UNIVERSITY OF PORT HARCOURT

"ORDER IN DISORDER:
re-thinking inside the box"

AN INAUGURAL LECTURE

By

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INAUGURAL LECTURE

SERIES NO. 153

SEPTEMBER 27, 2018

University of Port Harcourt Printing Press Ltd.
University of Port Harcourt,
Port Harcourt,
Nigeria.
E-mail: uniport.press@uniport.edu.ng

ISSN: 1119-9849
INAUGURAL LECTURE SERIES NO.153
DELIVERED: SEPTEMBER 27, 2018

Designed, Printed and Bound by UPPL.

ACKNOWLEDGEMENTS

My sincere appreciation goes to my immediate family; my sweet and lovely wife, Mrs Chinyere P.C. Mmom (JP) for providing me with the necessary comfort and for understanding and bearing with me in my radical moments. Our children, Christie (Da'ada) Dean (Chief o!), Annie (My GF) and Kelsey (Uncle & Minister) are highly appreciated for the joy they have brought to our home. My Parents, Elder & Mrs. G.O.C Mmom are appreciated for giving me the opportunity of formal education. I appreciate my siblings: Chief S.O.C Mmom, Dr. Chigozirim F. Mmom, QS. Chimeze N. Mmom, Adanne Gloria, Engr. Wisdom C. Mmom, Miss. Joy U. Mmom and Barr. Chidi Gift (nee Mmom) are appreciated for watching my back. Am greatly indebted to my parents in-law, Mr.& Mrs. Jonathan K. Wornu for their priceless contributions to my welfare.

I most sincerely thank the 8th Vice Chancellor of the University of Port Harcourt, a World-Class Entomologist, Professor Ndowa E.S Lale; whom the Lord used to promote me to the pinnacle of the academic ladder. I also say thank you for giving me the opportunity to present my Inaugural Lecture in your tenure as the Vice Chancellor of this unique university. I also say big thank you to the Deputy Vice Chancellors; Professors R.E Ogali and Hakeem B. Fawehinmi, the Registrar, Mrs. D.D Otto, and the entire University Management for this wonderful opportunity of standing before this great audience to deliver this lecture.

I consider many people as my academic mentors, so on a day like this, I acknowledge your efforts in making me an accomplished academic. Therefore, I say big thank you to the following people: My Ph.D Thesis Supervisor, Prof. R.A.O Sule (late), Prof. A.M Adeyemo (M.Sc. Supervisor), Prof. Don M Baridam, Prof. J.A Ajienka, Prof. Ogbonna F. Joel, Prof. O, Akaranta, Prof. Israel O.

Owate, Prof. Lawrence Ezemonye, Prof. S.N Uchegbu, Prof. Eugene Aniah, Prof. B.C Didia, Prof. A. Chidi Ibe (the Sorcerer), Prof. Vincent Idemyor (the Oracle), Prof. (Mrs.) Bene Willie-Abbey, Prof. (Mrs.) Eunice Nwachukwu, Prof. Temi Ologunorisa, Prof. Vincent A. Asuru and Mr. U.D Agumagu.

My Professional colleagues are not left out of this thank you section, so my appreciation goes to Engr. Olu Andah Wai-Ogosu, Prof. Chris Ekweozor, Dr. John Onwueteaka, Prof. C.K Wachukwu, Dr.(Mrs.) Ibitoroko George-Opuda, Prof. Chris Madu, Prof. Best Odinioha, Prof. Chituru Orluwene, Dr. Ir. Okon Inah, Dr. Ralp Offiong, Mallam Umar. Anka, Prof. T.K.S Abam, Mr. Austin Igbuku and all my former colleagues at Ogoni Restoration Project Team of SPDC, Port Harcourt

My colleagues in the Department of Geography and Environmental Management are not left of this list. I sincerely appreciate the encouragements and support of the following persons towards my academic success: Prof. Osi Akpoghomeh, Prof. C.U Oyegun, Prof. S.B Arokoyu, Prof. J.E Umeuduji, Prof. A.A Obafemi, Dr. C. F. Igwe, Dr. (Mrs.) G.C Emenike, Dr. V.E Weli, Dr. C.H Wizor, Dr. C.L Ezekwe, Dr. E. I. Elenwo, Mr. T.N Deekor, Mr. V. Wekpe and Dr. O. Lawal. Many thanks to Dr. Olatunde S. Eludoyin for taking pains to review the initial draft of this lecture. My boys, Dr. Gift Chukwu-Okeah, Mr. Meelubari Kpang are highly appreciated for always reminding me that I have to be a Professor to enable them grow faster. They helped me in data collection and collation and co-authored some research publications with me; you shall be great. I also acknowledge the administrative staff of my Department as well as the staff and students of the Centre for Disaster Risk Management for your support. Capt. Matthew Karimo, Abiye Tomquin, Victor Allen, Vitalis Chukwuemeka and others not mentioned here were very encouraging to me as they started calling me Professor, when I

was still a Senior Lecturer and that challenged me to earn the title quickly.

Right here in this university community, Prof. Okey Onuchuku, Prof. Henry Alapiki, Prof. Eme Ekekwe, Prof. O.C Nwaorgu, Prof. B.F Nwinee, my brother in the fellowship, Mr. William Wodi (FCIS), Prof. O.A. Abumere ('Talcking' mentor), Prof. Iyk Agbagwa, Prof. Nath Abraham, Dr. G. O Worlu, Dr. J. Nwogu, Dr. Otu Ekenyong, Prof, K. A. Anele, and Dr. Jones Ayuwo are appreciated for standing by me and encouraging me to ride on; despite some challenges. Members of CARAI; Val Nwanze, Emimeke Dienye, Prof. E Emasealu, Dr. Sam Dede, Dr. Friday Nwafor, Dr. Ovunda Ihunwo, Dr. Kalu Wosu, Dr. Etido Inyang, Dr. John Yeseibo, Dr. Imo Edward, Dr. Charles Asuk, Chief Eromosele, Precious Omuku and members of the Snooker Board of the Senior Staff Club of the University of Port Harcourt were great motivators.
I also use this medium to appreciate my political associates: Sir. (Hon.) Anugbum Onuoha, Ph.D, Hon. Samuel O. Nwanosike, Chief Okey Okah, Chief. Prince Weli-Wosu, Emma Okas Wike, Hon. Chris Orji, Hon. Ken Eziwhuo, Hon. B.S. Emerengwa, Hon. K.K Aribodor, Sir Isaac Okemini, Barr. George Ariolu and many others that space won't allow me here to list are equally acknowledged for your encouragements.

I wish to also use this medium to appreciate my religious brethren; Mr. & Mrs. Adegoke Fabunmi, Ibezim Johnson, Arc. Meze Enyidah, Pst. Dr. Dave Nyekwere, Arc. Emmanuel Dike, Evuchaiwe Chinedu, Prof. J.A Makinde, His Lordship, Hon. Justice C. Nwogu, Mrs. Nnenna Emordi, Past. Dr. U Ahiamadu, Elder Victor Ahuama, Elder Ken O Ine, Elder Ikechi Emem, Elder Okey Emem, Elder E. B Jack, Dr. H.O Nwankwo-Ala, Elder (Dr.) P. E. Nwankwo-Ala, Elder (Hon.) Andrew Egbelu, Elder (Dr.) N.H. A. Nwafor, Elder (Prof.)

Arthur N. Chuemere, Elder (Prof.) M. O. Wegwu and others for your prayers and words of encouragement.

My special friends and associates are not forgotten here; so I say thank you to. Hon. Chinazom Azubuike Chieme, His Lordship, Hon. Justice Charles N. Wali, Engr. Sam Wali, Engr. Emma Wahor, Mr. Boniface Pabon (a.k.a Solomon), Barr. Kelvin Akani, Mr. Owhor ThankGod, Sochikamso Okor, Gen. Udaya, Emeka, Godpower Imiete, Arinze Nnamezie, Chukwuezugo, Mrs. Chibuzor Ewuzie, Sarima Okedu, Ibifubara C. Odimabo, Dr. Fred Allison, Dr. Patrick Aniche Briggs, Ovie Ade, Assoc. Prof. Gift Nwiyi, Ms. Oriaku, Tmg, Prof. Prince Nwachukwu Ololube, Mr. & Mrs. O.C Nmom, Mr. & Dr. (Mrs) P.N Nmom and Class 1986, CGS, I/E, you have all done well. Members of the Intellectuals Club Omuanwa; Hon. Chizi Nyeomasila, Dr. Styv Worgu, Barr. Ezemonye Chieme, Hon. Chinedu Ordu, Barr. Nnamdi Amadi-Wali, Engr. Kingsly Nyemezu, Hon. John Ogundu Gibson Godwin, Collins Ejiowhor, Bright Wosu, Henry Bob Ikuru, Promise Ajoku, Hon. Ugo K. Chinnah, Hon. Chidi Wosu, Deliver Wobodo, Goodluck Obi Amadi, Kingsley Emeka and Collins Emeka, you have been a source of motivation, gracias!

Am grateful to my Professional Associations: Association of Environmental Impact Assessment of Nigeria (AEIAN) and the Nigeria Environmental Society (NES), for your support and encouragements.

ORDER OF PROCEEDINGS

2.45P.M. GUESTS ARE SEATED

3.00P.M. ACADEMIC PROCESSION BEGINS

The procession shall enter the Ebitimi Banigo Auditorium, University Park, and the Congregation shall stand as the procession enters the hall in the following order:

ACADEMIC OFFICER
PROFESSORS
DEANS OF FACULTIES/SCHOOLS
DEAN, SCHOOL OF GRADUATE STUDIES
PROVOST, COLLEGE OF HEALTH SCIENCES
LECTURER
REGISTRAR
DEPUTY VICE-CHANCELLOR [ACADEMIC]
DEPUTY VICE-CHANCELLOR [ADMINISTRATION]
VICE CHANCELLOR

After the Vice-Chancellor has ascended the dais, the congregation shall remain standing for the University of Port Harcourt Anthem.
The congregation shall thereafter resume their seats.

THE VICE-CHANCELLOR'S OPENING REMARKS.

The Registrar shall rise, cap and invite the Vice-Chancellor to make the opening Remarks.

THE VICE-CHANCELLOR SHALL THEN RISE, CAP AND MAKE HIS OPENING REMARKS AND RESUME HIS SEAT.

THE INAUGURAL LECTURE

The Registrar shall rise, cap, invite the Vice-Chancellor to make his opening remarks and introduce the Lecturer.

The Lecturer shall remain standing during the Introduction. The Lecturer shall step on the rostrum, cap and deliver his Inaugural Lecture. After the lectures, he shall step towards the Vice-Chancellor, cap and deliver a copy of the Inaugural Lecture to the Vice-Chancellor and resume his seat. The Vice-Chancellor shall present the document to the Registrar.

CLOSING

The Registrar shall rise, cap and invite the Vice-Chancellor to make his Closing Remarks.

THE VICE-CHANCELLOR'S CLOSING REMARKS.

