



**FEDERAL UNIVERSITY OF TECHNOLOGY  
MINNA**

**UNRAVELING THE MYSTERIES  
OF AQUATIC BIODIVERSITY:  
THE GOOD, THE BAD AND THE UGLY**

*By*

**PROF. FRANCIS OFURUM ARIMORO**

*B.Sc, M.Sc (Jos), PhD (Abraka), MZSN, MFBAN*

*Professor of Animal Biology*

**INAUGURAL LECTURE SERIES 67**

**30<sup>TH</sup> AUGUST, 2018**



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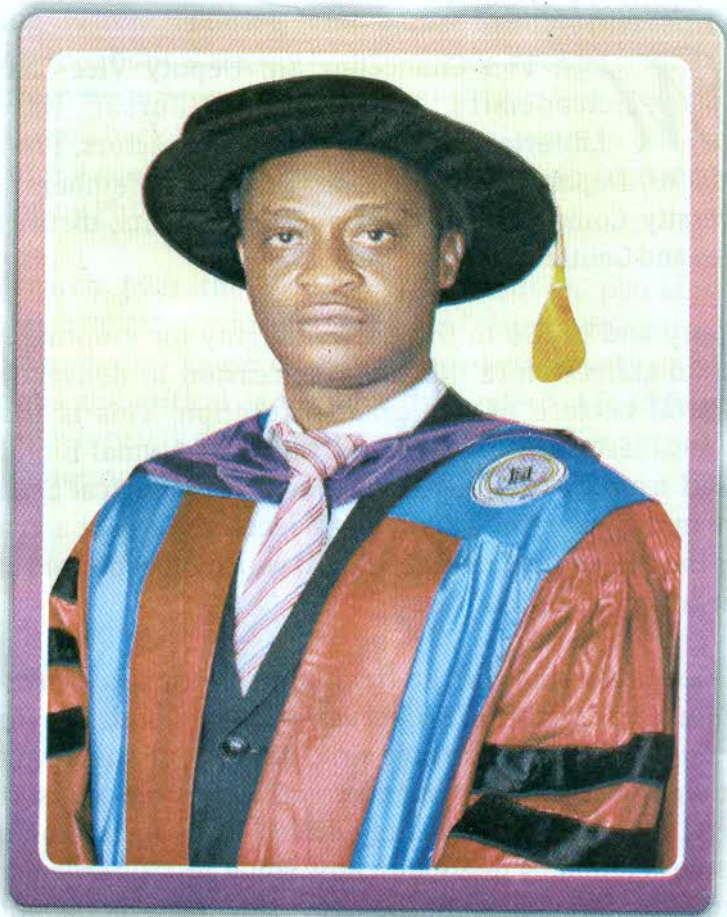
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## PREAMBLE

**M**r. Vice-Chancellor Sir, Deputy Vice-Chancellor Academics, the Registrar, Bursar, University Librarian, Deans of Schools, Directors, Professors, Heads of Departments, Erudite Scholars, Members of the University Community, invited guests, students, distinguished Ladies and Gentlemen.

All glory and praise to the Lord Almighty for granting me the grace to stand before this august occasion to deliver the 67<sup>th</sup> Inaugural Lecture of this great institution. This is the **First** inaugural lecture from the Department of Animal Biology and **second** from the defunct Department of Biological Sciences. I share in the view that an inaugural lecture is a debt a Professor owes the University Community and which must be paid at some point during his career.

The Vice-Chancellor Sir, the titled of my lecture is '*Unravelling the Mysteries of Aquatic Biodiversity: The Good, The Bad and The Ugly*'. I chose this topic first because of some mysteries surrounding aquatic biodiversity and ecosystem and second to unravel the immense benefits derived from aquatic biota. The bad side of it mainly deals with how some aquatic organisms are harmful to humans and the ugly side of aquatic pollution resulting to destruction of ecological habitats.

I started off my early primary school days in Orogodo Primary School, Agbor in Delta state. The school got her name from the popular Orogodo River that flows through the town. The people of Ika land place much value on this river and their riparian areas.

Indeed the river forms part of the peoples' collective consciousness; It is entwined with Ika history, folklore, art, traditions, and literature. This river continues to provide drinking water, fisheries, and game habitat that sustained communities built along the riverbanks. As a young child, I derive pleasure in swimming and playing in the river. As fate would have it, I returned back to this river after several years to undertake a study of the ecology of the macroinvertebrates which led to the award of my PhD in 2007.

My research over the years has focused on plankton and macroinvertebrates, which I think of as "*charismatic microfauna and macrofauna*." These organisms are key players in aquatic food webs and critical as they are the preferred food for many fish. My lecture will therefore unravel the mysteries surrounding these unique organisms.

# INTRODUCTION

## **BIODIVERSITY**

The term *biological diversity*, or *biodiversity*, originated in the study of terrestrial ecosystems. One formal definition for biodiversity is "the variety and variability among living organisms and the ecological complexes in which they occur" and "encompasses different ecosystems, species, genes, and their relative abundance" (Angermier and Karr, 1994).

