Introduction

Mr. Vice-Chancellor, Sir, it is with an overwhelming sense of gratitude to the Almighty God, the Father of our Lord Jesus Christ, that I stand in good health and sound mind before this eminent gathering of University Principal Officers, Provosts, Deans, Heads of Departments, Royal and Spiritual Fathers, family members, teachers and mentors, colleagues, staff, students and well-wishers to deliver the 393rd lecture in the series of Inaugural Lectures of the Obafemi Awolowo University. This 393rd Inaugural Lecture of the Obafemi Awolowo University, Ile-Ife, is the 6th in the Department of Botany. Incidentally, three of the first five inaugural lectures from the Department had been from the unit of Plant Ecology; the other ones are from Plant Physiology and Plant Taxonomy. I appreciate God that my inaugural lecture today is the fourth from Plant Ecology unit of Botany Department. I thank the Almighty God for this day.

Mr. Vice-Chancellor, sir, distinguished ladies and gentlemen, my career adventure into the field of Botany was a true manifestation of the fulfillment of the divine purpose of God in my life. I never dreamt or thought I would ever be an academic. But by divine providence, I became one and today, I stand before you to render an account of my little contribution to knowledge. I give all glory to the Almighty God for this day. The steps of the righteous were ordered by God and so were mine. It was not by accident that I studied Botany and my choice in this regard was deeply rooted in my desire to be a Biology teacher in a secondary school. When my friends and classmates were applying for courses like Medicine and Pharmacy, I applied to study Botany. When many of us in Biological Sciences in Part One were applying for a change of course at the end of our first year, I did not apply because I had made up my mind to be a Biology teacher in a secondary school.

In my first year (1978) during my undergraduate studies here in the Department of Botany of the University of Ife, now Obafemi Awolowo University, all students in Part One in the university did the same Elementary Mathematics I & II (MTH 101 & MTH 102) in Harmattan and Rain Semesters respectively in 1978/79 session.

My performance as a Biological Science student caught the attention of the then Head of Department, Professor Abayomi Lawanson (now late) and was surprised that I did not apply for change of course like others despite my very good performance. On resumption to the new session in the second year (1979/80), he called me to his office and asked why I did not apply for a change of course. My response then was that I desired to be a Biology teacher in a secondary school after graduation; this surprised him. He encouraged me to keep it up and said if I could maintain the standard, he would guide me and ensure that I would finish a semester ahead of my colleagues and become a Botany teacher in this University and not in a secondary school. This was a motivation for me and he kept to his word, mentored me and I completed the degree program in seven semesters (February 1982) rather than the normal eight semesters (June 1982). This was the first of its kind in the history of this university. In September 1983, I returned to the University to study Plant Ecology at the Postgraduate level and I was employed as Graduate Assistant on September 29th, 1983. This was the beginning of my story in the academics.

Mr. Vice-Chancellor, sir, an Inaugural Lecture is an occasion of significance in the career of an academic and a core university tradition worldwide. There are two school of thoughts on the delivery of Inaugural Lecture. For the first school of thought, it is an opportunity for newly appointed Professors to present a public lecture relating to their field of study to mark their appointment/promotion. According to the other school of thought, it is a platform for a Professor, not necessarily a new one but a public servant, to profess his/her expertise, thereby giving an account of his / her stewardship or contribution to knowledge to the university community. Mr. Vice Chancellor, sir, I belong to the latter class. I have carefully x-rayed my research trajectory till date, spanning more than four decades based on the experience garnered over these years in the forests and I have chosen to speak on the topic which aptly describes the nucleus of my academic

voyage – "**Biodiversity Conservation and Management: Roles of the Children of Adam and Eve."**

Ecology as a Field of Science

The science of ecology is generally viewed as a discipline that studies interactions/relationships between individual organisms or systems and their environments**.** I am concerned with natural systems and have been studying organisms in their natural abodes or what we call habitats. The environment was described as the global issue of the year in 1970 when concern was building up about man's fate as he desecrated his surroundings and source of livelihood. The environment has played significant roles in the earth's biological history through its role in natural selection and other evolutionary processes. Man has always had an interest in the environment, but this interest centered on what man can get out of it, especially food, medicines, shelter and energy.

Ecology also borrows from the biological fields of taxonomy, physiology, morphology, genetics, and the physical sciences.

Vegetation, the object of my study, which is the creation of the third day (Gen. 1:11-12), could be defined as the assemblage of plants in the waters, land, and air in a given area. Ecology deals with (i) individual plants, (ii) a population and (iii) aggregations of populations and communities. The overall aim of ecology is human survival and the field is of ever-increasing relevance as man continues degrading his environment.

Tropical Environment

Ours is the tropical environment, geographically that part of the world mostly lying approximately between the tropics of Cancer and Capricorn (23^0 North and South of the Equator respectively) (**Fig.1)**. This area is characterized by very small variations in day lengths throughout the year, rains that come mostly during the period of long days (summer) and during period of shorter days (winter). Seasonal temperature variation is small. As a Plant Ecologist in tropical area, I carried out my investigations as a natural scientist, hoping to contribute to our understanding of the

world around us and provide information to applied scientists for use in technological applications and for us to benefit more from the biological resources around us.