The Vice-Chancellor shall then rise, cap and make his Closing Remarks. The Congregation shall rise for the University of Port Harcourt Anthem and remain standing as the Academic [Honour] Procession retreats in the following order:

VICE CHANCELLOR
DEPUTY VICE-CHANCELLOR [ADMINISTRATION]
DEPUTY VICE-CHANCELLOR [ACADEMIC]
REGISTRAR
LECTURER
PROVOST, COLLEGE OF HEALTH SCIENCES
DEAN, SCHOOL OF GRADUATE STUDIES
DEANS OF FACULTIES/SCHOOLS
PROFESSORS
ACADEMIC OFFICER

PROTOCOLS

- The Vice-Chancellor
- Previous Vice-Chancellors
- Deputy Vice-Chancellors (Admin and Academic)
- Previous Deputy Vice-Chancellors
- Members of the Governing Council
- Principal Officers of the University
- Provost, College of Health Sciences
- Dean, Graduate School
- Deans of Faculties
- Heads of Departments
- Distinguished Professors
- Directors of Institutes and Units
- Visiting Academics and Colleagues
- Esteemed Administrative Staff
- Captains of Industries
- Cherished Friends and Guests
- Unique Students of UNIPORT
- Members of the Press
- Distinguished Ladies and Gentlemen.

Preamble

Mr Vice-Chancellor Sir, I count it a very great privilege and honour to be called upon to deliver my Inaugural lecture on this 27th Day of September, 2018. I give gratitude to God Almighty, the giver of life and wisdom for making me achieve this feat in just a few years of my engagements in academics.

Sir, when I was pronounced a Professor in October, 2016, I hurriedly went to apply to deliver my Inaugural lecture, but I was told the year, 2017 was fully booked and that I had to request for a slot in 2018. As I applied and came back to the office, I became afraid and troubled, if I was matured enough to give an inaugural lecture, given the fact that so many Professors wait for many years to package themselves for this task. However, I took solace in the fact that NOBODY ASKS QUESTIONS DURING INAUGURAL LECTURES. So, I can say anything I want to say and walk away, and anybody not satisfied could either take it that way or engage me privately. But as the day drew closer, I became more apprehensive again because that assumption may not be absolutely correct, as I would have left a bad impression about myself in the minds of the public and this impression may even outlive me.

Mr Vice-Chancellor Sir and my distinguished listeners, I learnt that an Inaugural Lecture could take the form of sharing ones research experiences over the years. It could also take the form of demystifying a challenging contemporary problem in the society, or it could be in the form of giving explanation to what may appear as a puzzle to the public.

Thus, I have decided to caption this Inaugural Lecture: "**Order in Disorder:** re-*thinking inside the box.* I deliberately chose this title to keep you perplexed and curious, especially as the contemporary thinking is usually outside the box, and NOT inside. So, why do I

want to take you people back to 'Egypt'? Is there anything left inside the box to think about? I want to declare here that re-thinking inside the box which is a rider to this title does not actually have anything to do with what I want to discuss here, I am just trying to act like our Pastors, who choose sermon titles that attract our attention, only to tell us old Bible stories of; David and Goliath, Peter and Paul, Elijah and the Widow, e.t.c that we have heard of from Cradle Roll. Therefore, ladies and gentlemen, there is still more inside the box that you haven't seen yet. Permit me, therefore to continue with my hoax as I in the next 60 or so minutes discuss - **Order in a seemingly disordered World**.

As a growing young boy, I heard of Ahoada and Degema towns/Divisions, and had thought that these places would be wonderlands. I also read about the ancient town of Calabar as the first capital of Nigeria. However, when I visited these towns, I was disappointed as they never grew beyond their snout. I know that many inquisitive minds would have wandered in imagination the way I did. So, I have come here today to attempt to provide an argument for the perceived stunted growth of these settlements using some geographical models and theories.

The Holy Bible in Genesis 1:1-5 *states that "In the beginning God created the heavens and the earth. 2 Now the earth was formless and empty, darkness was over the surface of the deep, and the Spirit of God was hovering over the waters. 3 And God said, "Let there be light," and there was light. 4 God saw that the light was good, and he separated the light from the darkness. 5 God called the light "day," and the darkness he called "night."*.....

The above excerpt shows that the discipline of Geography and Planning started from the Bible where God himself created order from void and if you follow the biblical account of God's creation, you can't but agree with me that God is the Author and Founder of

Geography and Environmental Planning and that is why I chose this discipline. You can agree with me that everything came into existence in sequence, one after the other, thus ensuring order (harmony) in space before Man came to occupy and subdue the Earth and ended up creating Disorder (disharmony) in space.

My Vice- Chancellor, Sir, Ladies and Gentlemen, some people are described as Jack of all trade but Master of none, yet people like Prof. Chi Ikoku and Prof. A. Chidi Ibe have been described as Jacks of many trades and master of all. For me, I can simply describe myself as Prince of many interests and master of some. Mr Vice-Chancellor, I am a Professor of Geography and Environmental Management with varied interests ranging from Urban Planning, Environmental Resources Management, Environmental Assessment and Remediation, Ecological restoration, Disaster Risk Management to Pollution control. I have made impact in my field of studies and contributed to societal development. I have made my Department, Faculty and University proud in my research and professional activities as I was listed among the first 800 scientific researchers in Nigeria by the Google Scholar H-index and Citations, 2015 edition. This has helped to increase the ranking of University of Port Harcourt among the comity of Universities in Africa. By this achievement, I am probably the first scholar in my Department and Faculty of Social Sciences to be listed in this Hall of Fame. Ladies and Gentlemen, Aristotle noted that every auto-biographer is an egoist. Thus, if I am to speak about myself, I would tell you that in my dreams last night, I lifted helicopter with one hand, of course, you shouldn't doubt me as you weren't with me while I dreamt. Therefore, before I bore you with these tales about my achievements, let me discuss first, my lecture and get back to this later if time permits.

WHAT IS GEOGRAPHY?

Geography as an academic discipline is as old as the academia and plagued with the dynamism of the variables that constitute its curriculum (Onwumereobi, 1991).Geography is traditionally defined as the study of the surface of the earth as the home of man. It is the science that describes the earth's surface with particular reference to the differentiation and relationship of areas (Kinvig, 1965). It is a field of science devoted to the study of the lands, the features, the inhabitants, and the phenomena of Earth. Geography is the study of the diverse environments, places, and spaces of Earth's surface and their interactions. The modern academic discipline of geography is rooted in ancient practice, concerned with the characteristics of places, in particular their natural environments and peoples, as well as the relations between the two (Haggett, 1972 & 2001). Geography is also seen as the study of spatial differentiation on earth. In other words, it is a discipline that studies the differences that exist in space from one place to another and how such differences influence the way people live and earn their living. Geography as a discipline has attracted a lot of definitions depending on the view point of the author/writer.

(ii) **Geography: from Evolution to Revolution**

The discipline of Geography has passed through the process of evolution and revolution to its present state. Three (3) basic questions influenced the thinking of and perception of Geography over the centuries. They are; the '**Where', 'What is Where' and the 'Why' questions.** As people travelled, they encountered different environments and peoples. Such variations in people and places were intellectually stimulating Stores of knowledge were built up about such new and exotic places, as demonstrated by the Greek philosopher and world traveller Herodotus in the 5th century BCE. That knowledge became known as geography, a term first used as the title of Eratosthenes of Cyrene's book *Geographica* in the 3rd

century BCE. Such was the volume of knowledge compiled thereafter that Strabo's *Geography*, published three centuries later, comprised 17 volumes. Its first two provided a wide-ranging review of previous writings, and the other 15 contained descriptions of particular parts of what was then the known world. Soon thereafter Ptolemy collated a large amount of information about the latitude and longitude of places in his seminal work.

At this stage, the basic interest of Geographers was then to identify and locate places on earth. For instance, people were interested in answering questions such as where is the Atlantic Ocean? Where is Helsinki? Where do we find the mongoloid? Where is Nigeria located? No wonder, one is said to know a lot of Geography if one is able to name places and tell where they are located. You cannot claim to know Geography or be a Geographer if you cannot name and locate major cities of the world. Addressing this question led to the development of a major branch of geography today, which could described as the oldest branch of Geography, it is known as Cartography or mapmaking.

Thus, the evolving practice of geography involved mapping the world, drawing outlines of what hitherto were *terrae incognitae*, and filling them in with details about their physical environments and the people inhabiting them. Thus, for centuries the locations of places were only inexactly known. Such geographical advances depended on improvements not only in cartography, but also in astronomy, which was vital for navigation. Methods for determining latitude and longitude and measuring elevations and distances were refined and were of great value to navigators and explorers and their sponsors. Many expeditions, such as those of James Cook in the second half of the 18th century, conducted scientific experiments that enabled advances in navigation and cartography and collected samples of flora and fauna that were used to classify knowledge about the

natural world—as in the pioneering work of the 18th Century French naturalist Georges-Louis Leclerc, comte de Buffon. These links between geography, exploration, cartography, and astronomy have been maintained, appearing as the first sections of many contemporary atlases (with maps of the heavens along with terrestrial phenomena such as climate). (https://www.britannica.com/science/geography/Human-geography) Geography was practiced and taught largely because its information was valuable—notably for traders, those who invested in them, and the statesmen who supported both groups. By the early 19th century, there was great demand for information and knowledge about the world. To aid commercial enterprises aimed at exploiting its resources and peoples, governments became involved in colonial ventures, annexing land beyond their frontiers, providing administration/military protection and encouraging settlements. All such endeavours required geographical information, including accurate maps. Increasingly, governments became directly involved in these activities, as with the U.S. government's sponsorship of major expeditions to the country's expanding western frontier and the establishment of national mapping agencies around the world.

With all the known places of the world located and mapped, attention of Geography shifted away from the Where question, to the 'What is Where question. Thus, identifying and describing areal variations of the Earth's environments and their exploitation by human societies became the focus of geographical thinking and research. This led to or accounted for the creation of distinctive places on earth (regions). Emphasis of geography was on describing features that distinguish places on the earth's surface. This thinking brought about the development of Regional Planning as a sub-unit of Geography. Thus, it was not just satisfactory to identify and locate places, but to describe the spatial variations and distinguish or classify areas according to distinctive features.

However, advances in geographical studies came as need arises to explain why things are the way they are and where they are. Thus, Geographers having satisfactorily addressed the question of 'What is Where', emphasis shifted to 'Why' question. It then became imperative for us to give explanations to concepts and phenomena in space (Harvey,1969 and Mmom, 2010). The process of providing answers to the Why question led to Quantitative Revolution in Geography in the 1950s. Quantitative revolution brought about measurements in Geography. It is then believed that the only way one can give satisfactory explanation to spatial phenomena is to measure and generate quantitative data about the phenomena. Thus, Geography began adopting scientific research methodology to provide answers to, or explanations for spatial event or phenomena. The introduction of quantification in geography marked a turning point in the development of the discipline as Geography changed from being an Ideographic to a nomothetic discipline. In other words, Geography changed from being a mere descriptive study/discipline to a scientific discipline.

Dualism in Geography

Two major schools of thought influenced Geographical thinking; Environmental Determinism and Environmental Possibilism. A group of Geographical scholars led by Ellen Churchill Semple, Ratzel, Strabo, Ptolemy held the view that the environment man lives in determines the way man lives and earns his living. In other words, man is a product of his environment as such subject to the dictates of his environment. They argue that "people and their environments are inseparable" (Harvey, 1969). The other holistic concepts of these views are that "the character of people is seen in the light of the physical environment they inhabit." Several studies express this term in connection with the influence of environment on human. In the Man-Environment relationship, the environment is

active, while man is passive. Man does not have a will of his own; he is like a robot being manipulated by his environment. Doyle (2011) stated that determinism is a theory or doctrine based on the occurrences in nature, or social or psychological phenomena causally determined by preceding events or natural laws. From a metaphysical and philosophical position, for everything that happens there are conditions, such that without those conditions, nothing else could happen. It is also the view that every event has a cause and that everything in the universe is absolutely dependent on and governed by causal laws. Since determinists believe that all events, including human actions, are predetermined, determinism is typically thought to be incompatible with free will. The environment poses obstacles to his growth, for instance, about 70% of the earth is covered with water, and so human settlement expansion is inhibited by shortage of well-drained land. Our climate and weather conditions limits our agricultural practices, we cultivate cassava and some of these crops in the south because our environment provided us such favourable soil conditions.

