, or corruption and greed)? Does each of us know the specific role we are to play for sustainable nation building? Do the youth, women and men know their roles? Are they playing that role? Are we a production economy or a consumer economy? Are we raising large population of consumers or producers? Compare Figures 16 and 17 and imagine an economy that is sustained by consumers (or an economy with a greater percentage of its productive workforce being consumers-Fig. 17). What will happen to that economy in the long run? The weight of the consumers will crumble the efforts of the few producers. Nigeria must work towards reversing this ugly trend of perpetually being a consumer nation. How? There must be concerted and sustained capacity building in science, technology and innovative learning (STI) with emphasis on vocation and skill acquisition. We must raise and strengthen the status of our monotechnics and polytechnics. Every community no matter the constraints

and challenges must produce something or add value to what they produce, no matter how small, rather than just consuming.

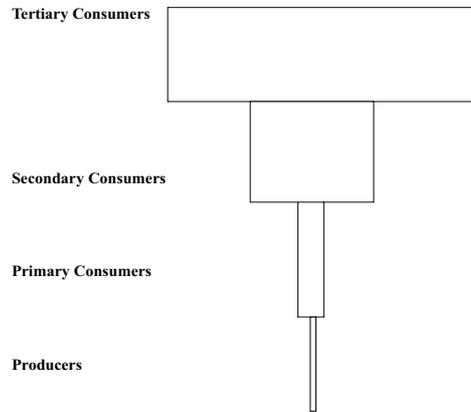


FIG.17. IMAGINE A REVERSE ENERGY PYRAMID LIKE THIS.?

Communities show structural unity- This implies that organisms live together in an orderly manner in spite of biological competition among them. The structure could be random, to take advantage of available resources (eg striga).It could be an orderly one due to the physical environment or biological competition (eg penguins in polar regions). Clustered structure could be for protection, mutual assistance, reproduction or access to a particular environmental resource (eg quela birds). In like manner, the subdivision of Nigeria into Federal, States, and Local Governments is supposed to foster structural unity among the three strata/components and not create disunity and disaffection.

Similarly, in a plant community for example, you have the emergents (tall trees) which occupy a small space but very strong in competition and can survive for 100s or 1000s of years, the annual grass(which survive for one year only), the perennial grass (who can survive for at least 2 years; the shrubs that are neither trees nor grass (that can survive for decades).. They all share a common space (the environment)! Each has a role in the overall workings of the environmental system. The lesson for us is that no matter how strong and powerful, how wealthy and influential; how weak or poor- know that the space is sufficient for each and everyone. We all have a responsibility to working towards the common unity of the space we share by ensuring structural unity.. An emergent can be destroyed by a small and tiny stem borer; the fall of the emergents could greatly affect other plants and pollinators in that community.

Abundance and Diversity: Abundance is an expression of the total number of organisms in a biological community, while diversity is a measure of different genes, individuals, populations and species present. Human life is inextricably linked to the diversity of ecological services provided by organisms. Nigeria, for instance, is rich in biodiversity. The country is endowed with a variety of plants and animal species. There are about 7,895 plant species identified in 338 families and 2,215 genera. There are 22,000 vertebrates and invertebrates species. These species include about 20,000 insects, about 1,000 birds, about 1,000 fishes, 247 mammals and 123 reptiles. About 1,489 species of micro-organisms have also been identified. All of these animal and plant species occur in abundance within the country's vegetation that range from the mangrove along the coast in the south to the Sahel in the north. Most of the biodiversity sustain the rural economy (FGN 2010). What we need to do is to harness the potentials and opportunities in the abundance and diversity of plant and animal species. Let us add some value (value chain) to these natural endowments (especially our cocoa, rubber, cotton, groundnut and fruits) that we have rather than export them in their raw state. We need to celebrate our diversity as a nation of over 160 million people rather than see it as a problem. Let's do all we can to ensure unity in our diversity as a country.

Complexity. Complexity in ecological term refers to the number of species at each trophic level and the number of trophic levels in a community. For example, in tropical rainforest, the herbivores can be grouped into fruit eaters, leaf nibblers, stem borers, sap suckers each composed of species of very different size, shape, and even biological kingdom, but that feed in related ways. A highly complex and interconnected community can form a very elaborate food web. For Nigeria, our complex ecological systems and interconnectedness can be a great advantage in terms of food and nutrition security. There is no reason whatsoever, why any person in Nigeria should go hungry. We can enjoy the varieties of the food webs that each ecological zone provides (from the grains in the north to the root crops in the middle belt all the way to the tree crops in the south).

Stability and Resilience- Many ecological communities tend to remain relatively stable over time. Three types of stability can be identified: constancy (lack of fluctuations in composition or functions), inertia resistance to perturbations) and renewal ability to repair damage after disturbance. It has been proven by some ecologists that the more complex and interconnected a community is the more stable and resilient it will be in the face of disturbance. This partly explains why Nigeria is still standing in spite of the myriads of challenges. Its sheer size makes its complex, and, the interconnectedness in the communities that form it helps it to remain stable.

Every community affects another adjacent community. Because most communities are open systems (that is, there is free flow and interaction of energy and matter), whatever happens to one community affects the other. Bush fires in a particular community will invariably affect the adjacent community. In like manner, conflict in a particular human community will have a ripple effect on other communities. As a nation, we must collectively and proactively tackle conflict (no matter how small) in any part of the country before it spreads.

Community and Our Common Unity. The word community is a combination of two words: common unity. Thus, a people with common history, social, economic or political characteristics and/ or interests living in a particular area make up a community. Sociologically, any group of people having cultural, religious, ethnic, or other characteristics in common could be regarded as a community. There cannot be a community if there is no common unity!

Most animals are gregarious. They live in groups that may be described as packs, pride, school, herd or flock. In human communities, we must seek to maximize the strengths and opportunities of our social bonds, rather than allow social constructs imposed on us by society, culture, family or our perceptions to limit us. Too often, we limit ourselves and create walls, barriers and fences to opportunities around us. Man invented both the literal and mental prisons. Until we break out of the social constructs and move beyond the socially induced systems that define and limit us, we will never truly enjoy the benefits that human community offers. We must build on what unites rather than on what divides.