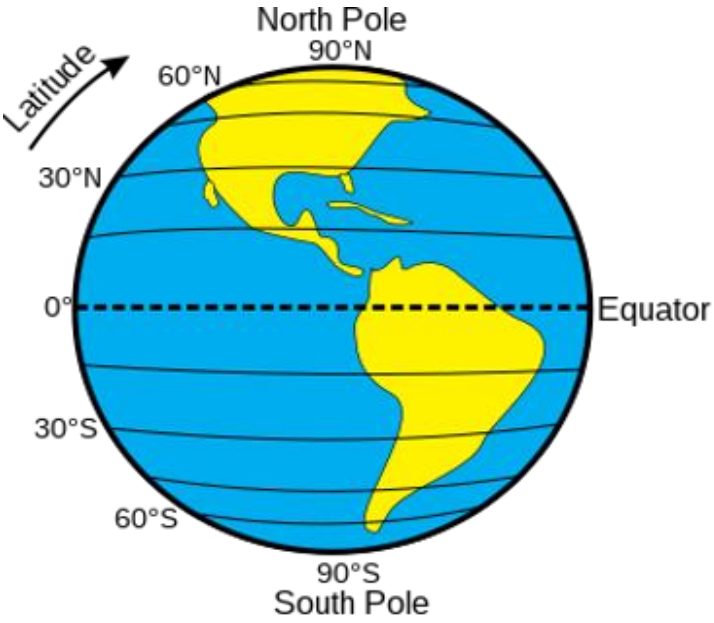

Fig. 1: The Earth or the Globe

Forest Ecology

Forest Vegetation.

The forest is a type of vegetation consisting predominantly of woody plants (trees, shrubs, herbs and climbers) and from which grasses are virtually absent (Hopkins, 1974). Forests contain resources upon which the lives of most African countries depend. Forest products are harvested for food, raw materials, medicines, fodder, house construction and handicrafts. These products make people living within forest areas depend so much on forests. In terms of broad ecological zonation, Nigeria has forests in the

south, and savannas in the north, occupying about 20% and 80% of the land area, respectively. A large and growing proportion of these forests has been and is being affected by major disturbances, anthropogenic and natural.

Over the years, I started my ecological studies in the Nigerian Forest Zone and research activities as a Plant Ecologist focused on Biodiversity- its conservation and management in the Tropical ecosystem.

Biodiversity

The term "biodiversity" (formed by joining "biological" and "diversity") refers to the great number and wide variety of organisms in the world: plants and animals, including humankind. The tropical rainforest is Earth's most biologically diverse terrestrial ecosystem (Gillespie *et al.,* 2004). Biodiversity is everyone's business. Up-to-date information on biodiversity is critical for proper management and conservation of any area. By protecting natural diversity, we are protecting our planet for ourselves and future generations.

The story of Adam and Eve is not merely a tale of beginnings; it is a profound reminder of our stewardship. As stewards, we are tasked with protecting and nurturing creation, recognizing that our well-being is intricately linked to the health of our planet. This divine charge calls us to honor the delicate balance of ecosystems and the species that inhabit them.

As the Children of Adam and Eve (Adarihurun), we possess a unique capability: the ability to reflect, reason, and innovate. Our intellectual gifts empower us to understand the complexities of biodiversity and the threats it faces. However, with this power comes great responsibility. We must act as advocates, educators, and practitioners of conservation, striving to implement sustainable practices and inspire future generations.

Benefits of Biodiversity

Biodiversity plays vital and diverse roles in our economy and social lives. Biodiversity not only provides direct benefits, such as food, medicine, and energy, but also affords us a "life support system" (**Fig. 2).** Biodiversity is required for the recycling of essential elements. It is also responsible for mitigating pollution, protecting watersheds and combating soil erosion. Increasing our knowledge about biodiversity can transform our values and beliefs.

Nigeria is endowed with enormous biodiversity that includes the freshwater swamp forest, mangrove forest, and coastal vegetation, lowland forest, derived savanna, guinea savanna, Sudan/Sahel savanna and montane ecosystems. Each of these ecosystems has its diverse species of fauna and flora with diverse genetic endowments

Fig. 2: Biodiversity: Life Support System.

Threats to Biodiversity

The world's biodiversity is under threat from various dangers, majority of which have been caused by children of Adam and Eve. Almost all scientists acknowledge that the rate of species loss is greater now than at any time in human history. The major threat to biodiversity is extinction. The loss of species and their habitats

results in low-quality, less healthy, less sustainable natural ecosystems.

What factors continue to threaten biodiversity? There are five main threats to biodiversity: Habitat loss, overexploitation, Invasive alien species, Pollution (soil, water & air) and Climate change. **(Fig.3)**

Fig. 3: The major threat to biodiversity

Restoration and Conservation.
Ecological restoration is a process of helping to restore the natural features and functions of degraded ecosystems. Ecological restoration is often an important element for conservation and/or enhancement of natural biodiversity. Protecting biodiversity is a universal challenge and an objective that can only be achieved through a comprehensive effort on the part of all parties involved.

My Background, Research Interest, and Contribution to Knowledge
Mr. Vice Chancellor, sir, the journey to this podium started on September 29th, 1983, when I was appointed as a Graduate Assistant in the Department of Botany. Born in Ile-Ife, where my

grandfather was sojourning as a trader (Oshomalo) and as a farmer in Famia (a village in Ife area of Southwestern Nigeria). I had my primary education in Ilase-Ijesha (my hometown, in Obokun Local Government, Osun State) when my grandfather returned home due to old age. My closeness to nature in my early childhood triggered my keen interest in understanding of the natural environment, especially as it relates to plants. As a child living in a traditional African village during my formative years of life, I was able to observe the complex interaction between plants and the other aspects of the environment. Eventually, I developed an interest in pursuing my career in plants and their environments.