Contrary to this view is the Possibilism School of Thought that believes that the Environment does not control or determine Man's and means, rather man controls the environment. Although natural environment posses some constraints, on human life, culture is determined independently of nature by human social conditions. Man does not surrender to the will of his environment. Man has conquered nature and subjected the environment to his will. The theory holds that the environment sets certain constraints or limitations, but culture is otherwise determined by social conditions. In Cultural ecology Marshall Sahlins used this concept in order to develop alternative approaches to the environmental determinism dominant at that time in ecological studies. Some of those who advanced this theory were Strabo in 64 BC and Paul Videl de Blache as they noted that humans can make things happen by their own

intelligence over time. Although the environment establishes culture, it does not completely define culture. Strabo cautioned against the assumption that nature and actions of humans were determined by the physical environment they inhabited. He observed that humans were the active elements in a human-environmental partnership. With the progress in knowledge and Technology of a cultural group, there is a corresponding increase in option available by which they can interact with the natural environment.

IS THERE ORDER IN DISORDER IN SPACE?

Generally speaking, describing the structure of amorphous (unstructured) materials such as metallic glasses has been a longstanding problem in materials science. A new technique called fluctuation microscopy allows us to see order on length scales that are difficult to study with traditional scattering techniques. At first glance, the structures of amorphous materials seem rather uninteresting — particularly in comparison with crystalline materials, which display a wide variety of structures. But advances in characterization techniques described at a recent symposium on *Order in Disorder: Probing the Structure of Amorphous Materials*, show that the structures of amorphous materials are much richer than is commonly appreciated (Hufnage, 2004)

Similarly, the world or space we live in appears chaotic or formless. It seems that things just exist anyhow and anywhere without any pattern or design. Thus, certain fundamental questions arise: Can we always find order in systems that are disordered? If so, just how large does a system have to be to contain a certain amount of order? Is there order in the organization of human space? Or do things just exist where they are or are there some underlying forces behind the form and pattern of human organization of space? Attempting to provide answers to these questions forms the focus of this lecture.

Order is the arrangements of things in relation to each other according to a particular sequence, pattern or method. Order satisfactorily Environmental Planners (Regional/Urban/Rural) enhances the process of maintaining order in space. Planners, following the natural order established, create additional orders where order seems not to exist. To be able to create order in space, environmental planners apply certain principles, theories and models to simplify realities. Some of these theories and models are herein discussed below.

The Growth Pole Theory by Francois Perroux (1955)

The Growth Pole theory was developed by French regional economist, Francois Perroux, in 1955. He was concerned with the phenomenon of economic development and with the process of structural change. He attempted to explain how modern process of economic growth deviated from the stationary conception of equilibrium growth. His arguments were based on Schumpeter's theories of the role of innovations and large-scale firms.

In Schumpeter's analysis, development occurs as a result of discontinuous spurts in a dynamic world. The cause of discontinuous spurts is the innovative entrepreneur whose activities take place in large-scale firms. These firms are able to dominate their environment in the sense of exercising reversible and partially reversible influences on other economic units by reason of their dimension and negotiating strength, and by the nature of their operations. This is the most important feature of Perroux's theory and leads to the concepts of dynamic propulsive firm and leading propulsive industry. The dynamic propulsive firm is relatively large and belongs to a relatively fast growing sector. Its high ability to innovate and intensity its interrelation with other sectors of the

economy makes such firms important enough for the induced effects to be transmitted to her complementary regions.

A leading propulsive industry has highly advanced level of technology and managerial expertise, high income elasticity of demand for its products, marked local multiplier effects and strong inter-industry linkages with other sectors. Examples of propulsive firm/industry are the petroleum/petrochemical industries, automobiles firms, etc. These propulsive firms have two types of linkage, namely, forward linkage and backward linkage. In backward linkage, an industry encourages investment in the earlier stages of production by expanding its demand for inputs, such as human resources, monetary capital, physical capital/infrastructure and technology.

In case of a forward linkage, an industry encourages investment in the subsequent stages of production either by transmitting innovation or effects of innovations forward. As a result of innovations, costs of production in the industry decline. It results in a fall in the price of its output. In this condition, the demand for this industry's output by those industries which use its output as input will increase.

Perroux's theory is based on the Schumpeterian theory of development and theory of inter-industry linkages and industrial interdependence. According to him, "Growth does not appear everywhere and all at once, it appears in points or development poles, with variable intensities. It spreads along diverse channels and with varying terminal effects to the whole of the economy". It is related to Perroux's idea of an economic space as a field of forces consisting of centres, "from which centrifugal forces emanate and to which centripetal forces are attracted. Each firm or propulsive industry, being a centre of attraction and repulsion, has its proper field which is set in the field of other centres."

Geographers criticized the Growth Pole theory as being abstract as it didn't have a spatial dimension. In other words, it was dealing with an abstract/economic space without linking the industry or firm to a concrete space where such pole is located. Nevertheless, Regional Planners, leveraging on the principle of the theory, added the geographical character of space or location to Perroux's concept which made the theory receive a specific geographical and regional importance today. Thus, Boudeville (1968) defined a regional growth pole as a "set of expanding industries located in an urban area and including further development of economic activity throughout its zone of influence." The place where these 'expanding' or 'propulsive' or 'dominant' industries are located in the region becomes the centre of the region and agglomeration tendencies are promoted. In other words, the geographical location of these firms become Growth Centres

The key and the most important theoretical foundation of the whole concept is the argument that *growth is not uniform in different places* ,but growth has different degrees of intensity in different points, or poles, and then it spreads via channels and its final result for the state economy is different in different regions" (Vystoupil, 2003). Similarly, growth/development does not occur at every part of a region at the same scale, but appears to be concentrated at some centres from where it further spreads to other areas within the region.

Thus, the growth centre through the concentration of economic activities begins to attract people, capital and investments which further consolidates such location. It is argued that this centripetal force becomes stronger at the earlier stage of development, but would trickle down to the contiguous areas in the form of transfer of knowledge, increase in demand for produce from the surrounding areas and increase in income, capital movement for investments at

home, etc. But critics of the Growth Centre concept see it as encouraging polarised development as the backwash effect is more dominant and influential than the spread effect.

In connection with the theory of growth poles, there have been proposals which pointed out that there are instances of economic growth which happen in the regions without growth poles which mean that the presence of growth poles is not essential for economic growth (Vystoupil, 2003). He mentions Switzerland (where tourism is not concentrated in poles, but spread all over the country) and Denmark (the prosperity of which was not initiated and maintained due to a large propulsive company).

Perroux's observation and belief was that concentrations of economic forces would develop in areas that could provide the material and infrastructural resources necessary for the establishment, sustenance, and growth of key industries. These resources contributed toward the economic growth of this cluster of industries and caused them to become key or "propulsive" industries that caused an economic thrust in related industries and businesses through "fields of (economic) forces." The thrust was not necessarily felt in the growth pole's region, or even within its country of location. Therefore, this concept recognized the forces of polarization but did not recognize geographic or political boundaries. Thus, development is seen as being cumulative, that is, built upon one another. A Swedish economist Gunnar Myrdal, (1898-1987) developed a theory/model known as the Cumulative Causation Model of regional growth. Myrdal was convinced that market forces lead to deepening of interregional differences - i.e. the rich regions are getting richer and the poor are getting poorer (Peet, 2009). The impulses which may cause negative cumulative process include a sudden bankruptcy of a production plant or local increase of taxes.

In this context, Myrdal (1953) points out that the rich regions may utilize external and internal economies of scale (Glasson, 2002). Myrdal considers traditional mechanisms such as *mobility of capital*, *regional drainage* (outflow of financial resources from the periphery to the centre via bank system) and *selective migration* as means by which cumulative mechanisms manifest themselves. Myrdal held that the effects of individual cumulative mechanisms are related and lead to a *growth spiral* - i.e. to the outflow of growth sources (capital and labour) from the underdeveloped to more developed regions (Blazek, 2008). In this context Myrdal´s circular cumulative causation differentiates between *negative* (i.e. polarized or back-wash) effects of more developed regions to underdeveloped regions and *positive* effects (spread or trickle-down effects) - e.g. growth of demand in more developed regions for resources and agricultural products produced in underdeveloped regions or expansion of technological advancement.

In developed countries the positive effects on less developed regions is more significant than in developing countries due to the system of parliamentary democracy, stable and integrating institutional framework and a conscious effort of the state to decrease the differences between the rich and the poor in accordance to the concept of *welfare state* (Blazek, 2008). The main tool to improve underdeveloped region is, according to Myrdal, is *an integrated development plan* which allows the implementation of investments which are beneficial for the whole society.

The introduction of a new industry or the expansion of an existing industry in an area also encourages growth in other industrial sectors. This is known as the multiplier effect which in its simplest form is how many times money spent circulates through a country's economy.

Money invested in an industry helps to create jobs directly in the industry, but it also creates jobs indirectly elsewhere in the economy. New industrial development, for example, requires construction workers who themselves require housing, and services such as schools and shops. An increased demand for food will benefit local farmers who may increase their spending on fertiliser.

Workers employed directly in the new industry increase the local supply of skilled labour, attracting other companies who benefit from sharing this labour pool. Other companies who supply components or use the new industry's products are attracted to the area to benefit from reduced transport costs.

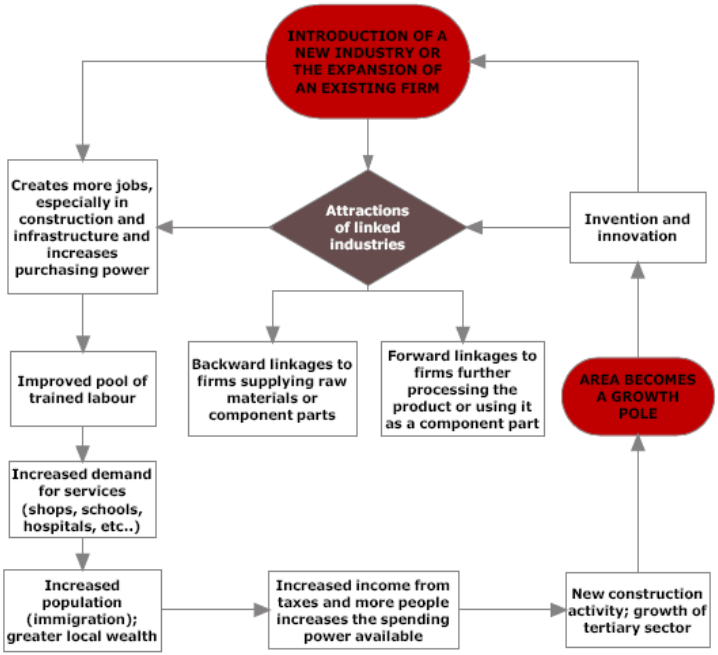


Fig.1 Simplified diagram to show the development of an industrial region (after Gunnar Myrdal,1953)

Summarily, development in a region is said to be cumulative, that is built on initial advantage. Thus, once a part of a region receives initial advantage of growth, agglomeration economies begin to attract further development. There is the tendency for an area with good roads, electricity and other social infrastructure to attract investments, technical skills and capital. Spin-off effects include new inventions or innovations that may lead to further industrial development and new linkages. Through this multiplier effect, an area can develop as a Growth Centre, as illustrated in figure 1 above.