Aquatic biodiversity can be defined as the variety of life and the ecosystems that make up the freshwater, tidal, and marine regions of the world and their interactions. Aquatic biodiversity encompasses freshwater ecosystems, including lakes, ponds, reservoirs, rivers, streams, groundwater, and wetlands. It also consists of marine ecosystems, including oceans, estuaries, salt marshes, seagrass beds, coral reefs, kelp beds, and mangrove forests. Aquatic biodiversity includes all unique species, their habitats and interaction between them. It consists of phytoplankton, zooplankton, aquatic plants, insects, fish, birds, mammals, and others. It is the number of different native species, or species richness. Over 1.4 million identified species live on earth, and experts estimate that as many as another 10 million to 100 million unidentified species may exist (Helfrich *et al.* 2009). Generally, habitat heterogeneity supports higher diversity of life. Coastal estuaries and mangrove swamps, for example, are "edge" ecosystems that link salt- and freshwaters and trap nutrients that allow them to support a rich diversity of aquatic plants and animals.

Marine, coastal and inland areas support a rich assortment of aquatic biological diversity that contributes to the economic,



cultural, nutritional, social, recreational and spiritual betterment of human populations. Life originated in the world's oceans and over the millennia has spread inland and evolved into the diverse forms used today by a variety of stakeholders, including commercial and artisanal fishers, fish farmers, developers and tourists (Pawar, 2016).

## **DIVERSITY OF AQUATIC ECOSYSTEMS IN NIGERIA**

The finite natural resource base shared by 180 million humans and unknown number of plants and other animals is estimated as 923,700 km<sup>2</sup> of land excluding the coastal region. Approximately 125,471 km<sup>2</sup> of Nigeria land mass is covered by the waters of the nation's major rivers, lakes, ponds and pools (Oribhabor 2016). The landmass of Nigeria is enclosed between latitudes 4°16'-13°52' N and longitudes 2°49'-14°32' E and being 1100 km on a North/West axis (Figure 1). Nigeria stretches from the border with Benin Republic to the Eastern border with the Cameroon Republic. The country is a West African maritime State with a coastline that is about 853 km, long. The Nigerian coastal zone can be defined as the area which extends from the shelf break, inland to the limit of tidal influence. This coastline is interrupted by a series of estuaries, which open into an extensive lagoon system in Lagos and Ondo States. In Lagos State, the creeks, floodplains, lagoons and rivers account for approximately 22% of the 790 km<sup>2</sup> land mass. There are at least twenty-two estuaries from Benin River in Delta State coastal region to Cross River in Akwa Ibom State. The Nigerian coastal zone is generally low lying, resulting in extensive wetlands and mangrove swamps. Nigerian had the largest area of mangrove forest in Africa.

## **BIODIVERSITY IN THE AQUATIC ECOSYSTEMS OF NIGERIA**

Nigerian aquatic ecosystems are characterized with diverse species of plants and animals. Unlike the terrestrial habitats, animals in the oceans are found at all depths, so that the total



habitable space of a 4 km (average) deep ocean is 1,263,804 km<sup>3</sup>. It is therefore reasonable to assume that Nigeria's aquatic flora and fauna biodiversity is higher than that of the terrestrial habitats. The total fauna of the World is comprised of 25 phyla of which 24 phyla are invertebrates. The phylum Chordata consists of the non-vertebrate and vertebrate chordates. Invertebrate species diversity is much higher in the aquatic ecosystem than in the terrestrial ecosystem. The significance of greater protection to the aquatic ecosystems cannot be over-emphasized, since its diverse fauna is of great economic and social importance. A summary of the faunal biodiversity of Nigeria aquatic ecosystems is shown in Table 1. There are at least 2570 faunal species.

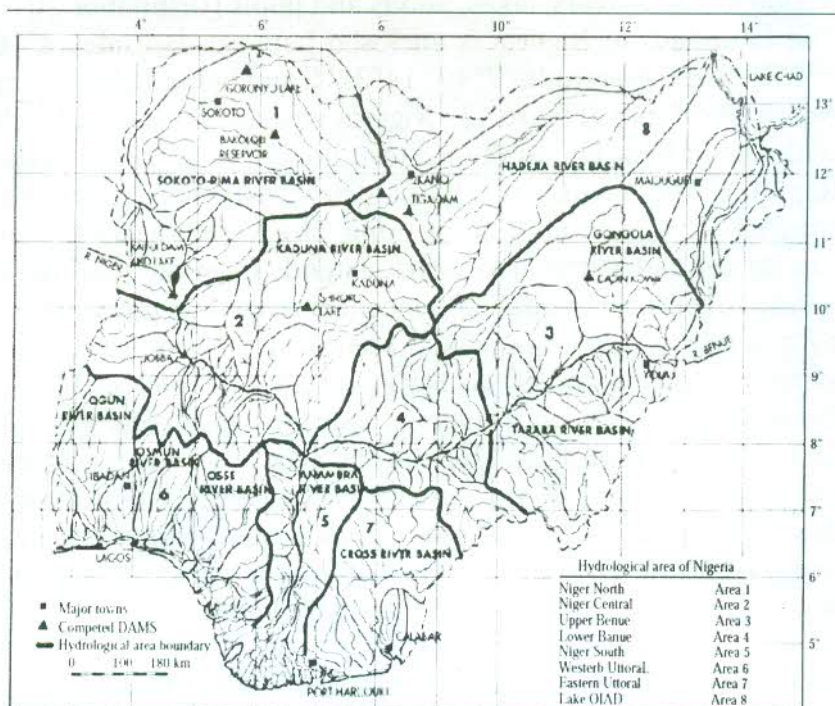


Fig. 1. The Hydrology map of Nigeria (Ita 1993).