Mr. Vice-Chancellor, sir, the saying "All flesh is grass", a statement which is both scientific and biblical (Isa. 40 vs. 6) means that all animals (flesh) are derived from plants (grass). In a food chain, plants are producers that make food through photosynthesis by capturing sunlight. Primary consumers then consume these plants on the first trophic level. The secondary consumers then eat the primary consumers. It is, therefore, inevitable that all organisms depend on plants for their food directly or indirectly. Consequently, whatever it is, the quality of the grass will eventually be transferred to the other animals along the food chain (**Fig. 4).**

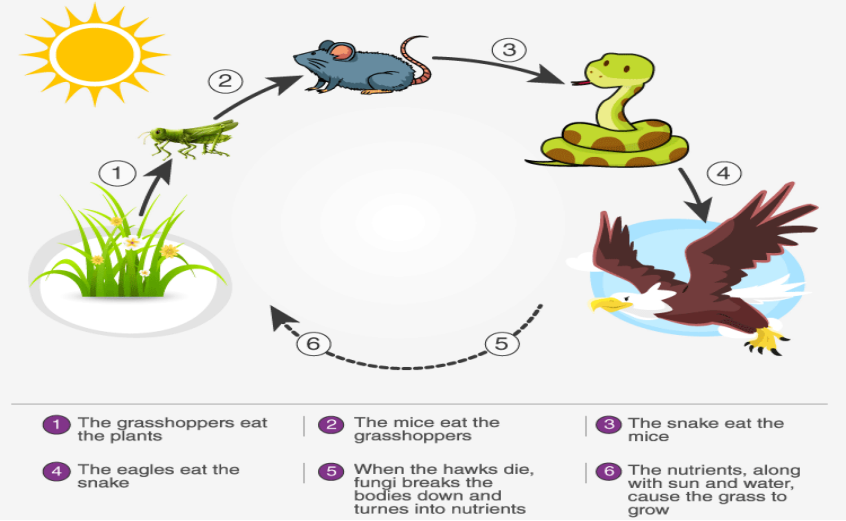

Fig. 4: Food Chain

My entry into the world of scientific research started in 1983 with an attempt to evaluate the effect of soil texture, moisture availability and nutrient level on the performance of two widely distributed savanna grasses, *Andropogon species (A. gayanus* and *A. tectorum*) and *Schizachyrium sanguineum*. Grasses are the major utilizable resource of the savanna and the factors that affect their production need to be clearly understood for improved management. Foster and Mundy (1961) described *A. gayanus* as the best suited for Northern Nigerian range conditions and Adegbola (1962) ranked it highest in palatability for grazing stock and it is heavily grazed by cattle, sheep, and goat. Isichei (1983) observed that *A. gayanus* and other *Andropogon* species in humid savanna zones of Nigeria were better accumulators of nitrogen than other grass species. In our study (**Oke** and Isichei, 1990), only one nutrient, nitrogen, which is often limiting in tropical ecosystems, especially in savanna was investigated to minimize complexity. Our interest was to find out how the growth medium type affects the apportioning of the absorbed nitrogen to the various plant parts since the parts serve different purposes in the plant and are not equally utilized. Monitoring the yield, nitrogen accumulation and partitioning in grass species revealed that *A. gayanus* accumulated nitrogen better than *Andropogon tectorum* and *Schizachyrium sanguineum* (**Oke** and Isichei, 1990). Our investigations further revealed the specific parts of the grass where Nitrogen is mainly concentrated at different periods of the year (**Oke** and Isichei, 1993). The ability of the grass species to accumulate considerable nitrogen in the below-ground parts (root and rhizome) and the decreased level in its above-ground parts as the season progressed enabled it to use the nitrogen conserved below-ground for the new growth in the field after the first rains.

Human Activities and Their Effects on the Tropical Environment

Human activities are adversely impacting most environmental factors essential for the survival of man and other organisms on

Earth. Some of these human activities and their consequences on the environment that are making the environment less suitable for continued life on Earth have also engaged my attention through these years.

Flora and Structure of Forest Vegetation in a Tropical Environment

Knowledge of the floristic composition and structure of forest vegetation is critical to understanding the dynamics of forest ecosystems and the effective management of such ecosystems requires the understanding of their functioning, not only for their improvement but also to prevent their further degradation (**Oke** and Isichei, 1997). An understanding of the floristic structure of the fallow vegetation ecosystem is thus desirable.

Precisely because of the importance of woody shrubs and trees in conservation, the study of floristics and structure of the fallow vegetation in the Ile-Ife area of southwestern Nigeria was embarked upon (**Oke** and Isichei, 1997). In this study, the vegetation of seven fallow plots of different ages was analyzed for their floristic composition and aspects of vegetation physiognomy. The result of this study indicated that the more mature forest plot had more woody species, with no herbaceous plants when compared to the younger plot (**Oke** and Isichei, 1997). It was also observed that few species were dominant in the various plots and all the dominant species, such *as Albizia zygia, Funtumia elastica, Ficus exasperata* and *Spondias mombin* found in the study plots have been listed by one or more authors (Hall and Okali, 1979) However, the abundance of *Newbouldia laevis* is a distinctive feature of secondary forest regrowth. *Terminalia superba a*nd *Triplochiton scleroxylon* were poorly represented because of the excessive removal of mother trees. The occurrence of *Elaeis guineensis, Baphia nitida*, *Cola nitida,* and *Cola acuminata* in the young plots reflects recent cultivation and previous land use of these plots (Ross, 1954). However, the occurrence of *Cola nitida* and *Musa sapientum* is evidence of settlement in the recent past.