The Gravity Model of Spatial Interaction

For decades, social scientists have been using a modified version of Isaac Newton's Law of Gravitation to predict movement of people, information, and commodities between cities and even continents. **Newton's law of universal gravitation** states that a particle attracts every other particle in the universe with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centres. This is a general physical law derived from empirical observations by what Isaac Newton called inductive reasoning. It is a part of classical mechanics and was formulated in Newton's work *Philosophiæ Naturalis Principia Mathematica* ("the *Principia*"), first published on 5th July 1686. In other words, the law states that every point mass attracts every other point mass by a force acting along the line intersecting both points. The force is proportional to the product of the two masses, and inversely proportional to the square of the distance between them.

Mmom (2011) noted that the idea of geographical complementarities and the friction of distance are brought together in the Gravity Model of Spatial Interaction. The Gravity model is perhaps the most widely applicable of the spatial interaction models. Gravity Model postulates that the interaction between two locations in space is

proportional to their size (population sizes) and inversely proportional to some friction of distance separating the two places. Since larger places attract people, ideas, and commodities more than smaller places and places closer together have a greater attraction, the gravity model incorporates these two features. The relative strength of a bond between two places is determined by multiplying the population of the two cities and then dividing the product by the distance between the two cities squared.

The Model:

$$Iij = f\left[\frac{Mi\ Mj}{D^{ij}}\right] \quad \text{----------equation1}$$

where Iij= is the gravitational force acting between two objects (the number of interactions between place i & j during some time period; m_i and m_j are some measures of the size of i & j, Dij is the distance between the two and f is the gravitational constant.

The gravity model tells us that if a small city and a large one are located at equal distance in the region where we live, we are likely to travel more often to the large city than to the small city (Mmom, 2002; 2007; 2011)

By making generalization about what we infer about one's spatial behaviour to entire population; that is, the number of trips from a given centre to each set of centres will tend to be proportional to the product of their sizes and that of the originating centre and inversely proportional to the distance separating them with the original centre, implying that certain basic assumptions were made. In other words as with other geographical and economic models, certain assumptions about the real world are made to simplify reality.

Firstly, there is the assumption of an isotropic or uniform space, that is, homogeneity between the centres. In other words, the interactions that are being compared take place in a uniform space in terms of time and money cost. The second assumption is that of a homogenous population. In other words, there is the assumption that the interaction between the two centres involves people or goods that are similar to those in the two other places between which there is interaction. If one set of population is more affluent than the other, then the gravity model would not predict amount of interaction since people with more affluent men make more travels and make more distant telephone calls than the less affluent people. In fact the more affluent people maintain high levels of interaction, Thoman and Corbin (1974) remarked that the assumption of homogenous population include the idea that the cities between which the interaction takes place vary only in size since this is the only variable in the model. If this assumption is not made, the models would not predict interaction in both cases equally well.

One of the areas in which the gravity model has been applied is the delineation of the commercial or trade areas of cities. Reilly (1931) applied the gravity model in the study of retail trade activities and this resulted to what is commonly called the Reilly's Law of Retail Gravitation. This law states that "city attracts retail trade from an individual customer located in its hinterland in proportion to its size, and in inverse proportion to the square of the distance separating the individual from the city (Alden and Morgan, 1974).

Criticisms

Despite the relative simplicity of the model, it suffers a major criticism in terms of its assumption of the effect of distance. Studies have shown the function of distance as an exponential one. This is contrary to the classical assumption of interaction being inversely

related to square of distances between the two centres (Omuta and Onokerhoraye, 1994).

More so, it has been argued that it is not only economic reasons that lead to distance decay. Social or non-economic reasons such as intervening opportunities also affects interaction. In other words, it has been debated that the interaction between a pair of origin and destinations is conditioned by the number and quality of intervening opportunities between them. Interaction between the points may be higher if there are no such opportunities, but would be less if there are plenty of such opportunities between the set of interacting places.

Mr Vice-Chancellor Sir, despite the criticisms of this model, we can appreciate the application of this model in explaining our spatial behaviour in Nigeria. We would prefer to visit large cities than small cities because of varieties we expect to get; we would prefer to invest or locate our businesses in larger cities than the small cities because of the perceived high level of patronage to make our businesses flourish. The attraction would definitely make the larger cities continue to grow larger at the expense of the small cities or towns.

Spatial Concept of Distance

Distance, simply defined is the separation between points in space. Physical and human resources are not evenly distributed, therefore, movements become essential in the functioning of human societies. These movements are not random as there is a retarding effect of distance on movement and spatial interaction which is known as distance decay (Mmom, 2011). The consequences of this distance falls upon the fact that the abstract dimensions of space itself imposes certain restrictions upon human activity in the sense that distance represent a barrier to movement. This effect is what is

referred to as the friction of distance which man responds to in a predictive fashion through the principle of least efforts. In other words, an individual's spatial behaviour is subject to the minimization of effort postulated by Ziph in 1949.

Distance plays a dominant role in man's organisation of space. It is conceptualised in two forms, namely, absolute sense and relative sense. Absolute distance is expressed in metric units, that is, in miles, kilometres, meters, etc, and does not change. Relative distance on the other hand relates separation of two points in terms of human behaviour and not in terms of physical or metric parameters. Relative distance is measured in terms of time, monetary cost and convenience. For instance, what a traveller considers while embarking on a journey is not actually the physical separation or absolute distance, but the time it takes, monetary cost, as well as convenience in reaching one's destination from the origin. Traffic flow and terrain may slow down or facilitate a journey that may be far apart or near in absolute terms.

Two locations may be physically or absolutely contiguous, but relatively distant apart in terms of the cost in overcoming the friction posed by the physical distance between two points in a straight line, but if the points are separated by a mountain range with difficulties in crossing over by crow flies, then the relative measure in terms of time, money and convenience come to play in determining the actual distance between the two points.

Absolute distance has an effect on the relative distance; the more the physical separation of points, the more the relative distance in terms of time, cost of movement and convenience. However, what actually determines the cost of transport may not just be the physical separation, but the nature of terrain, mode of transport involved and

the convenience or ease of movement. More so, movement cost does not proportionately and uniformly increase with physical distance.

Distance –Decay Function

The frictional effect of distance is one of the major factors affecting spatial interaction. If the real world was to be limitless or without a distance, location behaviour would have been uniform and all contemporary transport systems would be redundant. There would be no need to live in towns, cities in fact; urbanization which is characteristic of the contemporary world would virtually disappear as individuals would search for their own place in the sum (Chapman, 1979). Man's behaviour in space may be interpreted as a consistent attempt to minimize efforts involved in overcoming distance.

Distance is a basic geographic dimension and the distance-decay curve specifies the relationship which variable bear to distance. Distance-Decay function is therefore defined as a series of rectangular co-ordinates relating a given variable with distance, and showing greater values of spatial variable for any smaller distance than for any greater distance (Thoman and Corbin, 1974). For instance, we may measure the volume of interaction or quantity of any given variable at increasing distances from a specific reference point and plot those references on graph. When these observations are joined together with a line, one discovers that the value decreases with increase in distance. However, it is noteworthy that not all variables respond this way. There are some exceptional cases, over a specified range; we may discover some variables remaining constant, while others may increase with distance. But in most geographical studies, it is proved that spatial interactions decreases with increasing distance.

Let us take an example of an individual's residence and plot the number of visits he makes to his friends. If our graph show a flat and gentle slope, we may conclude that the variable (individuals visit to friends) is not very sensitive to distance. This is so because large changes in distance away from the individuals residence results to only a small change or variation in the volume or frequency of the individual's visit to his friends. On the other hand, if the graph is very steep, revealing large changes in the volume of visit to friends with only small change in distance, then we may also conclude that the variable is highly sensitive to distance. This analogy could be simplified by introducing the concept of spatial elasticity as seen in figure 2 above. The steeper the slope of the graph, the greater the change in the variable with distance, hence the more elastic the variable. In other words, a spatial variable is elastic to distance if the variable shows a greater change with distance that is, reducing with increase in distance. On the other hand, a spatial variable is inelastic if it does not show greater responsiveness to change or increase in distance, that is, if the slope is gentle.

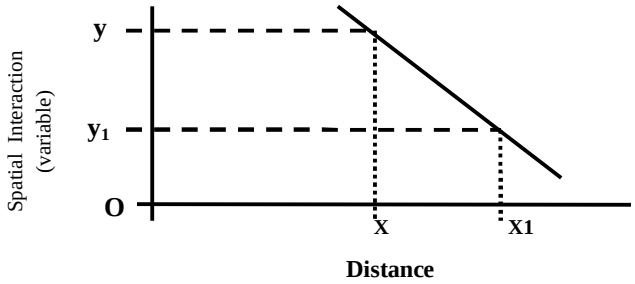


Fig. 3: Spatially elastic variable

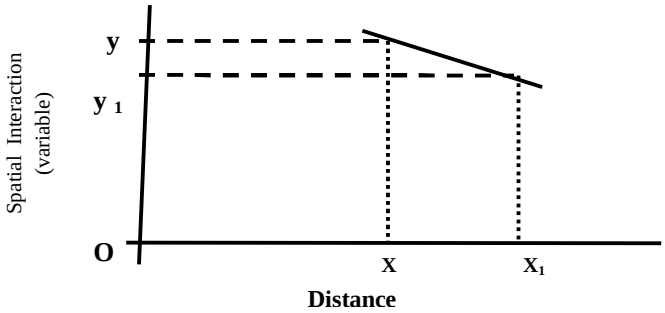


Fig. 3a: Spatial elasticity of distance

Reasons for Distance – Decay

A fundamental problem that has bothered human geographers has been why things or spatial variables decay with distance. Therefore, this section attempts an answer to this question. Although the answers or reasons provided here may not be all exhaustive, it serves an attempt to provide explanation for distance decay as there is no end to the search for knowledge.

The reason for distance decay could be broadly categorized into two, namely economic and noneconomic reasons. The economic reason could be explained in terms of the cost of overcoming distance measured in monetary and time terms. These two factors or variables

increase as the distance increases and are limited for any given use. As the money cost involved in interacting with a given points increases, it is most likely that the interaction decreases. For example, the monetary cost of embarking on pilgrimage to Mecca reduces the number of Muslim Pilgrims able to visit Mecca. Similarly, as the time required interacting from a point increases, the value of the variable will decrease. The two economic variable or reasons operate in the same direction, but only one of them will be relevant for any given location. For example, if we have all the money needed for a particular purpose, we will still be constrained by time limit. Similarly, if we have all the time needed, we may be constrained by limited monetary budget. It becomes apparent from the foregoing discourse that the cost of overcoming distance in terms of money and time are the major economic reasons for distance decay. Nevertheless, if the economic reasons are held constant, there emerges another picture of distance decay which implies that there are other explanations for the distance decay. For instance, if we plot the number of telephone calls from Port Harcourt City to other places within Nigeria, we would expect to have more calls going shorter distances, reflecting distance decay effect. Since the unit cost of telephone call across the country is constant; call-cost may not be used as an explanatory framework for the few calls going longer distances than shorter distances. The basic principle here is that people are more likely to be familiar with their immediate neighbourhood than with distant places. People are more likely to know more people in the city where they live than people living in farther places. To this extent, we may conclude that knowledge (information) about distant places are likely to decrease with increase in distance, as such, it may be this lack of information that produces this distance decay effects.