7 A SYSTEM'S APPROACH TO UNDERSTANDING THE ENVIRONMENT AND HUMAN COMMUNITIES

Because the environment is so complex, we need to have a framework within which we can dismantle it for analysis. Such a framework is provided by the concept of system. A system is defined as a set of objects together with the relationships between the objects and between their attributes, and can operate at any scale (Chorley and Bennett, 1978). It can also be seen as a regularly interacting and interdependent components forming a unified whole. There are four major environmental systems. These are ecological system (ecosystem) consisting of plants, animals and their effective environment; hydrological system consisting of all waterbodies, atmospheric system, consisting of all gaseous and non-gaseous components in the earth's atmosphere and geophysical system, comprising of the processes that result in the building of mountains, volcanic eruptions and associated earthquakes, the weathering of rocks, movement of continents, processes of soil formation, and geology.

Environmental science seeks to understand such systems,, or networks of interactions among many interdependent factors. A focus on system is useful because it encourages us to inspect the relationships among components. A complete understanding of life on earth as we know it and its future prospects requires knowledge of the dynamics of these systems. Quite often, systems are examined in terms of their common characteristics. All the four environmental systems (Ecological, Hydrological, Atmospheric and Geophysical) have common characteristics. These characteristics, summarized below, possess lessons for human societies (especially in Nigeria):

- i. All systems have some structure or organization or order (NOT CHAOS). We must put some order in our educational, transportation;economic, and social systems to avoid being chaotic. For example, in the Nigerian educational system, addressing the problem must start from the Crèche to the Nursery all the way to the university level.
- ii. Presence of some driving force, or source of energy. Systems will tend to go from ordered states to disordered states (to maintain order, energy must be added to the system, to compensate for the loss of energy). (WHAT VALUES DRIVE US AS CITIZENS? WHAT DRIVES OUR ECONOMY?)
- iii. Energy flow and transfer (NOT BOTTLED UP). Everything must go somewhere.
- iv. Materials (nutrients) cycle. That is, whatever goes around comes around. Take what you need and pass on the rest. DO NOT HOARD).
- v. Porous boundaries (NOT CLOSED OR FENCED)
- vi. Emphasis is on function (what you do or can do) (NOT TITLE). There is no such thing as a free lunch. Every component must play its part for the system to work effectively. A STATIC SYSTEM will soon collapse!
- vii. All systems show some degree of integration (NOT ISOLATION). Everything is connected to everything else. A change in one part will have repercussions on the other parts. Whatever affects a part of Nigeria affects us all whether we like it or not. We must all work for the unity of the country.
- viii. Resilience (the ability of systems to recover quickly from disturbance, periodic or destructive events such as fire or floods). Three kinds of resilience are identified in ecological systems: Constancy, ability to remain relatively stable and constant over time; inertia, resistance to perturbations; and, renewal, ability to repair

damage after disturbance. We must lay emphasis on those things that build our resilience- Science, Technology and Innovation, Capacity building in various sectors of the economy, good governance and, diversification of our economy.

8. MAKING THE CASE AGAINST ENVIRONMENTAL PHARISEES/HYPOCRITES

☞ "Pharisee" is from a Greek word (pharisaios) taken from the Heb/Aramaic "Perisha" meaning "Separated one." In the time of Jesus, the Pharisees were one of the three chief Jewish sects, the others were the Sadducees and the Essenes. Of the three, the Pharisees were the most separated from the ways of the foreign influences that were invading Judaism, and from the ways of the common Jewish people in the land (See more at: <http://www.uscatholic.org> and International Standard Bible Encyclopaedia, Electronic Database Copyright © 1996, 2003, 2006 by BibleSoft, Inc. All rights reserved). For the most part they were known for their covetousness, corruption, wickedness, self-righteousness, pride and hypocrisy (Matthew 23; Luke 18: 9-14).

☞ The Pharisees criticized Jesus and his disciples for not keeping the law and interacting with sinners. Jesus in reply called them hypocrites and accused them of leading people astray with their wrong ideologies (yeast).

Who are Environmental Pharisees?

With this biblical background about the Pharisees, I coined the term **Environmental Pharisees/hypocrites** not in a derogatory sense or to insult the Pharisees described by Jesus in scriptures, but to mean any of the following:

- ☞ People who preach about environmental quality, but do not work towards achieving environmental quality. They can use government money to preach about the environment through advocacy, conferences, workshops, and seminars but do nothing about the environment.
- ☞ Those who are environmental teachers but are not environmental Doers (environmental hypocrites!) When we call them "hypocrites," we must go back to the primary meaning of the word. They are essentially "actors or masquerades," They talk the talk but do not walk they talk
- ☞ Anyone who is so proud that he cannot take care of his immediate environment (for example during Sanitation Days)
- ☞ Those who destroy or work against policies and legislations that protect the environment for some selfish interests. They choose the less altruistic option that says 'let us pollute and maximize profits'
- ☞ Those who throw wastes indiscriminately (through the windows of their moving vehicles, trains or ship; from the top of storey buildings; on the highways; inside drainages and waterways, etc)

- ✍ Those who are offended by people that care about the environment in their neighbourhood (some people cannot just stand a good environment. They must throw a water sachet or piece of paper!)
- ✍ Those who pollute the minds of younger generation with their ideology (yeast) that says ' the environment will take care of itself, just use it anyhow'
- ✍ Those who are constant critics of every good effort towards environmental management and sustainability
- ✍ Those who trivialize environmental issues or simply joke about them (for example in the case of forest, we here jokes like 'get-in, log and get out!'). No commensurate efforts at forest regeneration or tree planting by these people.

All these descriptions raise the issues of environmental ethics and attitudes. Ethics essentially defines what is right and what is wrong. It examines the moral basis of environmental responsibility. In these environmentally conscious times, most people agree that we must be environmentally responsible, but just how responsible are we? When the fossil fuel we use produces carbon dioxide and our vehicles and industries produce carbon monoxide that adds up to global warming and climate change. How environmentally responsible are we, when oil spills destroy aquatic life and arable lands? How responsible are we when the gas we flare pollute the air? How responsible are we when toxic wastes and mountains of refuse dot our major cities? Do we examine the ethical basis of our actions on the environment? For example, should an industry lobby legislators to vote NO on a particular bill because it might reduce profits, even though its passage would improve the environment?