Shasha Forest Reserve, created in 1925 and generally believed to be ecologically rich with forest tree species, has witnessed a rapid rate of destruction from excessive logging, conversion to plantations, and farming (Field Trip Earth, 2008). As a result, Akinyemi and **Oke** (2014) therefore studied the composition and structure of the forest reserve. The results of this study showed that the floristic composition of the Shasha Forest Reserve (119 species/ha) was higher than many other tropical forests. Our study revealed that the Forest Reserve has a reasonably good woody (tree and shrub) species composition and richness in the face of logging and slash-and-burn agriculture in the forest. Logging affected the structural composition of the forest reserve through the removal of large and tall trees**.** Thus, there is a need to control human activities to protect the plant species for effective management and utilization.

Taungya farming involves the growing of annual or biennial crops along with the forest species during the early years of the establishment of the forest plantation (Jordan *et al*., 1992). It is important to understand that agroforests are conceived to allow biodiversity conservation and restoration. We resolved to assess the extent to which these methods of land use can provide habitat for indigenous woody species diversity, especially in the tropics and seek to highlight the contribution of *taungya* agroforestry system in four different forest reserves (Aponmu, Idanre, Owo and Ore in Southwestern Nigeria) as a type of land use method adopted in forest reserve management to conserve native woody species diversity and maintain soil fertility (Akinbisoye, **Oke**, Adebola and Mokwenye, 2014). Our study concluded that *Taungya* agroforest helps to conserve biodiversity and averagely enhances native plant biodiversity conservation and significantly improves the soil quality in the tropics.

The presence or absence of a good vegetation cover or soil conservation measures are strong determinants of the amount of sediment generated by surface erosion. We (**Oke,** Isichei and Aina, 1999) investigated the implications of floristic composition and

structure on soil erosion, sediment yield, and soil properties in natural habitats. The benefits of forest conservation can be assessed from the results of our study on the relationship between vegetation physiognomy and indices of soil erosion in the University Estate (**Oke**, *et al* 1999, 1999a). Young plots without shade and with little vegetation cover produced the highest values of runoff and sediments, followed distantly by the values obtained in the natural forest plots with moderate canopy openings.
The fate of Opa Lake concerning its configuration without vegetation along its watershed and on its bank was investigated (Ogunkoya, Oyinloye and **Oke,** 1997). Urbanization, deforestation caused by farming activities, and the prior existence of aquatic weeds within the Opa catchment in the Ile-Ife area of Southwestern Nigeria have facilitated changes in the configuration of the Opa Reservoir and loss of reservoir capacity. As a result of this observation, it was recommended that there was the need for dredging of the reservoir if the Opa Reservoir was to continue to fulfill its function.

During our study on the erosion and sediment yield in the forest ecosystem, we observed other processes such as litterfall, stem flow, and through fall, and this led us (Oziegbe, Muoghalu and **Oke**, 2011) to examine the magnitude of nutrient fluxes through litterfall, incident rainfall, throughfall, and stem flow, and evaluated the relative importance of these components as pathways of nutrient recycling to the soil of the forest. The study showed that litterfall is the main pathway for cycling calcium, copper, iron, magnesium, manganese, nitrogen, and zinc while net precipitation (stem flow, throughfall) is the main pathway for cycling lead, mercury, phosphorus, potassium, sodium and sulfur in the forest. These findings have added more value to the understanding of nutrient cycling. and most especially in the management of tropical rainforests because the amount of nutrients returned to the forest floor is important in maintaining fertility and productivity.

Comparative Evaluation of Floristic Composition of Riparian Forest and Adjacent Upland Vegetation in Southwestern Nigeria.

Our further interest in the critical understanding of the dynamics of the vegetation for sound management practices and the importance of woody shrubs and trees in conservation, made us embark on comparative floristic composition and diversity of the riparian forest and its adjacent upland vegetation in our immediate environment, i.e. Ile-Ife area of Southwestern Nigeria.

In our study, it was revealed that woody species varied considerably between the two vegetation habitats under consideration (Olaloye, **Oke** and Akinyemi, 2015). There were more woody species in the upland vegetation (6,725 per hectare) than in the riparian forest (5,800 per hectare). This could be a result of multiple disturbance regimes such as flooding, debris torrents, channels migration, and landslides, as well as trees-fall that occur in riparian areas compared to upland vegetation, where tree-falls are the only disturbance (Olaloye, **Oke** and Akinyemi, (2015).

Generally, Sorensen's similarity index expresses low similarity (32%) of species composition between riparian and upland vegetation in our study, a reflection of the difference in species composition of the sites. Shannon-Wiener (H') values in our study revealed that the upland vegetation was more of a secondary regrowth species compared to the riparian vegetation. The species evenness (E_H) was higher in upland vegetation (0.72) than the riparian vegetation (0.67) (**Table 1).**

Table 1: Summary of Species Composition and Structural Characteristics of the Upland and the Riparian Vegetation

S/N	Attributes	Upland Vegetation	Riparian Vegetation
1	Number of woody species	40	38
2	Number of shrubs	24	23
3	Number of trees	16	15
4	Number of climbers	1	2
5	Number of families	24	26
6	Mean basal area m^2 ha^{-1}	0.74±0.30	0.55±0.12
7	Density of woody species per hectare	6,725	5,800
8	Shannon-Wiener	2.71	2.43
9	Mean girth size (cm)	24.04	23.11
10	Species Evenness	0.72	0.67

My interest in environmental management and biodiversity conservation also led to further investigations of the effects of human activities such as (i) logging, (ii) sawmilling, (iii) iron smelting, (iv) pipeline vandalization, and (v) limestone quarrying, and (vi) other animal activities such as Bats on vegetation characteristics in tropical environments.