Economists argue that knowledge acquisition involves cost, as such, it is like money and time is economic reasons for distance decay. However, Thoman and Corbin (1974) affirmed that traditional economic theory at the elementary level is based firmly on the assumption of perfect knowledge and work on the spatial variation of information is undertaken in many disciplines other than Economics, hence, it is classified here as non-economic factor.

Another non-economic factor or reason for distance decay is the presence of intervening opportunities. Intervening opportunities are the number of chances or opportunities that exist between an origin and destination. There is the possibility that an individual travelling a given distance would meet some opportunities on his way before arriving his destination. In fact, the number of opportunities between the origin and destination increases as distance increases. For instance, if an individual decides to travel from Mile One to 9^{th} Mile in a city to find a good restaurant for launch, there is high probability of his finding many good restaurants before the 5^{th} mile. Therefore, given the existence of those opportunities or chances of similar satisfaction closer to ones point of origin than at distant destination, the chances are that we will not continue to travel to further distances for the same satisfaction. In effect, as a result of intervening opportunities, an individual is likely to travel only shorter distances from origin to derive satisfaction. The longer the distance between origin and destination, the greater the number of intervening opportunities in between the origin and destination.

Social and Physical Distances

Social distance is a structural concept used to locate individuals within an abstract dimension defined in terms of such personal characteristics as their income, occupation, educational background, etc. Originally, it was defined exclusively in terms of differentiation between individuals on the basis of their socio-economic

characteristics. Knox (1990) noted that the idea of social distance has a long history which is associated with the moves of Bogardus in 1962, in which he graphically illustrated the perceived social distance between native-born white Americans and other racial ethnic and linguistic groups. He suggested that social distance could be reflected by a ranked social scale of social relationships which people would be willing to sanction. The further up the scale, the closer the perceived distance between people to have as friends; as neighbours, as member of one's country; one's occupation; admit to close kinship by marriage, etc.

In effect, the less the social distance between individuals, the greater the probability of interaction of some kind. It is generally accepted that the greater the physical proximity between people (their residential propinquity) the more the likelihood of social interaction of some kind. However, this is not often the case as studies have shown that what determines social interaction is not merely the residential propinquity, but the social distance of people. If we plot the number of times or frequency of visit to our residential neighbours and that to other friends far from our neighbourhood, we will discover that we make more visits to outside friends than our neighbours. It is very possible that we never visited our neighbours on the same street throughout the year. The reason for this is the perceived social distance between our neighbours and us. If these neighbours are to be in the same occupation, educational background, or social economic status, then we would visit them more often.

The exact influence of social and physical distances depends to some extent on the nature of the interaction concerned. Instrumental interaction related to trade unions, political parties etc, will clearly be less dependent on physical distance than instrumental interaction which is focused on local action group concerned with organization

of local or community development project. In most cases, the influence of social and physical distances is closely interwoven and difficult to isolate. Voluntary association for example reflect class, life style with membership depending on social distance.

Intervening Opportunity Model (IOM)

The intervening opportunity model was put forth due to exaggeration of the effect of distance on interaction. The model modifies and qualifies the concept of distance. Isard (1964) noted that the intervening opportunity model avoids the problem of physical distances by *stating* the number and quality of opportunities lying between two points as a measure of the distance separating the points.

The model was put forth by a sociologist, Samuel Stouffer in the 1940's. He saw the gravity model as being too deterministic in nature and so introduced some sociological variables. By studying migration within the United States, he observed and stressed that there was no deterministic relationship between migration and distance as used in the gravity model

The model states that the number of persons or people migrating a given distance would be proportional not to the size of the population existing at that distance but to the number of opportunities existing at that distance. In other words, the number of persons migrating a given distance is directly proportional to the number of opportunities at that distance and inversely related or proportional to the number of intervening opportunities between the origin and destination. Fielding (1974) noted that for some categories of movement, especially migration, the mass or size of centre, distance to attracting cities is not as influential as are intervening opportunities. The more opportunities that exist nearly,

the less attractive are distant opportunities. Migrants would be constrained not by the distance separating them from those opportunities, but by the number of opportunities they had to pass up in order to get to them. In effect, this model introduces and incorporates psychological consideration, that is, perception of distance and opportunities more explicitly than does gravity model. The model is mathematically stated thus:

M= DX/x ---------- Equation 2

Where M number of migrants travelling a given distance, Dx = number of opportunities at the distance, and X as the number of opportunities intervening between the origin and the opportunities at the distance.

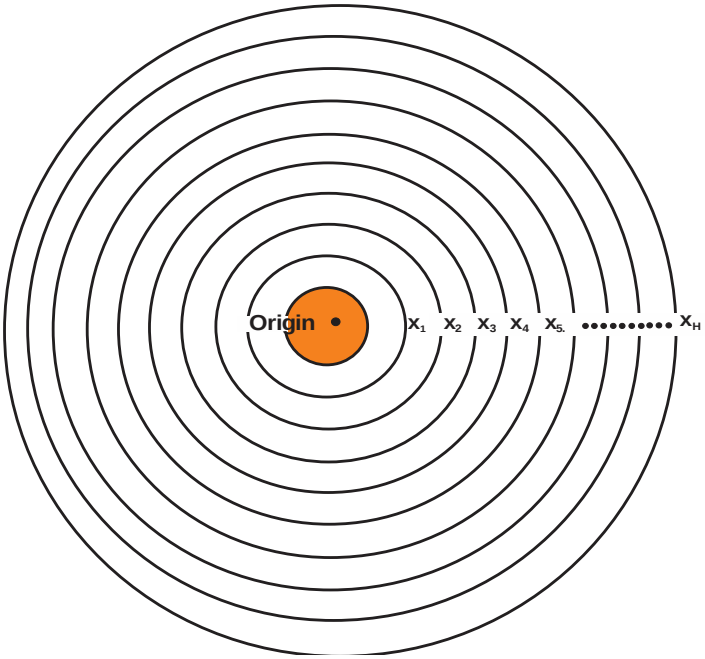


Fig.4 Spatial Structure of the Intervening Opportunity Model (IOM)

If the opportunities are calculated from a given centre or origin outward, they would appear as lying in distance bands or concentric circles outward as in fig 4 above. The intervening opportunities lying between the origins and the farthest destination are therefore expressed as X_1, X_2 X_3 X_4.. X_n

Intervening opportunity model has been widely tested by many scholars and yielded positive results. The model can therefore be used not only in migration studies, but for explaining distance-decay involving movement. Introduction of probability concept makes the intervening opportunity less deterministic as the gravity model. The closer the probability is to I or unity, the greater the chances that a given opportunity will not be passed up. For instance, if the probability is 0.5, that is less than I, then there is Fifty-fifty or equal chance that the opportunity will not pass up or undermined. But if the probability is 0.75, there is 75% chance that the opportunity will not be passed up (Mmom, 2011).

Against this backdrop, several factors tend to determine the probability value, and some of these are nature of opportunities, density of opportunities and purpose of the movement. One of the major factors is the amount of variance between opportunities. If the opportunities on the way are the same or homogenous, there is higher chances that the traveller would not pass up the opportunity. In fact there would be justification or reason for the traveller to proceed beyond the nearest opportunity. But if on the other hand, the opportunities vary, that is, heterogeneous, there is high probability that the traveller would go further by passing the nearer opportunities in order to increase his satisfaction. In other words, the more heterogeneous the various opportunities are, the more likely that the traveller is to expect that he will gain by travelling farther. Summarily, where opportunities are homogenous, the probability is

equal to 1 and as the opportunities become more heterogeneous, probability becomes smaller.

The next determinant is the density of the opportunities. There is need to scale or balance the satisfaction to be derived by travelling long distance to better opportunities against the cost of getting there. The greater the distance between opportunities, the less likely a traveller would pass up or by pass a given opportunity. Therefore, given a fairly uniform distribution of opportunities in general, a reduction in the unit travel costs (Time & Money) would mean that a more distant opportunity would seem more attractive.

Finally, the purpose of the trip the traveller is making will affect the probability factor. Trips may be multi-purpose or single-purpose. Single purpose trip may be highly specific and the probability is equal to 1, which implies that the traveller may not satisfy his needs. The purpose of the trip is mirror image of the nature of opportunities, that is, homogeneous and heterogeneous opportunities. Thoman and Corbin (1974) affirmed that the heterogeneity of opportunities and the specificity of trip purpose are mutually determined. If we consider the maximum opportunity heterogeneity to exist when all opportunities are different and the maximum specificity of trip purpose exist when it can be satisfied by one category of opportunities only, then the probability in both cases would be equal to one zero.

Economic Rent

The concept of Economic Rent was first brought to lime light by David Richardo in 1817. He perceived rent as the payment for use of things which could not be produced. In fact, he noted that the rent yield per unit of land is equal to the excess returns from using the land over the least fertile land. In effect, Richardo's concept of economic rent was based on the intrinsic characteristics of land

(site). More fertile land yield high economic rent than least fertile land. For instance if Chyke's farmland produces 50 tons of maize and sold at N1,000 per ton, totalling N50,000 and if his expenses (cultivation/harvesting cost and living expenses) equal N20,000, then Amadi's rent is N30,000.00. On the other hand, if Igwe's farmland produces 30 tons of maize and sold at N1,000 per ton, totalling N30,000 and if he expends N20,000, his rent would be N10,000.00. Thus, it implies that Chyke's land yields more economic rent than that of Igwe. In effect, what leads to this variation in rent is as a result of the quality of such land (fertility) and not their location.

However, while David Richardo was developing his theory, Von Thunen was doing so in Germany, but looked at Economic Rent from a geographical perspective. He considered one of the most spatial variables (distance) in influencing land value, use, agricultural structures as well spatial economic systems. Von Thunen did not only consider the site (intrinsic characteristics of land) but the situation (relative location) in determining its rent. The distance between a land where productivity takes place and the market (place of consumption) has impact on the cost of production as well as the net returns. In other words, the closer a land (production activities) is to the market, the greater the savings on transport. In effect, Von Thunen defined his Economic Rent as the net value of returns generated by a given land use over a given period of time. This net value of returns is the residual income after all costs of production, except the cost of land are deducted from the gross income. In other words, it is the surplus return accruing to a piece of land because of its more favourable location over another piece of land (geographic rent). This is mathematically stated thus:-

$$R = P.\ Q-(Pc + Tc)$$ ----------Equation 3

Where R = Rent, P.Q = Gross Revenue; PC= Production Cost, TC Transport Costs. Although Von Thunen's idea was formulated in an agricultural situation (context), it is of serious significance to spatial analysis generally,

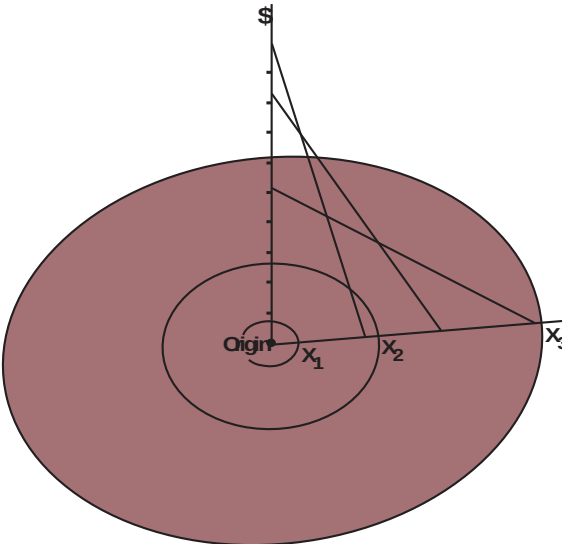


Fig. 5 Economic Rent graph (The down slope of the graph shows reduction in rent with increase in distance)

The Von Thunen Agricultural Landuse Model (1926)

Johannes Heirich Von Thunnen was one of the earliest location theorists who sought an explanation for the variation in agricultural landuse. His main aim was to discover the laws which govern the prices of agricultural products and their spatial arrangements within an area presumed to maintain no trade connection with the outside world and surrounded by wilderness (Ebong & Animashaun, 1992). He was a German agriculturist who at the age of 27 acquired his own agricultural estate, Tellow, near a town of Rostock on the Baltic Coast of Germany. He farmed on this estate for about forty years

during which he gathered some useful data that enabled him put forth his major publication, titled “The Isolated State”.