The goal of environmental ethics is not just to make us show concern about our environment- many already are. Rather, the goal of environmental ethics is to challenge the moral foundation of environmental responsibility and how far this responsibility extends. Whether we adopt the anthropocentric approach, which holds that all environmental responsibility is for human interests alone; or, the biocentric view, which holds that all living things have an inherent right to exist; or even the ecocentric viewpoint, which holds that the entire environment (living and non-living things) must be protected, environmental ethics rests on one premise: that the individual is a member of a community of independent parts..

In any natural community, the well being of the individual and of each species is tied to the well being of the whole. Today we talk about the global village, a world that is without information and communication and environmental borders. Ecological degradation in any nation almost inevitably

impinges on the quality of life in others. For instance, drought in Africa, have resulted in a wave of environmental refugees. Insurgency in Nigeria is already affecting neighbouring Cameroon, Chad and Niger. The growing slums and shanty towns around the Federal Capital Territory of Nigeria may be time bombs of civil unrest. Individuals, communities and nations must have fundamental ethical responsibility to respect and protect the life-support systems of their immediate environment, to sustainably manage biodiversity and to conserve the goods and services that the environment provides. There must be individual and corporate (societal) environmental ethics. We must all work together to address environmental problems. Our attitude to the environment must take a holistic ethical view(a mix-grill of the preservation ethic, development ethic and conservation/management ethic) See figure 18.



(a) Preservation (b) Conservation/Management (c) Development

Fig. 18 (a-c) Environmental attitudes

The preservationists see the environment as something very special that must be preserved.. The environment has intrinsic value or inherent worth apart from human appropriation. Some preservationists hold religious aesthetic or recreational views about the environment, while others hold scientific views on the need to preserve the environment.

In the development ethic, the environment has only instrumental value in so far as man economically utilizes it. It is based on individualism or egocentrism. It assumes that man exists to dominate and subdue the environment and that all the goods and services on earth are for man's benefit and pleasure. This view is reinforced by the work ethic, which dictates that man should be busy creating continual change in the environment and that anything that is bigger, better and faster means progress. They hold to the notion that man's energies are best harnessed in creative work. If something can be done or built, it should. Today, we see the by-products and wastes associated with development.

The conservation/management ethic approach recognizes that we must have a decent living standard for all, but to achieve this, we must ensure a

balance of resource availability and resource use. In other words, there must be a balance between total development and absolute preservation. The goal of the conservationists is one people living together in one community, with a common unity, indefinitely.

In the words of the great Indian philosopher and statesman Mahatma Gandhi, the Earth provides enough to satisfy every person's need, but not every person's greed. While expansion and domination are central attitudes of developed nations, resource exploitation is common in developing countries. We all try to take from the 'common good' / or in Nigerian parlance, the 'national cake' without regard for the future. This attitude is deeply entrenched in the fabrics of our society. All of this is reflected in our unstable relationship with our environment. Nations of the world must confront the problem of individual and corporate irresponsibility toward the environment. It is criminal for individuals or corporate businesses to use loopholes, political pressure, and the time-consuming nature of the legal actions to circumvent or delay compliance with environmental regulations. Individuals and corporate businesses must not only show concern about the environment, those concerns must translate to a new individual and corporate environmental ethic that guarantees a sustainable and quality environment.

It appears that many individuals want a clean environment but they do not want to make major lifestyle changes to make the desired change happen. Decisions and actions by individuals faced with ethical choices collectively determine the hopes and quality of life for everyone. As environmental knowledge and awareness begin to catch up with good intentions, people in all walks of life will need to live by an environmental ethic.

If we are to respond to environmental problems adequately and successfully, our environmental ethic must express itself in new and innovative ways. We must recognize that each one of us is individually responsible for the quality of the environment we live in and that our personal actions affect environmental quality, for better or worse. The recognition of individual and corporate responsibilities must then translate to changes in individual and corporate behaviours. That is to say, our environmental ethic must begin to express itself not only in our national laws but also in subtle but profound changes in the way and manner we all live our daily lives.

9. CONCLUSION AND RECOMMENDATIONS

9.1 Conclusion

All I have tried to say in this inaugural lecture has been poignantly captured in the preamble to the Earth Charter, a United Nations document that

highlights principles for environmental protection and sustainable development.

In an increasingly interdependent world, it is imperative that we, the citizens of the earth, declare our responsibility to one another; the greater community of life, and future generations. The Earth community stands at a defining moment. Environmental degradation,, biodiversity loss, and depletion of natural resources threaten to destroy the ecological systems that sustain life. Injustice, poverty and armed conflict deepen the world's suffering. Fundamental changes in our attitudes, values, and ways of living are necessary. A shared vision of basic values is urgently needed to provide an ethical foundation for the emerging world community.....

As never before in human history, common destiny beckons us to redefine our priorities and to seek a new beginning. Such renewal is the promise of these Earth Charter principles. Fulfilment of this promise requires an inner change- a change of mind and heart. It requires that we take decisive action to adapt, apply, and develop the vision of the Earth Charter. Every individual, family, organization, business enterprise, and government has a critical role to play. Youth are fundamental actors for change. We can, if we will, take advantage of the creative possibilities before us and inaugurate an era of fresh hope'

In the end, even though a global perspective is essential for both environmental protection and social justice, we need to, as we say in environmental parlance, 'think globally and act locally'. I hope that this lecture would have given us the inspiration and motivation to do both.

9.2 RECOMMENDATIONS

9.2.1 We must all go green

This simply means as individuals as well as communities, we must live in a way that is friendly to and sustainable for the natural environment and for planet earth. It means we must all contribute towards maintaining the natural ecological balance in the environment, and preserving the planet and its natural systems and resources. It also means taking steps, whether big or small, to minimize the harm we inflict on the environment (including the carbon footprints we leave behind), as a result of inhabiting this planet.