Logging Activities as They Affect Biodiversity

Further attempts to document the influence of children of Adam and Eve on biodiversity made us investigate the different species of forest trees that are preferentially extracted for use as timber by assessing their disappearance from the forest and their presence at the sawmills in areas where sawmilling activities were flourishing in Osun State of Nigeria. Our study in Ago Owu Forest Reserve showed that different species of forest trees that were preferentially extracted were extensively investigated over a certain period (**Oke** and Oyedare, 2006). The most depleted timber species in the forest reserve include *Daniella ogea*, *Cordia milleni*, *Antiaris africana*,

Terminalia superba, *Triplochiton scleroxylon* and *Milicia excelsa*. All these were poorly represented due to the excessive removal of mother trees.

We made further attempts to document the influence of children of Adam and Eve on biodiversity by investigating the effects of sawmilling dust on the vegetation characteristics in some environments in Southwestern Nigeria where sawmilling activities were blooming, such as Isokan Local Government Area of Osun State, Nigeria. The sawdust particles released led to (i) drastic reduction in chlorophyll concentration (ii) decrease in leaf area (iii) and decreased in internode length of the leaves of the vegetation around the studied sawmills (**Oke** and Oyedare, 2006a). Visual observation, however, revealed that plants within a 50 m radius of sawmill sites are mostly chlorotic, having dead patches.

In an attempt to further establish the effect of logging on biodiversity, Haastrup and **Oke** (2018) carried out a study in Onigambari forest reserve in Southwestern Nigeria to monitor the effect of logging on tree species diversity and soil status in a typical forest reserve. The result of the study indicated that at the unlogged sites, the diameter distribution of tree species increased as the diameter class increased **(Table 2**).

Table 2: Status of tree species according to diameter (cm) classes in Onigambari Forest Reserve.

Diameter Class (cm)	Logged		Unlogged	
		No. (%)		No. (%)
10-20	-	-	-	-
20-30	-	-	3	2.89
30-40	2	3.17	5	4.81
40-50	5	4.76	7	6.73
50-60	7	7.94	8	7.69
60-70	10	9.53	10	9.62
70-80	13	12.69	11	10.58
80-90	16	17.46	13	12.50
90-100	19	20.64	15	14.41
>100	21	23.81	32	30.77
Total	**93**	**100**	**104**	**100**

Iron Smelting Activities as They Affect the Environment

The establishment of an Iron Smelting factory in Fashina around 2012, along Ibadan express road, Ile-Ife, Osun State, Nigeria, and the release of the industrial effluent to the surrounding vegetation made us decide to investigate or evaluate the effect of the industrial effluents on the soil and its effects on the crops grown in the area. Our study (Akinyemi, Olatunji, **Oke** and Oluyemi, 2015), evaluated the growth response of pepper (*Capsicum chinense*) to the soil of the site contaminated with effluents. Our findings revealed that pepper (*Capsicum chinense)* grown in the contaminated soil produced a better yield when compared with the control soil. The heavy metal in the discharged effluent may likely exceed the threshold limits of FEPA and WHO over time.

Mineral Exploitation Activities as They Affect the Environment

Mineral exploitation directly affects plant biodiversity through both physical and chemical modification of their environment and indirectly in various ways (Radcliffe, 1974).

Limestone Quarry:

One of the biggest negative impacts of quarrying on the environment is the damage to plant biodiversity (Sustainable Floor, 2009).

In 1958, the West African Portland Cement Company established factories in Ewekoro and Sagamu, both of which were incorporated in Nigeria and started commercial production of cement in 1960. We embarked on field trips in 2008 in both the dry and rainy seasons to the factory sites at Ewekoro and Sagamu to assess the vegetation of the area and the impact of cement manufacturing on the biodiversity of the areas. Our investigations (**Oke** and Ibhanesebor, 2010 and 2012) revealed that the Limestone excavation in the two areas has altered the landform of the area and created new and varied habitats, namely, large man-made ponds and hills of spoil heaps which were not originally in the area. These habitats now supported faunal and floral species not found in any other sites in the area. The spoil heaps provided a haven for *Leucena leucocephala*, an uncommon plant in the area and *Azadiractha indica*. The aquatic habitat created by the limestone evacuation has also provided refuge for crocodiles, different fish species and some plant species such as T*ypha australis.* Our investigation revealed that the original vegetation of these areas has been destroyed by limestone quarrying and a reduction in plant species diversity.

Oil Pipeline Vandalization

Oil pipeline vandalization, refined petroleum products spills, explosions, and fires are common occurrences in Lagos State, which is also a coastal region. The resultant effect of all these is the unfortunate loss of lives and property, and the pollution of mangrove vegetation by refined petroleum products spills. It is against this background that we (Omodanisi, Salami, and **Oke,** 2011) resolved to assess the effect of the petroleum products spill on the mangrove vegetation in the Ilado area of Lagos State, Nigeria. Our assessment revealed that there was a drastic reduction in the abundance of both woody and herbaceous species in the

impacted area when compared with the unimpacted area and plant species generally decreased with the severity of oiling. The current vegetation, which is now a modified vegetation due to human activity has deviated from the original vegetation.