Assumptions

Like every location theorist, Von Thunen made the following assumptions to simplify reality.

i. The existence of an ‘Isolated State’ cut off from the rest of the world and surrounded by wilderness.
ii. The domination of the state by a single large city located at the core of the state with a single large urban market.
iii. The setting of the state in an isotrophic space, that is featureless plain with equal soil fertility, terrain and movement ease equal in all directions from the central city market.
iv. The farmers are both producers and marketers themselves. In other words, there are no middlemen, the farmer produces, pays the same amount as transport for their produce, and moves his produce to the market in exchange for industrial goods.
v. All farmers have profit maximization as their goal and there are no external economies of scale and complementary production (Haggett,1977) postulations.

POSTULATIONS

Based on these assumptions and his idea of economic rent, he postulated as follows:

i. That landuse vary in intensity, commerciality, and products as the distance increases away from the central city market.
ii. Farming in the vicinity of the city centre often appear to be more highly capitalized, technically sophisticated and associated with higher median income than farming at the distance from the city central market (Cox, 1972)

Thus, landuse pattern takes the form of concentric ring around the central city market. Each concentric ring has its own type of farming

which is determined mainly by cost of transport, weight and possibility of products.

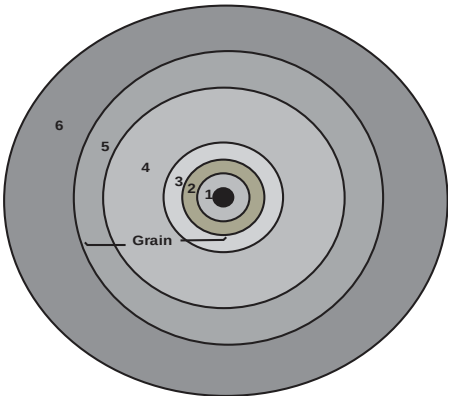


Fig. 5 Von Thunen's Concentric Rings

Ring I = intensive dairy farming, truck gardening (production of perishable products) variables, etc. 2 – wood cutting (forestry) this was due to the high demand for wood – as well as the high cost of transporting them to the city centre 3- extensive agriculture 4 – ranching. 5 and 6 are waste land. The intensity of landuse decreases with increase in distance from the central city.

Farmers attempt to maximize profit through the market values of their product (cost of production + transport cost-total revenue). Von Thunen therefore argued that the activity which yields the highest economic returns displaces other competing activities which are consequently made to occupy other pieces of land where they yield the highest economic rent or where they yield the highest net returns. Von Thünen concluded that the cultivation of a crop is only worthwhile within certain distances from the city (transportation costs would be higher than sales price). Von Thünen also advances the function of *location rent* - potential profit of the producer in certain conditions. A product (service) will be produced at a specific

location where the location rent is the highest. Other aspects of location are the product´s perishability and its weight.

Many scholars all over the world have validated this concentric ring model. For instance, Prothero (1957) studied landuse around Soba, a nucleated village in southeast Zaria, Nigeria and confirmed the existence of zoning. However, his model has suffered some criticisms. Firstly, his isolated state, which assumes a close system in a single city function without contact in any other settlements, seems inconsistent with modern experience. If a road cuts across the state from that central city, landuse pattern changes.

In fact, the concept of isolated state is very abstract and far from reality. Secondly, the concept of isotropic space is too ideal to occur in any region. Thirdly, there are other factors which affect agricultural landuse in reality (physical environments, crop combination, economies of scale, level of development, innovation diffusion, etc) that are not introduced. Fourthly, existence of many markets within a region could complicate landuse pattern. Fifthly, the concept of economic rationality of all farmers is unrealistic.
Finally, political policy as an element of inter-regional trade could influence landuse pattern.

Despite the criticisms and many simplifications, this model has proved that agricultural production is the function of distance from the market.

Central Place Theory- Walter Christaller (1933)
Central place theory was developed for the purpose of providing an explanation to the spatial organization of settlements in particular, their relative location, number, size, function and distribution. Walter Christaller is reputed and acknowledged as being the first Geographer to construct a general and purely deductive theory of settlement. Considering the crystallization of mass about a nucleus

as part of the elementary order of things, he posed a number of basic questions concerning the general principle underlying optimal human settlement. Although the generic term central place was originally employed to denote urban agglomeration, the theory is generally concerned with the full array of human settlements, ranging from hamlet to a megalopolis (Ebong & Ammashaun, 1992).

The conceptual basis of this theory is the idea of centrality, which refers to the degree to which a settlement services its hinterland with goods and services. In other words, it is the relative importance of settlement to its complementary regions. Walter Christaller made the basic assumption among others to simplify reality:

i) An isotrophic surface that guarantees movement ease in all direction in the area:
ii) Even distribution of population
iii) Equal purchasing power of the population.

He regarded central places in terms of their relationship with one another; thus discovering how the spatial organization of the place follow a hierarchical pattern which ranges from centres of highest order down to the lowest order places. He also hypothesized that centres provide functions which cater for the area from which to derive sufficient revenue. Thus, an interlocking lattice of market areas emerge (Theoretical hexagonal systems).

A higher order central place performs higher order functions. In fact, it performs varied functions of its hierarchy and that of the lower order settlement. Lower order settlement on the other hand performs only the functions that are limited to its size in the hierarchy. Two major principles are at play in his theory, that is, the principle or concept of Threshold and Range. Threshold refers to the minimum population requirement of any centre to provide certain level of

goods and services. In other words, it refers to the minimum population purchasing power required to make any activity viable at the centre. The range concept on the other hand refers to the maximum distance people are willing to travel to obtain services provided at a centre. From these two concepts the lower and upper limits of goods or services can be found. With the upper and the lower limits, it is possible to see how the central places are arranged in an imaginary area. Mmom (1998) noted that range poses a barrier depending on the essentiality of the goods and services and the absence or presence of intervening opportunity. Where there are no close substitutes, people would be willing to travel any length for such services especially medical services.

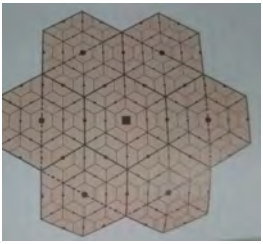
Walter Christaller's theory has been used as a tool for rural planning. For example in an area or region with many small sized dispersed rural settlements, it is not realistic that goods and services can be provided for all because of the cost implications of such decision. In this case, what is done is to identify central places and locate these central facilities in them. These are focal point and rallying points of the population of their hinterlands or complementary region.

Ojo (1973) applied the model in accounting for the settlement patterns, size, distribution and types found in the rainforest of Southern Nigeria. The central place order depends on the number of different goods and services it offers

In conclusion, Christaller noted that settlement vary in size and hierarchy as well as the functions they perform. Settlements that are of the same hierarchy are evenly spaced. For example centres like Lagos, Port Harcourt, Kano and Abuja are of the same hierarchy and are evenly spaced apart. The higher the position of a settlement in the hierarchy, the larger its function in the provision of goods and services to its complementary region.

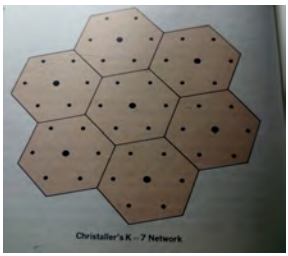
A Central Place is a settlement which provides one or more services for the population living around it. Simple basic services (e.g. grocery stores) are said to be of low order while specialized services (e.g. universities) are said to be of high order.

Having a high order service implies that there are low order services around it, but not vice versa. Settlements which provide low order services are said to be low order settlements. Settlements that provide high order services are said to be high order settlements. The sphere of influence is the area under influence of the Central Place and as transport is equally easy in all direction, each central place will have a circular market area as shown in the following diagram:



K=3 Network

K=4 Network



K=7 Network

However, circular shape of the market areas results in either un-served areas or over-served areas. To solve this problem, Christaller suggested the hexagonal shape of the markets as shown in the above

diagram. Within a given area there will be fewer high order cities and towns in relation to the lower order villages and hamlets. For any given order, theoretically the settlements will be equidistance from each other. The higher order settlements will be further apart than the lower order ones.

Christaller noted three different arrangements of central places according to the following principles: 1. The marketing principle (K=3 system); 2. The transportation principle (K=4 system); 3. The administrative principle (K=7 system).

The following diagram shows the arrangement of the central places according to the marketing principle. There are three (3) orders of central places. (note: there can be many orders of settlement.) (a) First Order service centre providing first order services (b) Second Order service centre providing Second Order Services. (c) Third order service centre providing third Order Services and the different orders of settlements arrange themselves in a hierarchy.

Generally speaking, the lower the order, the larger the number of settlements and the higher the order, the greater the area served. If the arrangement of the settlements is according to the principle k=3, the theoretical number of settlements will progressively divide the previous order by 3 as shown in the diagram. One high order central place is serving three (including itself) of the next lower order central places. The relationship of the market area between a lower order centre and the centres of the higher level can also be indicated by the value 3.

In the transportation principle, Christaller pointed out that the marketing principle is an awkward arrangement in terms of connecting different levels of the hierarchy. As an alternate arrangement, Christaller suggested that central places could be organized according to what he called the transport principle. The

traffic principles states that the distribution of central places is most favourable when as many important places as possible lie on one traffic route between two important towns, the route being established as directly and as cheap as possible. The more unimportant places may be left aside. According to the transport principle, the central places would thus be lined up on straight traffic routes which fan out from the central point. When central places are arranged according to the traffic principle, the lower order centres are located at the midpoint of each side of the hexagon rather than at the corner. Thus, the transport principle produces a hierarchy organized in a k=4 arrangement in which central places are nested according to the rule of four.

In the K=7 system, also known as the administrative principle, no central place occurs at the boundaries of hexagon and thus there is no division of central places. This is required by the system objective; namely, the unequivocal administrative control which would clearly not be achieved by the division of central places. This is achieved by reorienting the hexagonal areas of each level of administrative control containing the central places within that area and six (6) dependent central places of 1,7, 49,343... up to the 7^{th} order (Thoman and Corbin, 1974, Ebong and Animashuan, 1992)

Some of my researches and contributions to knowledge

Mr. Vice Chancellor Sir, distinguished Ladies and Gentlemen, I have come this far by faith, leaning on the Lord. It's not by power, neither is it my might, but by the spirit of God. The race is not to the swift; neither is the battle to the strong, but time and opportunity happen to them all (Ecl. 9:11).