≈ In practice, going green means adopting five basic practices in our daily life. All five practices are important in protecting the environment from harm, as well as helping to ensure that living (for humans and other creatures) on earth is sustainable.

- ≈ reducing pollution;
- ≈ conserving resources;

- ⌘ conserving energy;
- ⌘ reducing consumption pattern and waste generation;
- ⌘ and, protecting the earth's ecological balance

Reducing pollution

In our day-to-day activities, we actually release substantial amount of toxic substances into the environment. Think about the herbicides and pesticides we use on our farms. Many of them eventually get into the food chain and contaminate the food we eat. Think about the shampoo, soap and cleaning detergent that we use. Many of them contain chemicals that are washed down the sinks and pipes, into drains, rivers, reservoirs or even the sea. Think about the 'pure water sachet' we dispose of indiscriminately. Because they are non biodegradable, they affect soil quality and ultimately food security. The wrappers (polymeric materials) used in packaging food could be harmful to humans. In turn, harmful gases are released when such wrappers (as well as other waste) are buried or burnt. Think about the car that you drive to work, or even the bus or cab that you take to your office. These vehicles emit greenhouse gases (contributing to global warming) and toxic substances like lead (harmful to living things, including the human body) into the atmosphere.

Going green means that we can do something to reduce the impact of our daily activities on the environment.. We should consider for instance switching to organic farming in which case the food will be free from carcinogens, keeping away from junk foods and, use of natural detergents and organic lotions. Also, going green in practice, means to drive less, and use the public transport instead. Automobiles are one of the single largest sources of air pollution on earth today, and the harmful gases released contribute to global warming and climate change. By taking public transport (such as buses and trains), you are actually helping to reduce your ecological footprints (the amount of air pollution to be generated). Going green also means buying eco-friendly vehicles rather than vehicles that use leaded fuel.

Conserve resources

We must realize that while human wants are unlimited, the earth's resources are limited. All over the world, we are consuming more and more of natural resources. More trees are felled for firewood, roofing and the paper industries. More oil, coal and other mineral resources are exploited from the earth to drive the industrialization process, consequently contributing to pollution, acid rain and global warming. In turn, the pollution we create in the process of production and consumption further destroys the very valuable but scarce natural resources we have on earth. Many animals are hunted and killed to the point that some are

already extinct. If we do not take concrete steps and efforts to conserve these finite resources now, soon we would outstrip the earth's capacity to support life and there would be none left. With deforestation and fewer trees on earth, there are fewer plants to absorb excess carbon dioxide from the atmosphere, accelerating the impact of global warming. In turn, global warming worldwide and other anthropogenic factors have led to climate change. Climate change in turn is exacerbating flooding, sea level rise, drying up of river regimes and marine ecosystems and destruction of habitats of more plants and animal species. At this rate, the earth would not be able to sustain life on this planet for long.

All these boil down to man's attitude to his environment. Our rate of consumption of the earth's resources is phenomenal. We must reflect on this and put a halt to the situation. Going green implies that we must evaluate what we really need, as opposed to what we want. Is the new car really what we need? If not, then don't buy it. Like natural systems, we must consume only what we need, and be considerate in our consumption. In other words, remember that we are not the only ones that the earth has to provide for.

Conserve energy

Another aspect of going green is for us to conserve the energy we use. Fossil fuels such as coal, natural gas and petroleum are also finite and can be exhausted. There are still some difficulties in harnessing the green and sustainable energy sources such as solar and biofuels. Conserving energy means adhering to energy saving tips in the office and at home. It means switching off lights when we are not using them. It means using energy-saving bulbs. It means buying ozone-friendly refrigerators and appliances. It means buying unleaded fuels. Saving energy simply means less pollution. The less energy we use, the less pollution we create.

Reduce waste generation

Going green in practice also means reducing our consumption and waste generation. In waste management, we talk about the 3 Rs- *Reuse, Reduce* and *Recycle*. Reusing implies that we reduce our consumption of new materials if we do not need them. Reducing wastes means establishing sanitary landfills and incinerators for the dumping or burning of our wastes. Recycling means turning wastes to wealth. Recycling allows us to convert the wastes into new things. In this regard, we need to encourage wastes scavengers in this country by establishing wastes recycling plants for those who collect metal wastes in trucks and convert them into pots, buckets, and other tools.

Protect the earth's ecological balance

We must also in practice protect the earth's ecological balance. The earth's ecological balance refers to the equilibrium formed as a result of the harmonious co-existence of living organisms, including plants, animals and man, on this planet. Should the balance of this equilibrium tip in any direction, all the organisms involved would be adversely impacted. We must remember that only about 20% of the planet earth is landmass while about 80% is water. These terrestrial and aquatic systems have millions of plants and animal species, including man. As human population increases exponentially and the rates of urbanization and industrialization increase, we must ensure a harmonious co-existence with other living organisms inhabiting the earth. For far too long, man has acted as if he is the only one on the earth. To make way for societal developments, man has destroyed many natural habitats to many plant and animal species. The major causes of deforestation, land degradation, mining and climate change are anthropogenic in nature. In the process, man has striped other creatures of their habitats and even lives. With the destruction of forests, man is also hindering the earth's ability to to act as carbon sink resulting in loss of many plants and animal species

To feed our increasing population, we have been stretching the earth beyond its limits, through activities such as over-farming and over-fishing. Unrelenting, we continue to seek to challenge these limits, through inventing new ways of producing more for our greedy species. We introduced the use of man-made chemical fertilizers, artificial hormonal injection in farm animals, and genetic engineering. In the process, we have introduced many man-made and harmful substances into other species, the environment and ourselves (unwittingly, we have also tainted the quality of our food supplies, and bring harm to our bodies). And many of these substances have impact still beyond our full comprehension.

The ecological balance we have with other living organisms has been greatly upset. Many plant and animal species have gone extinct as a result of man's actions. And this is even before we have even discovered their existence! The loss of the numerous plant species also mean the end to important sources of medicinal plants and herbs that could potentially be cures to deadly diseases plaguing mankind today. Whether it is for ethical reasons (ie. taking responsibility for the harm we have inflicted on the environment), or for selfish reasons (ie. to satisfy our wants), we need to do something today, before it is too late.