Bats' Activities:
My observation in my early life in primary school in my town, Ilase-Ijesha and similar observation within the university campus environment (University of Ife/Obafemi Awolowo University) during my days as a student and later as a staff revealed that colonies of fruit bats (*Eidolon helvum)* with very large populations are known to have a very destructive impact on roosting trees and the environment as a result of their feeding entirely on flowering and fruiting tree. Consequently, Ayoade, **Oke** and Omisore (2012) decided to determine the extent and magnitude of the damage caused to the urban vegetation by roosting colonies of the frugivorous bat *Eidolon helvum*. I also observed that they are fond of trees such as *Ceiba pentandra.*

Table 3: Total Number of the Tree Species and Species Diversity Index at Different Locations in the Study Site.

S/N	Plots and Location	Total Number of Tree Species	Species Diversity Index (H')
1	Plot A (Parks and Garden)	4	1.232
2	Plot B (Parks and Gardens)	8	1.447
3	Plot C (Zoological Gardens)	10	1.798
4	Plot D (Buffer Zone)	7	1.836

Our investigation revealed that bats prefer to roost in the taller tree, very soon taller trees will soon be reduced to shorter plants in a matter of time (Ayoade, **Oke** and Omisore, 2012). This is an indication that the original vegetation has been degraded **(Table 3).**

Invasive Species

Allelopathic Effect of Tithonia diversifolia (an invasive species) on Biodiversity

Invasive species are one of the leading causes of global biodiversity loss. An invasive species is commonly defined as any living organism not native to an area and their introduction can sometimes be beneficial. Some introduced invasive species may be competitively superior to natives because they release allelochemicals, which negatively affect native species. The dual roles of allelopathic substances in *Tithonia species* on the growth parameters of plants inspired us to investigate the effects of the fresh shoot aqueous extract of *Tithonia diversifolia* on the growth of the seedlings of three woody plant species, namely, *Monodora tenuifolia, Dialium guineense,* and *Hildegardia barteri* (**Oke** *et al.,* 2011). The results of our investigation showed that the extract of *Tithonia diversifolia* could either have an inhibitory effect or promote the growth of the seedlings of the three selected woody species. The extract promoted the shoot height, leaf number, and leaf area in *M. tenuifolia* and *H. barteri,* but it was inhibitory in *D. guineense.* In this study, it was found that the effect of *Tithonia diversifolia* shoot extracts on the three woody species seedlings was pronounced (**Oke** *et al.,* 2011).

Trends of a Plant Invasion: Challenges and Outcomes

After our previous work on the roles of invasive species on the biodiversity of native species, Akinkuolie, **Oke,** Sanni and Olugbemiro (2022) resolved to study the trends of a plant invasion: challenges and outcomes**.** Knowledge of the trends following a plant invasion can assist conservationists, scientists, foresters, ecologists, and other concerned stakeholders in predicting the invasion potentials of exotic species to reduce the rate of invasion across the globe.

Soil Seed Bank Dynamics in the Tropical Environment

My research to find out what can be done to restore the damage done to the biodiversity in the ecosystem by the children of Adam and Eve led me to study soil seed banks in different Forest ecosystems such as (i) contrasting Plantations, (ii) Secondary Lowland Forests, (iii) Riparian Forests and (iv) Forest Reserves. Seedbank is defined as an aggregation of ungerminated seeds capable of replacing adult plants. The seeds buried in the soil seed bank are kept in a dormant state until appropriate germination requirements are met (**Oke** *et al.,* 2006). Seed banks are very vital for the restoration of plant communities by nature management authorities

Investigations were carried out in varied ecosystems such as (i) degraded tropical rainforest in Obafemi Awolowo University campus, Ile-Ife **Oke** *et al. (*2006) (ii) plantations (**Oke** *et al.,* 2007**); (ii)** forests at different altitudinal gradients (**Oke** and Okunola, 2008); (iii) invasive plant (*Tithonia diversifolia*) dominated fallow land (**Oke** *et al*., 2009); (iv) different physiognomies in Shasha Forest Reserve (Akinyemi and **Oke,** 2013); (v) an industrially degraded vegetation of Iron Smelting Factory (Olatunji, **Oke**. and others, 2015); (vi) riparian and adjacent upland vegetation (Olaloye and **Oke,** 2016).); (vi) heated Shasha Forest Reserve soil (Akinyemi, Oseni, and **Oke,** 2019); (vii) Ibodi Monkey Forest Reserve (Odeleye, **Oke** and others, 2018), (viii) and five different physiognomies in Akure Forest Reserve, Ondo (Akinkuolie, **Oke,** Isichei & others, 2021).

Results of all these investigation revealed (a) a low degree of similarity between the composition of the established vegetation and that of the soil seed banks (b) no similarity between their seed bank and woody species composition of the standing vegetation (c) that **soil seed banks may not be an important conservation tool for the regeneration of the degraded forest** (d) that *Tithonia diversifolia* suppressed the presence of other native species by outgrowing them and only a few species can compete with *Tithonia diversifolia* in its domain, where it is dominant, and the possibility for germination requirements of these other/native

species may not be fulfilled which shows a clear indication of loss of species due to the invasion of *T. diversifolia*. **(Table 4) Table 4:**

Impact of *T. diversifolia* on community characteristics of invaded sites.