I have contributed to knowledge with over 65 academic/research publications in referred journals with high impact within and outside this country as well as many technical reports. In 2001, I attempted to apply the Growth Centre and Central Place theories in identifying

Rural Service Centres (Central places) which could serve as centres for the location of shared development facilities in Etche Local Government Area (LGA) of Rivers State. Using connectivity and accessibility indices I identified three of such Centres which could be used as rural growth points in the LGA and this was published in the **Rivers Journal of the Social Sciences,** Vol. 5, No.1&2, Also, I researched on ways of promoting accessibility of Development projects for the transformation of the rural oil producing areas of the Niger Delta. Realizing that development projects by Oil Trans-national Corporations were indiscriminately sited without recourse to their accessibility to the people, thus leading to their failures to transmit development impulses, I used accessibility measures (Shimbel's connectivity index) and local people's perception of centrality to identify Central Places in three LGAs of Rivers State as suitable sites for location of rural development projects, This research was published in the **Nigerian Journal of Research and Production** in 2013.

Distinguished audience, as an Ikwerreman, I was worried about the rapid urbanization of Port Harcourt City and the implications of this development on my people. Thus, in 2005, we, Late Dr. W.W Nnah and I studied the impact of Urbanization of Port Harcourt City on the Rebisi people, the aborigines (Indigenous people) of Port Harcourt. Our study found out that the indigenous people are disadvantaged in the urbanization process. They have lost their economic base (land) as well as their cultural identity due to urbanization. Thus, there is need for deliberate efforts by government to integrate the plight and interest of the people in urban planning process for sustainable development. This work was published by **African journal of Interdisciplinary Studies,** 6(1 & 2)

Observing the rate of change in urban Landuse within and around floodplains of Port Harcourt Metropolis, **Mmom,** Wizor, and Nwankwo-ala (2008) studied Landuse Change on Urban Floodplains to ascertain the level of acceptability of the risk**.** We discovered that the disaster risk of this change was high, but the perception of the risk varied with residents and property owners in these highly susceptible areas. The risk people are exposed to in course of developments on urban floodplains was discovered to be as a result of lack of awareness of Government's minimum development standards, desire to maintain social ties, centrality of these locations, and in some cases relatively cheap cost of purchase of land in these areas. In effect, lack of adherence to/ implementation of planning regulations and minimum development standards have led to change in landuse on floodplains; thereby increasing the risk of urban flooding as experienced in Port Harcourt City. This research was published in the **Journal of Nigerian Environmental Society, Vol. 4, No. 2**.

Distinguished audience, I had earlier described myself as Prince of many interests and Master of some. In 2009, I studied the rate of decline of biodiversity in the Niger Delta and observed a rapid and steady decline in biodiversity which is a threat to the survival of humankind in the region. In my studies, I extolled the values of biodiversity in life sustainability and highlighted the rate of loss of biodiversity as well as identified the major causes of biodiversity loss in the region. In the paper published in 2009 in www.environmental experts.com, I considered the prospects of biodiversity conservation in the face of economic hardship and over dependence on biological resources. Thus, I concluded with the assertion that the continuous survival of mankind is hinged on the continuous availability of biodiversity based on their conservation and management.

Similarly, **Mmom** and Deekor (2010) studied the changing cropping systems in the Niger Delta and its impact on agro-crop diversity in the Niger Delta. In our findings, agricultural landscape of the upper Niger Delta displayed homogeneity (mono-cropping) as against the hitherto multi-cropping thus implying a change in cropping systems with serious implication for agro-crop diversity. The result of this is the rapid loss of indigenous species of agro-crops as well as their potential values. The paper therefore called for government intervention in agro-crop conservation, as market forces may not allow farmers to engage in the conservation of these threatened agro-crops diversity. Sustainable agricultural development may be illusive if these indigenous crops species are allowed to go into extinction. This study was published in the **Port Harcourt Journal of the Social Sciences,** Vol 1, no 2.

Mmom and Arokoyu (2010) studied mangrove forest depletion, biodiversity loss and traditional resources management practices in the Niger Delta and published it in **Research Journal of Applied Sciences, Engineering and Technology. United Kingdom**. 2010 Vol. 2, Issue. 1**.** Our study highlighted the rate of deforestation and exploitation of forest resources as a principal factor to biodiversity loss in the Niger Delta. Thus, it evaluates the traditional resource management practices of the local people to ascertain it viability for use in biodiversity conservation efforts in the Niger Delta. Traditional Resource Management practices were therefore discovered to be a viable option for resource conservation in the region. We therefore recommended that, conservationist should focus on exploitation of traditional knowledge systems of the people for sustainable biological resource management and development.

In 2011, **Mmom** and Chukwu-Okeah studied Impact of Drilling operations on Forest Resources in Obagi, Niger Delta and published our findings in **Research Journal of Applied Sciences,**

Engineering and Technology, United Kingdom. Vol. 3 no 5. The paper identified and evaluated the changes that have taken place over time on the forest resources of Obagi area owing to drilling operations using GIS as a tool. We observed and examined the damages to forest resources in the area and linked the changes to oil exploitation activities/ operations of the oil Trans-nationals in the area. We therefore advocated for more environmental friendly operations with a need for conservation of the endemic species in the area by the oil companies in the area for sustainable development.

Mmom and Mmom (2011) studied environmental sanitation and public health challenges in a rapidly growing city of the third World: the case of Domestic Wastes and Diarrhea incidence in the Greater Port Harcourt Metropolis, Nigeria, published in the **Asian Journal of Medical Sciences. UK/ Pakistan. Vol. 3 no 3.** With our focus on assessing environmental challenges of rapidly urbanizing cities of the third world, we identified diarrhea incidence as a health risk in Port Harcourt City and thus tried to measure their prevalence and comprehend their spatial distribution. We discovered a close nexus between urbanization, sanitation and public health. Public Health problems linked to urban growth are current major concerns of developing countries. This study therefore highlighted the incidence of poor sanitation related ill health as a consequence of rapid urbanization of Port Harcourt city.

Mmom and Deekor (2011) assessed the effectiveness of land farming in the remediation of hydrocarbon polluted soils in the Niger Delta and published in the **Research Journal of Applied Sciences, Engineering and Technology, United Kingdom. 2010, Vol. 2, No 7**. Land farming, otherwise known as remediation through enhanced natural attenuation was evaluated to ascertain its efficacy in reducing the hydrocarbon content of polluted soils with crude oil in the Niger Delta. We carried out pre-test and post-test

analysis on crude oil contaminated and treated sampled soil in B-Dere in Gokana Area of Rivers State. The contaminated soil was treated using animal faecal materials mixed with sawdust for a period of 9 weeks after which soil samples were collected and taken to the laboratory for analysis. Result of the analyses of samples showed a significant reduction in Total Petroleum Hydrocarbon (TPH) & Polycyclic Aromatic Hydrocarbon (PAH) in the soil after remediation. Thus, the authors conclude that land farming is an economical and effective technique capable of being used in remediation of hydrocarbon polluted sites in the Niger Delta.

Mmom and Igwe (2011) examined Nigeria stakeholders' perception of environmental offset as mitigation measures and its' implication for sustainable industrial development in Nigeria published in the **Current Research Journal of the Social Sciences. United Kingdom . 2011, Vol. 3 Issue, 4**. Environmental offsets are those conservation efforts aimed at mitigating residual impacts arising from any developmental projects. It is an emerging concept in environmental impact assessment to ensure 'no net loss' of biodiversity. We therefore assessed Nigerian stakeholders' perception of the workability of the use of offset in impact mitigation in Nigeria. Our findings show that most of the stakeholders doubted the workability of offset in Nigeria based on inconsistencies in government policies. The time lag between impact manifestation and achievement of offset result is so wide that a project may even be decommissioned, yet offset is not achieved. However, we advocated application of offset to mitigate the residual impacts of development projects.

My interest migrated to environmental consequences of sand mining in 2012. Therefore, **Mmom** and Chukwu-Okeah studied sand dredging and river morphology change along parts of New Calabar River in Akpor Area of Rivers State, Nigeria: implications for

biological resource conservation. We observed that sand dredging has been a major economic activity taking place in most parts and tributaries of the New Calabar River. We therefore assessed the environmental consequences of sand dredging, especially as it affects the river morphology. Down-cutting of the river bed was identified as a major consequence of sand dredging, land loss due to land sliding was equally observed. The increase in velocity of the river has posed threat to aquatic life, thus leading to loss/migration of aquatic biodiversity/ biological resources in the area. It was therefore concluded that unabated/ uncontrolled dredging activities in the area would in no distant time be detrimental to rivers management systems as well as future values of biodiversity in the area. We thus, advocated for proper monitoring of in-channel sand dredging activities to save the physical environment from collapse, as well as save the socioeconomic life of the affected people. This work was published in the **Research Journal of Environmental and Earth Sciences 4(1) UK**.

As part of my academic exploits, landuse and land cover change was studied. Thus, in 2013, **Mmom** and Fred-Nwagwu published in Global Advanced Research Journal of Geography & Regional Planning, analysis of Land use/Land cover Change around the city of Port Harcourt, Nigeria 2013 Vol. 2(5)**.** Landuse and land Cover change have become a central component in current strategies for managing natural resources and monitoring environmental changes. Landuse and land cover of region is a reflection of the level of development in a region on the one hand, and the level of development influencing landuse and land cover on the other hand. However, the pattern and trend in this change in Port Harcourt city is not properly documented in the literature. Therefore this study was instituted to analyse the extent and trend of landuse/ land cover change within and around Port Harcourt City. Using satellite imageries of 1986-2007 and GIS as analytical tools, the paper

discovered a significant change in landuse / land cover change in Port Harcourt city and environs which is basically as a result of rapid urbanization and other anthropogenic activities. More significantly, is the decline in agricultural land and rise in built-up areas. Thus, if the decline in agricultural land remains unchecked, in the nearest future food production would be a serious challenge and rural livelihood would negatively be impacted. The paper therefore recommended proper landuse planning and enforcement of development control to forestall the negative environmental and socio-economic consequences of landuse and land cover changes.

The proliferation on un-engineered landfills around the city of Port Harcourt attracted my attention, so **Mmom** and Mbee (2013) studied impact of landfill sites on real estate values in Port Harcourt Metropolis and published in the **Journal of Humanities & Social Sciences** Vol.10, (6). A total of 2000 real estate within 500 metres radius from landfill sites were identified and about 600 property owners/agents representing 30 percent of the entire real estate owners were sampled for study. The study observed that there is low pricing of property contiguous to landfill. In most cases; people are less willing to live or acquire properties near landfill locations. Thus property owners near open pits get scared of development for fear of such pits metamorphosing to landfills. Similarly, occupants are unwilling to rent houses near landfill sites thereby demeaning the value of such real estate. In the light of the findings of this study, the paper recommended that government should be proactive in waste management through integrated waste management. Landfills should be properly managed and open pit landfill should be replaced with engineered landfills as to reduce the nuisance of these wastes on the immediate surroundings.

Mmom and Aifesehi studied the impact of 2012 flood on water quality and rural livelihood in Orashi province of Niger Delta,

Nigeria and published in the **Journal of Geography & Geology,** Canadian Centre for Science & Education, Vol.5 (3) 2013. With a focus on six communities in the Orashi province of the Niger Delta, which was one of the worst hit by the 2012 flood? Water samples were collected and subjected to both physico-chemical and microbial analysis against WHO standards. The result shows that the various water samples came short of the WHO Standards for safe water. Thus it could be deduced that the 2012 flood triggered damages not only to the life of individuals, properties/ infrastructure, but also most of the drinking water sources, especially, streams and the dug-out wells which were submerged in the event of the flood. The paper discovered that the flood incident seriously devastated the rural economy; farming, the major source of livelihood. The flood has made livelihood support difficult for the people of the area. Thus, community initiated mitigation measures should be promoted so as to strengthen community resilience.