Going green means that we need to be more responsible and proactive in protecting the earth's ecological balance. This environmental consciousness should be present, whether we are dealing with government policies, or industrial and economic activities, or in our daily living. It should not be a matter of convenience,

or doing whatever we can within the limits of our societal or economic constraints. In fact, considerations for the environment should come first! For without a planet to live in, there would be no room for societal or economic life!

As an individual, you should consume (not just food, but other goods and services as well) based on your needs and not your wants. In addition, you should also encourage those around you to do the same. By consuming just what we need, we reduce the strain we place on the earth as a source of our resources. You can also keep an organic garden or start an organic farm (where chemical fertilizers and herbicides/pesticides are not applied) Use organic products instead of products that release harmful chemicals into the environment. Plant trees around your environment or protect a piece of forest land under your name. Respect the lives of other living creatures (plants and animals alike, not just your pet dog or cat), and also educate your kids on the importance of doing so. In this way, you would have built the foundations for a more environmentally-conscious generation. Make green living a way of life that contributes towards maintaining the natural ecological balance in the environment, and preserving the planet and its natural systems and resources.

All these efforts will contribute now and in the long run to keeping this earth sustainable. The advantages of going green are enormous. It helps us cut cost, whether as an individual, a household, a community or a nation. It translates to a healthier environment for you and me. As more and more people seek to live a green life by reducing the pollution and carbon footprints they leave behind, we can look forward to better quality air, a cleaner environment and better health. One of the most important benefits of going green is a more sustainable world. At the rate that we are consuming the world's resources, polluting the earth and increasing global warming, and destroying the earth's ecosystem, in no time, we would be left with nothing (no clean air, water, land and food) but an un-livable world beyond repair. On the day that we reach such a stage, there would be no material comfort or economic growth to talk about at all. This is because our very lives would be threatened - there would be no clean air, no clean drinking water, no food, and probably even no safety from the harsh climate that would have changed beyond recognition. What a horrible situation to be in! We need to do something, starting today, if we do not wish to end up in that horrible state. It is important for each and every one of us to do our parts, but an individual's effort alone is not enough. We need to work together as a human community. We must start now!

Living a green life can actually offer us a better quality of life on earth. To truly experience the benefits of going green, you need to look beyond material luxuries. Considering that material luxuries can only bring you momentary happiness, and that at the end of the day, other non-material things such as

building relationships, helping the poor, actually matter more. Going green does not mean to give up the comfortable life you have now. In the words of my Professor and Mentor (Professor G G R Thambyahpillay), it means *thinking high and living low*. It just means having more consideration for the things you use and the environment you live in, bearing in mind the impact of your actions on the earth, and taking a little effort and creativity to reduce the negative impact you leave behind on this earth. With a greener planet, you and I can look forward to a cleaner and more beautiful environment, relatively free of pollution. With better quality of air, surroundings and food, we are more likely to be healthier (to be around to fulfill our aspirations and enjoy our relationship with our loved ones). At the same time, we will be more in touch with the earth we live on. We can get to experience and better appreciate the wonders of the diversity of animal and plant life on this planet. All these benefits can actually help you live a fuller life, more than what a life filled only with materials can do.

Finally, as more and more people start living a green life, there will be greater drive for developments in the area of green energies, recycling and other green technologies, as well as a market for eco-friendly products and services. In turn, these developments would make it easier for people to adopt green living practices. A positive reinforcement loop would be created for a green way of life.

9.1.3. The Nasarawa State Environment of my Dream

Mr Vice Chancellor, permit me to dream big about my immediate environment as I look at it from the lenses of an environmentalist. Nasarawa State is so dear to my heart, and so is the Nasarawa State University. Nothing in their developmental efforts should be allowed to leave a sour, polluted, degraded, and an ugly environment behind. Efforts should be intensified toward a positive, aesthetic and sustainable environment.

The vision of the Federal Ministry of Environment, Nigeria is to *ensure a Nigeria that develops in harmony with the environment*. This vision is meant to be scaled down to the States, Local Government Areas, MDAs, and Corporate Organizations.

Using this vision, what do I envisage for the Nasarawa State Environment? I envisage a State that moves in the direction of **environmental sustainability**. **Environmental sustainability** is *the responsible interaction with the environment to avoid depletion or degradation of natural resources and allow for long-term environmental quality*. It also means *“Meeting human needs without undermining the capacity of the environment to continue to provide the goods and services in over a long time”* The core principle is hinged on the concept of sustainable development, which seeks to *promote development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (as spelt out in Agenda 21 of the Rio de Janeiro declaration by the UNCED in 1992)

Unfortunately, in Nasarawa State, towns in proximity to the Federal Capital Territory could best be characterized as slums, shanty towns with an *urban sprawl* growth pattern- a pattern of unplanned, low density housing juxtaposed with commercial development on previously undeveloped land. Urban sprawl is an auto-dependent development outside of the compact urban and village centre. It is typically along highways, and in the rural countryside. Urban sprawl is characterized by excessive land consumption; lack of choices in ways to travel; fragmented open space; commercial buildings surrounded by residential houses; lack of public spaces, and, difficulty in knowing where one town starts and where it ends.. For instance, places like Marraraba, New Nyanya, New Karu and Massaka have houses and commercial centres with streets branching out in complex directions and often include cul-de-sac. It is difficult to find open spaces in these locations. The complex problems shared by many of these towns especially increasing traffic congestion and commute times, air pollution, loss of open space and habitat, mountains of refuse/solid wastes, inefficient energy consumption, increased social vices, loss of farmlands, water pollution problems, diseases, and loss of sense of community, are all evidence of the impacts of urban sprawl.