Parameter	Uninvaded	Invaded	decrease over uninvaded (Impact) (%)
Total species	59	44	(-)25.4
Total number of families	25	24	(-)4.0
Shannon's index of diversity (H')	2.9836	2.1787	(-)27.0
Index of evenness (J')	0.8036	0.6035	(-)24.9
Similarity index		32.6%	
Dissimilarity index		67.4%	

In our study, Akinyemi, Oseni, and **Oke (**2019) on the heating effects of fire on soil seedbanks and their potential to restore a disturbed forest, it was shown that herbaceous species dominated the seed bank with few woody species emerging from the seed bank of the three different physiognomies in both heated and unheated soil samples. Generally, our results from this study showed a paucity of soil seed banks in Shasha Forest Reserve and a low similarity between the extant vegetation and the seed bank. The findings concluded that a soil seed bank alone may not be an appropriate tool for post-fire restoration**.** Hence, the need to assist in natural restoration**.**

In the Ibodi Monkey Forest Reserve, irrespective of the physiognomies, seeds were more concentrated in the upper soil layer than the lower soil layer (Odeleye, **Oke** and others, 2018). The relatively large number of herbaceous species found in Ibodi Monkey Forest compared with woody species suggested that depending on soil, relying on seed banks to regenerate a degraded ecosystem may result in restoration failure.

As a result of the information that little research has been conducted on seed banks in riparian forests, especially in southwestern Nigeria, Olaloye, and **Oke** (2016) embarked on the assessment of the soil seed bank composition and its role in the restoration of degraded riparian and upland vegetation. Our main objective was to determine the species composition and density of

the seed bank in the riparian forest and compare it with the species composition of the standing vegetation. Fifty-one species emerged from the seed bank of riparian forest consisting of four woody species namely *Alchornea cordifolia*, *Trema orientalis, Elaeis guineensis*, *and Mallotus oppositifolia*. Only one of the woody species that emerged from the seed bank (*Alchornea cordifolia)* were observed among the established/standing woody vegetation while other woody species were absent in the standing vegetation. The dissimilarity between the seed bank and above-ground vegetation of riparian forest and the adjacent upland vegetation of the study revealed that soil seed bank is insignificant in the restoration of degraded riparian forest and upland vegetation (Olaloye and **Oke,** 2016).

In furtherance of our investigations on the role of seed banks in the restoration of the degraded ecosystem, Olatunji, **Oke** and others, (2015**)** investigated the influence of different levels of disturbances occurring due to the citing of industry in Ile-Ife area and how it has affected the relationship between the standing vegetation and the seed bank. The index of similarity of the seed bank and standing vegetation in all five plots using the Sorenson Index of similarity shows a low similarity index between the seed bank and corresponding standing vegetation.

Performance of Crop Plants under Various Environmental Variables

Mr. Vice Chancellor, sir, a better understanding of the environment is important for plant growth and development. My experience as a grandson of a farmer in Ilase-Ijesha (my home town) while growing up and later as a researcher with my interest in

(i) the effect of environmental variables on crop performances informed the study of the growth and yield responses of cowpea (*Vigna unguiculata*) to soils from different fallow ages and soil moisture of various regimes in the rainforest zone

(ii) the effects of plant density on the growth characteristics of seedlings of cowpea (*Vigna*

unguiculata var. IFE BROWN) in two types of soils that are common in Southwestern Nigeria (**Oke** and Aba, 1998),

(iii) effects of various soil moisture regimes on the growth parameters, and yield of two early maturing Nigerian varieties (Ife brown and IT93/719) of cowpea (**Oke** and Oduola 2001).

(iv) the effects of four fallow soils of different physiognomies on the growth characteristics, yield of the cowpea in the Ile-Ife area of Southwestern Nigeria (**Oke** and Eyitayo, 2010).

As a result of our investigations, we learned that cowpeas can give satisfactory vegetative growth under a greater diversity of climatic, soil, and cultural conditions (Ligon, 1958; Turk and Hall, 1980) while the growth parameters and yield were adversely affected by low soil moisture regimes. hence, the more the soil moisture levels without water logging, the higher the dry matter yield (**Oke** and Oduola 2001). We also suggested that for farmers who are interested in cultivating cowpea, fallow lands dominated by *Chromolaena odorata* should be avoided as much as possible, as cowpea growth is adversely affected on such fallow soil, while fallow lands dominated by *Panicum maximum* is highly recommended for farmers who are interested in vegetative growth as such soils tend to have greater organic matter content, organic carbon content, and exchangeable cations, which favour cowpea (*Vigna unguiculata*) seedling growth. (**Oke** and Eyitayo, 2010).

As a result of our team's trips to the premises of Ife Iron and Steel Nigeria Limited, we observed that farmlands are exposed to industrial effluents. Against this background, Akinyemi, Olatunji, **Oke** and Oluyemi (2015) evaluated the effect of the industrial effluents of the premises of Ife Iron and Steel Nigeria Limited on the soil properties, growth, and yield of *Capsicum chinense* (Pepper). Our findings revealed that at low concentrations, industrial effluents in soil produced desirable and better growth characteristics and crop yield. It also

improves the soil properties by improving the soil nutrient status, especially the soil organic matter.

Other Works

During my two years sojourn as the Director of the Institute for Entrepreneurship and Development Studies (IFEDS), Obafemi Awolowo University, I had the opportunity to collaborate with other senior researchers in the Institute. In the existing literature, there is a paucity of information on ecopreneurship in developing countries, especially in Nigeria. It is against this background that a study was set to review critically ecopreneurship and other related concepts to synthesize a structure that could be useful in promoting ecopreneurship in Nigeria. It is evident from our study that entrepreneurial ventures with a unilateral focus on profits could not address sustainability in the current global inclination (Obisanya, Adegbite, Abereijo and **Oke,** 2016). Therefore, ecopreneurship is an indispensable tool that deals with environmentalism and capitalism towards achieving dual goals of profit and sustainability. The proposed framework in this work could guide policymakers in making decisions that would fast-track the development and propagation of ecopreneurship in Nigeria.