Mmom and Mbee (2013) also studied population pressure and forest resources depletion in Gele-Gele Forest Reserve of Edo State, Nigeria and published in the **International Journal of Physical and Human Geography** (European Centre for Research, Training & Development) UK. Vol.2(1). The growing human population and the challenge of providing food for the teeming population have led to serious encroachment in national reserved areas. Our study found out that there is rapid depletion of the forest stock in the reserve due to activities of poachers who depend on these forest resources for survival. The result also shows that aside from population pressure, lack of indigenous people's participation in the conservation strategy has contributed to poaching and a major factor to depletion of the forest stock. Thus it is recommended that the local people be properly integrated into the planning stage of any conservation activity of the forest reserve. Government should possibly reduce the size of the reserve to a reasonably manageable size considering the

growth in the local population. Also, there is need for incentives to motivate the locales and empower them into investing in other ventures rather than depending on the proceeds from forest resource exploitation in the reserve.

Mmom and Ubokobong (2014) studied spatio-temporal variations in urban vehicular emissions in Uyo City, Akwa Ibom State, Nigeria and published it in the Journal **of Sustainable Development.** Canadian Centre for Science & Education.Vol.7, No.4. Vehicular emissions have been observed as a major contributor to increasing air pollution globally; in fact, increasing volume of road traffic and congestion have been reported in literature to strongly impact on air quality in most urban areas of the developing countries. We investigated pollution from automobiles during traffic peak periods at intersections on some selected roads in Uyo, Nigeria. It estimated the level of some selected air pollutants which are largely products of internal combustion in motor vehicle engines, namely: Nitrogen dioxide (NO_2), Carbon monoxide (CO), Sulphur dioxide (SO_2), and Hydrogen Sulphide (H_2S), in six sample locations. Monitoring of ambient hourly concentration of NO_2, CO, SO_2 and H_2S, took place at six major intersections in Uyo during morning and evening (peak traffic hours) and afternoon (off-peak hours), hence variations in concentration of these pollutants was determined. Emissions concentration for CO, was found to be higher during the peak periods due to traffic congestion and intersection, where long waiting time for vehicles were observed but however exceeded the Federal Ministry of Environment limits / standards. Also, the concentration of SO_2 was alarmingly high, especially in one of the locations. Levels of Nitrogen Oxides (NO_2) and Hydrogen Sulphide (H_2S) measured, varied in time and space and were also above the recommended municipal and international standards in all the six locations during the peak traffic period. This finding thus has implications for public health in the study area as such there is the

need to control emissions of these obnoxious air pollutants in the city.

As a research Advisor in Shell Petroleum Development Company (SPDC), I went into remediation of hydrocarbon contaminated soil. Firstly, I observed the slow rate of bio-regeneration of remediated soil and on the premise of my research of the bioremediation process; I designed a strategy for the re-use of contaminated topsoil after remediation. Through this strategy, remediated soils achieved increased bio-regeneration. This study in the SPDC was published in the ORP, SPDC Bi-weekly Bulletin, 2014. Also, hydrocarbon contaminated sites have been remediated and certified by regulatory agencies using reduction in Total Petroleum Hydrocarbon (TPH) as major criterion. My research has shown that there is deficiency in the use of reduction in TPH as major criterion to this extent, I am advocating for the use of biological indicators (vegetables) as additional index to measure remediation success. This has been proposed to Department of Petroleum Resources (DPR) at the 2015 Bi-annual Conference of DPR held in Lagos, Nigeria.

More so, I monitored bioremediation progress and crop safety on successfully remediated soils. To this end, I set up a study to determine the level of bioaccumulation of TPH and some heavy metals in vegetables cultivated on recently remediated sites in the END as to ascertain the health implications of consumption of crops cultivated on such sites. Four crops were cultivated on a recently remediated and certified soil (Okra, Melon, Pumpkin and Maize) and monitored on a weekly basis for a period of 12 weeks. After a period, only fruited pumpkin (*Curcurbita maxima)* managed to survive and samples of the leaves were taken to the laboratory for analysis. Result of the analysis shows low bioaccumulation of TPH, but high concentration of Cadmium and Nickel in the pumpkin leaves above the WHO/FAO standards. Thus it is concluded that

consumption of vegetable cultivated on recently remediated sites would have health implication as such cultivation of crops on such recently remediated sites should be discouraged. Since the rate of attenuation is dependent on the site and several factors (level of concentration, rate of degradation, climatic factors, etc), the paper therefore recommends a minimum fallow period of about 36 months to allow for further degradation of contaminants to reasonable level

Mmom & Igbuku studied the challenges & prospects of environmental remediation/ restoration in The Niger Delta, Nigeria with Ogoniland as case study. This study which was initially presented at the annual International Conference of Environmental Science and Technology, Houston-Texas, May 2014 was finally published in **Journal of Energy, Technology and Policy, UK. Vol 5, No.1**, in **2015.** The study discussed the various environmental remediation techniques adopted by Shell Petroleum Development Company (SPDC) in responding to the UNEP report in Ogoniland. It highlights the successes achieved so far by SPDC using these techniques. Combinations of Thermal Desorption, Fixation/ stabilization as well as bioremediation techniques (Land farming) were discussed in the paper and their effectiveness were also evaluated in the paper. Above all, the paper discussed the challenges faced by operating company in the area in achieving total clean up of Ogoniland as contained in the UNEP report and actions for operating company. Finally, the paper proffers probable strategies for enhancing effective restoration of the Ogoni environment.

Mmom, P C, Mohammed T & Kpang, M.T (2016) studied the spatial patterns and challenges of city farming in the rapidly urbanizing City of Port Harcourt. We were worried again by the projection that by the year 2050, 85 % of the world would be urbanized and what would be the implication of this development on food production. Irked by this, we tried to consider Urban

Agriculture or City Farming as a leeway out. Therefore we studied the spatial pattern and challenges of city farming in Port Harcourt City. We used GIS as a tool to map urban farms in Greater Port Harcourt City and found out that lack of formalization of this sector is a major challenge to its full development. This research was published in the Proceedings of the 57th Annual Conference of the Association of Nigerian Geographers in April, 2016.

Mmom, Ezekwe and Chukwu-Okeah (2017) studied Land Management Practices and the Yield of Cassava *(Manihot esculenta Crantz)* in the Humid Deltaic Tropical Environment of Nigeria and published it in the Agricultural Research & Technology: Open Access Journal 8(4): ARTOA. This study was poised to assess the potency of three land management systems in the yield of cassava as a test crop. This was done using the Traditional, (planting on the surface), Ridge and the Mound land management system. To achieve this, runoff plots were constructed with the size (5m x 10m) and fertilizer applied to the three treatment plots. The result of the study revealed that the ridge land management system had the highest yield accounting for 156 tubers of cassava which in turn amounts to 35.8t/ha as against the other two land management systems. The study therefore recommended that the ridge land management system should be adopted as a land management practice to increase cassava production which in recent time is a foreign earner and for increased production.

"Gas Flaring and Artisanal Refining in Nigeria: Environmental and Safety Implications," a paper presented at the 1st University of Port Harcourt International Conference on Bioethics Perspectives on Surrogate Motherhood and Gas Flaring, 19th July, 2018. In the paper, I discussed the politico-economics of gas flaring in Nigeria; oil bunkering and illegal refining of crude oil, environmental & safety implications of artisanal refineries and challenges of legalizing

artisanal refining (modular refineries). The paper therefore recommended more concerted efforts by the government to actualize the modular refineries with proper strategy for sourcing crude oil. Finally, implementation of National Gas Master Plan was seriously advocated for by the presentation.

Current research frontiers

Mr Vice-Chancellor, distinguished Ladies and Gentlemen, my current research interest is in the area of Disaster Risk Management. A disaster is not just the occurrence of an event such as an earthquake, flood, conflict, health epidemic or an industrial accident. A disaster occurs when a hazard exposes the vulnerability of individuals and a community in such a way that their lives are directly threatened or sufficient harm has been done to their community's economic and social structure to undermine their ability to survive without seeking external support. Nigeria at large and the South-South in particular, is in recent years experiencing increasing occurrence of both natural and man-induced disasters with consequent physical, economic and social displacement of our people. **Therefore, the desire to build capacity for disaster risk reduction and strengthening our resilience as strategies for sustaining development informed my new research focus.**

Concluding Remarks

Mr. Vice-Chancellor Sir, this critical question appears again: **Is there Order in Disorder?** The answer is **YES**. The forgoing discourse on the various models and theories shows that there is an underlying force behind the structure and pattern of human organization of space. The principle of locational rent determines the demand for land in central locations because of high accessibility as such affects land value and landuse types around such areas. This explains the high cost of buying swampy land in GRA, Port

Harcourt, despite the huge labour and financial burden of sand-filling and compacting before buildings are erected.

The growth pole theory, cumulative causation model, gravity model and intervening opportunity explain the process of uneven development pattern in a region. Their applications give explanations for the unbalanced growth and development in a region. Thus, you can see why certain urban areas grow faster and larger than the others and have the tendency to grow more at the expense of their hinterlands. Development is not and cannot be evenly spread across a region at the same time; it certainly has to start at some points and spread later to its complementary region.

Walter Christaller's Central Place Theory can be used to explain the reasons for the stunted growth of towns such as Ahoada, Degema and Calabar as against newer/more recent cities like Port Harcourt. Cities or settlements of the same size/hierarchy are spaced apart; you can see Lagos in the far west, Kano in the North, Port Harcourt in the South here and even the more recent city of Abuja in the middle of the country. Thus, if the natural economic forces are allowed to continue to determine the development process, then, Calabar, Ahoada and Degema, including Yenagoa towns may never grow beyond their snout and can never be as large as Port Harcourt. Thus, a deliberate effort is required to create additional order and bridge the development gap between these cities and their contiguous hinterland and which is one of the main goals of Regional Planning. Therefore, environmental planners, applying these geographical concepts, such as accessibility, could identify potential growth centres of lower order around the regional space and locate developmental projects as to trickle down development impulses from the centres to the peripheries. It is believed that locating such projects at these growth Centres would foster a balance in development within regions.

Recommendations

Mr. Vice-Chancellor Sir, distinguished audience, University of Port Harcourt relocated to Choba in 1976. Since then till now, other contiguous communities such as: Ozuoba, Aluu, Alakahia, Rumuoparaeli, Rumuosi, Rumuekini, Rumualogu and even Nkpolu : have witnessed some kind of growth and development. However, development has not crossed the bridge of the New Calabar (Choba) River towards Emohua. Why has this been the case? I shall NOT attempt to answer this question using this medium, but shall simply call on the University management to establish the Faculty of Environmental Sciences to be made up of Departments of: Geography & Environmental Management, Geo-information Science, Disaster Risk Management and Development Studies, Land and Quantity Surveying, Architecture, Building Technology, and Transport & Logistics Management. Through collaborative research efforts of these disciplines, we shall demystify/unravel some of these mysteries/challenges to our development and ensure Order in our seemingly Disordered Space.

Mr Vice-Chancellor Sir, and distinguished Ladies and Gentlemen, I have paid my dues, so let the drums be rolled out with Lucky Dube- "... back to my Root.

Muchos Gracias!

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