These towns seem to be growing without a careful analysis of the capabilities and unique values of the land and landscape. By virtue of its proximity to the FCT, Nasarawa State ought to have learnt from the developmental challenges of FCT. The unhealthy housing development and the ugly environment around Marraraba-Gurku, Masaka, New Nyanya, New Karu and Auta-balefi should be revisited quickly by the State Government with a view to redressing the situation. It is not too late to plan those settlements if there is political will. In fact, it is better now than later because these settlements are disasters waiting to happen. The ugly environment created by these slums will lead to increase social vices and crime rates, not just in Nasarawa State but in the FCT.

Like the Thai saying, *Experience is a Comb the environment gives to a man when he is bald*, Nasarawa State should not wait until it is bald, that is, stripped of all its environmental beauty. Before it is too late, Nasarawa State must realize it is part of the global family-a family left in the environmental crossroads. The State must adopt sound and better environmental management strategies, compatible with environmental integrity and safety, in the wake of drastic environmental change. The State must match in the direction of a GREENER FUTURE. What is needed is a well-planned, long term and sustainable environment that is backed up by strong political and financial commitments, with a view to reinforcing the State government's appreciation and emphasis on a better and quality environment.

We must recognize that each piece of land has specific qualities based on its location and physical makeup. While some lands may have outstanding potential for agriculture, others may have value for tourism, scenic beauty, or urban uses. Once land has been converted from its natural state or agriculture to intensive human use, it is generally unavailable for other purposes. As development in the FCT progresses, competition for the use of the land will increase. Therefore, systematic land use and urban planning for Nasarawa State becomes critical.

How we plan the physical layout, or land use of our State is fundamental to environmental sustainability. Environmental sustainability in Nasarawa State will require a transition from poorly managed sprawl to land use planning practices that create and maintain efficient infrastructure, ensure close-knit neighbourhoods and a sense of communal living, and preserve natural environmental systems. To achieve this, Nasarawa State Government needs to go back to the drawing board: We need to halt the ugly trend already being experienced in Marraraba, New Nyanya, New Karu, Massaka and spreading fast towards Keffi. We must construct an orderly list of priorities for the use of available land. Developing a plan will involve gathering data on current state of the environment (geological, biological and sociological information), and current use. From these data, projections can be made about future populations and needs. All the data collected can then be integrated with the projections, and each parcel of land is evaluated and assigned a best use under the circumstances. Other issues of concern will be to develop a comprehensive transportation system that is efficient and inexpensive (eg rail lines), that conserves energy and land resources, and reduces urban pollution; urban recreation planning; encouraging 'smart growth' that is, developing 'livable' cities and towns. Smart growth is hinged on the principle that the quality of our built environment and how well we preserve the natural environment both directly affect our quality of life. Smart growth recognizes the connections between development and quality of life.

Strategic questions to ask as we strive to achieve environmental sustainability will include: *What is the current state of the environment in Nasarawa State?* How far are we from achieving the preferred-future system conditions and set goals? What strong dynamics/mechanisms are in place already to move us to achieve the preferred future? What strong dynamics/mechanisms are in place already that will inhibit us from or block a movement to the preferred future? What is the likely result of the interplay of these dynamics/mechanisms? *How do we get to our preferred future from here, with the least cost along the way?* How do we close the gap between where we

are now and where we want to be? How do we create changes of the right sort and the right scale and speed? How do we minimise the losses on the way to achieving sustainability? What changes are needed across society and communities (especially system transformations)? What changes need to be made within organisations and by individuals? How do we make sure that sustainability is not pushed to the sidelines while society deals with other important issues? What scenarios, options and solutions can we generate? *What should we do right now?* What can we do to begin implementing our action plans? Are the actions that we plan to take going to advance all our main goals? Or do we need to coordinate and combine actions to cancel out or prevent any negative effects across our goals? How can we prepare the ground for the next wave of actions? How can we increase our capacity to be effective in the future? What major discrete projects or programs need to be undertaken to achieve environmental sustainability? To achieve environmental sustainability, we must be able to innovatively craft action-oriented programmes and projects that are preventive and corrective in nature.

Once these issues are sustainably addressed, I see a State that is

- Well planned with less or no slums (taking advantage of its proximity to FCT)
- Going Green
- Harnessing its Solid mineral potentials sustainably for the development of the State
- An Ecotourist State where geographical features such as springs, inselbergs, plateaux, spurs and valleys are developed to attract tourists

10.2.3 The Nasarawa State University Environment of my dream

The University is simply a community of teachers and students, experts and apprentices, administrators and labourers working together in unity or, as it is expressed in Latin, '*Universitas Magistrorum et Scholarium*'. The university is built on a one-roof principle, which unifies diversity. All must find the roof, that is, the point of connectivity to bring growth and development to the university. We must grow and develop our comets (Departments) and planets (Faculties) to form a new universe (a University) to be reckoned with.

Mr Vice Chancellor, after spending my early childhood years in Keffi and now back to Keffi as a Professor of Environmental Science, I long for a university that has the enabling aesthetic environment for learning and research. I must commend the Vice Vice chancellor, Professor Muhammad Akaro Mainoma for giving the Nasarawa State University a face lift within the shortest period of his assumption of office as the Vice Chancellor. With the

access and motorable roads in place, we can now be proud to receive any guest into our dear University. I must also commend the efforts of Deans of Faculties for their efforts at landscaping and greening their respective faculties. With the collective efforts of Departments, Faculties, the Landscape Unit and University Management, we can craft a GREEN UNIVERSITY that is comparable with any university in the world. I use this opportunity to challenge our dear students to imbibe good environmental ethics by keeping our campus clean.

We have good examples of such Green Universities in Nigeria. (see Figure 19a-e). This is Gombe State University with common features like NSUK:

- It is a State University
- Established about the same period with the Nasarawa State University
- It has similarities in terms of topography, landscape, ecology, geographical location and so on but worst off in terms of the problem of gully erosion.



Fig 19 a) Gombe State University (Green University with solar street lights, gene bank of indigenous plants)





Source: Gombe State University

<http://gsu.edu.ng>/accessed 24/12/2014

I see that the Vice Chancellor, Professor M A Mainoma is already headed in the direction of environmental quality and I believe there is no going back. With the support of all, I believe Nasarawa State University in the next 20 to 50 years will be a State University to be envied.. We can do it. Yes we can!