Conclusion

Mr. Vice-Chancellor, sir, by now the reason for the choice of the title of this Lecture would have become obvious. Protecting biodiversity is critical to the survival of our planet and all living creatures on it, including the children of Adam and Eve. The activities of the children of Adam and Eve, as a result of population growth and the expansion of economic activities, are impacting aquatic and terrestrial biodiversity, making the ecosystems less suitable for the survival of humans and other organisms and continued life on Earth.

In spite of the emphasis placed on biodiversity conservation, the rate at which the plants in Nigeria are being depleted is alarmingly high and calls for an urgent attention. This depletion is occasioned by the use of wood for fuel by a large proportion of the population

of Nigeria. As a result, both dead and living plants are felled for fire-wood. The immediate consequences of human interference with natural vegetation bring about little resistance to heavy storms which ravage residential buildings in the cities and villages. To save this situation, our governments should make gas and kerosene available and affordable to the common people by restoring subsidies on them so that majority of the people may use gas and kerosene for cooking and heating.

As human interference with natural vegetation intensifies and degradation worsens, some plants are lost completely (extinction) in the process while some are threatened and some others become rare. To arrest this ugly trend, tree planting should be encouraged and intensified. Planting trees restores critical habitat for biodiversity.

While well-kept yards may look nice, they are unnatural habitats. Therefore, section off a portion of your yard and plant native (indigenous) shrubs, flowers, or trees to help meet the food, clean water, and shelter needs of local wildlife. Don't make your yard to look like a cemetery – 100% concrete floor.

It is important to educate the youths on the importance of the world's rich biodiversity and why we need to protect it for many generations to come. We inherit the biodiversity from our parents and borrow it from our children.

To address the challenges we face, we must embrace innovative approaches to conservation. This includes the integration of traditional ecological knowledge with modern scientific practices, community-led conservation efforts, and the use of technology to monitor and protect biodiversity. Collaboration across disciplines—science, policy, education, and the arts—will be essential in our quest for effective management and preservation. As we move forward, I urge each of you to reflect on your role as stewards of our planet. Whether through research, teaching, community engagement, or personal lifestyle choices, we can all

contribute to the preservation of biodiversity. Let us unite in our efforts, sharing knowledge, resources, and passion for the natural world. **In conclusion, biodiversity conservation is not merely an environmental issue; it is a moral imperative**. As the Children of Adam and Eve, we have inherited a sacred trust to protect and nurture the planet for ourselves and future generations. Let us embrace this role with humility, courage, and commitment, striving for a world where biodiversity thrives and all life flourishes.

On the whole, I could say that I have contributed my little quota in the area of Plant Ecology to the knowledge of environmental management and conservation under various environmental variables.

Other Contributions: Teaching and Community service

Mr. Vice Chancellor, sir, and my distinguished audience, my contributions are not limited to research alone but extend to other services within and outside the university. I have served and I am still serving in several capacities in this University and other Universities. I have served and still serving as Internal Examiner in many Departments in the University. I served as Head of Department (2009- 2011); Assistant Secretary ASUU (2004-2006), Secretary ASUU (2006-2011), two- term elected member of University Senate (1995 -1997 & 1998 – 2000), two-term Member of the University Governing Council (2009 - 2011 & 2011 – 2013), Director, Institute for Entrepreneurship and Development Studies {(IFEDS), (2014-2016}, during which the maiden edition of the Institute's Academic Journal was produced. I thank all those who worked with me at various times. I have served in many Faculty Boards and committees in the University system in the course of my 42 years as an academic staff.

I was part of the team that started the Predegree Programme by the Center for Distance Learning (CDL) in 2003 under the Leadership of the pioneer Director, Professor Oladipo Aina and I served as the Coordinator of Biology for 13 years (2003- 2016**).** I have made significant contributions in the area of mentoring of staff and

students and capacity building at different fora. I have been a part of the team that strengthened undergraduate and postgraduate training in Foundation Courses, Plant Ecology, Biostatistics, and Field Work in the Department of Botany. During my brief stay at First Technical University, Ibadan, I served as the Dean of the Faculty of Natural and Applied Sciences (2019 – 2021) under the leadership of Professor Ayobami Salami, the Pioneer Vice-Chancellor. I have served and still serving as External Examiner to several institutions (Federal, State and Private Universities) as well as a member of the Editorial Board for various local and international publications. I have also assisted in assessing colleagues to the rank of Professor and Associate Professor in several Universities (Federal, State, and Private). I am a member of different national and international professional bodies. I have served as a member of Council, Botanical Society of Nigeria, (BOSON) (2006 - 2011). I am currently a member Board of Trustees, Ecological Society of Nigeria (ECOSON). I have had the opportunity to make my positive impact in the Federal, State, and Private Universities where I spent Sabbatical Leave (Federal University of Technology, Akure, Bowen University, Iwo, and First Technical University, Ibadan)

I have participated in and presented papers at various conferences, workshops and seminars in the field of Indigenous Knowledge System, Botany, Environmental Sciences and Entrepreneurship. within and outside Nigeria. I have served as Consultant to many Environmental Management companies, especially in the areas of Environmental Impact Assessment (EIA), Environmental Auditing, (EAs) and Baseline Studies.

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