On my part as a Professor of Environmental Science and Researcher, I intend to contribute in the following ways

- Build capacity at the Undergraduate and Postgraduate level
- Synergise with the Federal and State Ministries of Environment, and the Ecological Fund office in tackling environmental challenges
- Synergize with the Nasarawa Geographic Information System (NAGIS),/The Nigerian Airspace Research and Development Agency(NASRDA), the Nigerian Meteorological Agency (NIMET), and other relevant Agencies in mapping various aspects of environment including mineral resources and capacity building
- Foster linkages with International Organizations and Centres to assist the Nasarawa State University
- Advocate for the teaching of an Introductory course on Environmental science at the GST or Long Vacation Training (LVT) programmes

Finally, Mr Vice Chancellor sir, after 25 years of intensive involvement in academic teaching, research, and consultancies in several aspects environmental management in Nigeria, I can say emphatically that Nigeria can

do more in the effective management of its environment from the mangrove swamps to the sahel savanna. Perhaps, much of what is contained in this inaugural address may not be new but the subject matter is worth repeating as often as possible, if only to arouse our concern for and provoke us into concrete actions in managing the environment.

We need a careful and coordinated planning of our environment. The National Policy on Environment must be translated from mere paper work to effective environmental management. Effective environmental planning is a necessary complement of national development. Any national development without adequate environmental planning is unhealthy in the short run, and, both chaotic and disastrous in the long run. Environmental planning and management is a continuous process, and therefore requires prudent assessment of its various dimensions and monitoring over time and space, especially in response to the various facets of national development.

Mr Vice Chancellor, I dare say that no set of policies or legislations, no amount of information, no regulatory framework can substitute for individual responsibility when it comes to ensuring a quality life that comes from a quality environment. Information can provide a basis for action. Policies, legislations and regulatory frameworks can influence change. However, all of this will be meaningless unless individuals acting as citizens, consumers, investors, managers, workers, students, teachers, market men and women, and professionals decide that it is important to them to make choices on the basis of a broader, longer view of their self-interest; to get involved in turning those choices into action; and, most important, to be held accountable for their actions. We must target the mindset of the individual through environmental education and awareness. We must pursue policies that mainstream economic, social and environmental goals. In the final analysis, each of us has to adjust our lifestyle to clean up the mess in our own small part of the world. Then and only then, will we have a world with *one people living together in one community, with a common unity, indefinitely!*

AKNOWLEDGEMENTS AND APPRECIATION

All praise, honor, power and glory be to my Loving and Living Saviour Jesus Christ in whom are hidden the treasures of wisdom and knowledge (Col 2:3), who preserved me through thick and thin, through real life-threatening dangers and has been with me till this day. When I experienced *conflicts on the outside and fears within* (2 Cor 7:5), He gave me tripled deliverance (2 Cor 1: 10). He delivered me in the past, and has delivered me now, and will continue to deliver. He has finally set my feet upon solid rock to stand. Where would I have been without Him? Thank you, LORD for being there for me.

I would like to thank all those whom God has used to make me what I am today. Through my life's journey, God has strategically positioned people to help me realize my dreams. First, I remembered my parents-The late Reverend Ayuba Kuzhe Gabi and Mrs Asibi Ayuba. They may not be famous, they may not be powerful, and they may not be rich. Nevertheless, it is remarkably reassuring and inexplicably invigorating, just to know that they are always there, praying, sharing and hoping for the best for their children. They laboured tirelessly and denied themselves so much, in order to ensure that I was well educated. They invested all they has in the education of their children and thank God, we did not let him down. Even though I lost my father in 2014, I know he is rejoicing at the bosom of His LORD. My mother is a mother in Israel and a mother in deed. I also thank my siblings and their family members: Bishop David, Late Danladi, Mrs Mary; Mrs Rhoda, Rev Moses, Chief Ezekiel, and Mrs Grace. Through you, I have to understood the power of unity in diversity. Thank you for your support, prayers and encouragement all along.

To the lady in my life, that has been so caring, loving, encouraging, and supportive over the past 12 years. My prayer partner, my friend, my adviser-Mrs Iya Haruna, May the LORD reward your labour of love and toiling. This beautiful lady gave me two lovely daughters that give me joy at the thought of them: Tehillah Awazi Haruna Ayuba and Roni Atsema Haruna Ayuba. Their love and patience have always been my source of strength and driving force. May the Lord sustain you and enlarge your borders. Thanks to the Gyani family for 'nurturing' and 'culturing' such a wife for me.

Mr James Abele provided his home for me here in Keffi all through my Primary school days. He is a man with a large heart, who accommodated children from different families in his home. Thank you very much, Sir.

I thank all my teachers from Sunday School, through Primary School to the University Level. Special thanks to Chief Ezekiel Maichibi, Peter Angbalaga, Pastor Luka Kigbo, Mr Kike Tanze, Prof J A Falola, my BSc Supervisor, Prof E A Olofin, Dr Luka Buba, Prof D U Sangari, Prof D U Essiet, Prof A. O Aweto, my supervisor at Msc and PhD levels, Prof O O Areola, Professor A. Faniran, Prof. Bola Ayeni, Late Prof SI Abumere, Prof SI Okafor.

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I am grateful to the University of Maiduguri for employing me as a Graduate Assistant in the Department of Geography, barely 3 months after my NYSC. I remain grateful to the late Prof. G G R Thambyahpillay who was instrumental to my being appointed as graduate Assistant in 1991. He saw the Professor in me when others saw a Corper. He taught me to '*think high and live low*'. To colleagues in the Department of Geography, University of Maiduguri, thank you for providing an enabling environment for exchange of ideas. I appreciate the role played by Professor M M Daura while we were both at Ibadan for PhD programme. Even though he was on the verge of completion when I enrolled for the PhD, he allowed me stay with him in his single room at Agbowo, Ibadan before I eventually got my own room. Little did we know then that after about 14 years, he would become the Vice Chancellor of the University of Maiduguri. As it turned out, it was during his tenure as Vice Chancellor that I became a Professor. We have attended national and International conferences together. While he served as President of the Association of Nigerian Geographers, I served as the Assistant National Secretary. I learnt a lot from him about simplicity.

I thank Nasarawa State University, Keffi under the leadership of Prof. M A. Mainoma who offered me a tenured position as a Professor in the Department of Geography, Nasarawa State University in 2014. I thank the Registrar Alhaji Dalhatu O. Mamman and other Principal Officers of the Nasarawa State University for providing an enabling environment for teaching, research and learning. I thank Professor Olayemi Akinwumi ((FHSN), Director Research and Publications of the Nasarawa State University for providing a cordial atmosphere for me as his Deputy Director. I thank the Information and Protocol Officer, Mr MJ Zakari for helping in facilitating this lecture.

I am deeply grateful to the Evangelical Church Winning All (ECWA); The Chapel of Joy, Bayero University, Kano; The National Christian Corpers' Fellowship (NCCF); The Chapel of Grace, University of Maiduguri; Glory Tabernacle, Ibadan; The Chapel of Salvation, NSUK;; Christian Chapel, FMC Keffi; Bishop T D Jakes (Dallas, Texas) and the Late Myles Munroe (the Bahamas Faith Ministries) for my spiritual growth and development over the years.

I acknowledge my colleagues at the primary, secondary and tertiary levels who taught me the spirit of fair play, tolerance and teamwork. Thanks also to my wonderful students, past and present, who allowed me test my ideas on them.

Exchanging ideas and experiences with students and colleagues as well as regular philosophical and environmental discourse with other Environmental consultants, have nourished my innate creative talent, and contributed immensely to the discovery of a number of innovative and

sustainable ways of solving some environmental problems. These ones are too numerous to mention. I thank Prof Emeritus N M Gadzama, Prof Emeritus David Okali (NEST, Ibadan) Prof E. O Oladipo, Prof. F A Adeniji, Prof Daniel Gwary, Professor F A Adesina, Dr Ernest Afiesimama, Prof KO Iwugo, Prof DU Sangari, Prof. Don Brown, Prof Tom Franks, Peter vers Hauke, Dr Jare Adejuwon (Director, Department of Climate change, Federal Ministry of Environment) Peter Tarfa (Deputy-Director, Department of Climate change, Federal Ministry of Environment); Prof Henry Mahoo, and Prof Mike Mortimore. I am grateful to the Nigerian Environment Study Action Team (NEST), Ibadan, for drawing our attention to the *Nigeria's threatened Environment* in 1991. I enjoyed my membership of this NGO over the years.

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Mr Vice- Chancellor sir, distinguished ladies and gentlemen, you are such a wonderful audience. Thank you for your patience in listening to me. God bless you all!

10. PROFESSOR H K AYUBA'S PROFILE

Professor Haruna Kuje Ayuba was born in Maha, Kokona Local Government Area of Nasarawa State on the 17th August, 1966. He had his primary education at ECWA Primary School, Keffi. He attended Government Secondary School, Uke, where he obtained the General Certificate of Education (GCE) in 1984. He gained admission to the Bayero University, Kano in 1985 and graduated in 1989 with B.Sc. Hons in Geography. In 1987/88, he won the University Prize for the best Geography student. He was posted to Borno State for his National Youth Service Corps (NYSC) in 1989, where he served with the Department of Geography, University of Maiduguri. Three months after the NYSC, he was employed by the University of Maiduguri as a Graduate Assistant in the Department of Geography in January, 1991. He did both his M.Sc. (1992) and PhD (1998) at the University of Ibadan. He rose through the rank to become a Professor of Biogeography/Environmental Science in the Department of Geography, University of Maiduguri, Nigeria since 2007. He has been a member of the University Senate since 2007. He has served the University in

various capacities as Chairman or member to several statutory or ad-hoc committees.

Professor Ayuba was a former Head of Department, Geography, University of Maiduguri; former Sub-Dean, and acted in several occasions for the Dean, Faculty of Social Sciences, University of Maiduguri. He was also former Head of Department, Geography, Nasarawa State University, Keffi, while on Sabbatical leave. He is the Assistant National Secretary, Association of Nigerian Geographers and a member of: The Nigerian Environmental Study/ Action Team (NEST); Climate Change Support Group, Federal Ministry of Environment, Abuja; Alumnus, International Dean's Course (IDC) on Higher Education Management (Supported by German Academic Exchange Programme, DAAD). He is also one of the Nigerian Negotiators to the United Nations Conference of Parties on Climate Change.

Professor Ayuba has over 60 publications in National and International Journals and has consulted and /or researched for International Union for the Conservation of Nature (IUCN), The Lake Chad Basin Commission (LCBC), Ndjamena; Ecosystem and Poverty Alleviation (ESPA (UK); ITAD (UK); Federal Ministry of Environment, Abuja; Nigeria Environmental Study/ Action Team (NEST); Heinrich Boll Foundation (HBF); African Radio and Drama Association (ARDA, Lagos; Women Environment Programme (WEP); amongst others. He has also travelled to several places around the world for conferences or research visits.: These include Cologne, Osnabruck, Berlin (Germany), London, Sweden, Bradford, Chad, Niger, Cameroon, Ethiopia, Tanzania, Japan, Moscow, Poland, and Peru.

Professor Ayuba has served as External Examiner to Federal University of Technology, Minna; Federal University of Technology (MAUTECH), Yola; Adamawa State University, Mubi; and University of Abuja;. He has also served as Professorial External Assessor to some Federal and State Universities in Nigeria. Professor Ayuba has graduated several Postgraduate Diploma (PGD) students, over 30 M.Sc. students and 07 PhD candidates over the past 10 years. He is a member of the editorial board of many academic journals. He is currently a Deputy Director, Research and Publications Directorate of the Nasarawa State University, Keffi. He has featured several times as Guest Speaker at the annual World Environment Day of the Borno State Radio and Television programme as well as on Environmental issues at NTA and AIT.

Professor Ayuba is happily married to Mrs Iya Haruna Ayuba and they are blessed with two daughters-Tehillah Awazi Haruna and Roni Atsema Haruna. His hobbies include Music, Reading and horticulture.

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