



**FEDERAL UNIVERSITY OF TECHNOLOGY
MINNA**

**THE AFRICAN CATFISH CULTURE
FOR THE 21ST CENTURY**

By

PROF. SOLOMON LAMBUDA LAMAI, FFS

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Professor of Fisheries (Aquaculture & Toxicology)

INAUGURAL LECTURE SERIES 22

17TH NOVEMBER, 2011



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This 22nd Inaugural Lecture was delivered under the Chairmanship of:

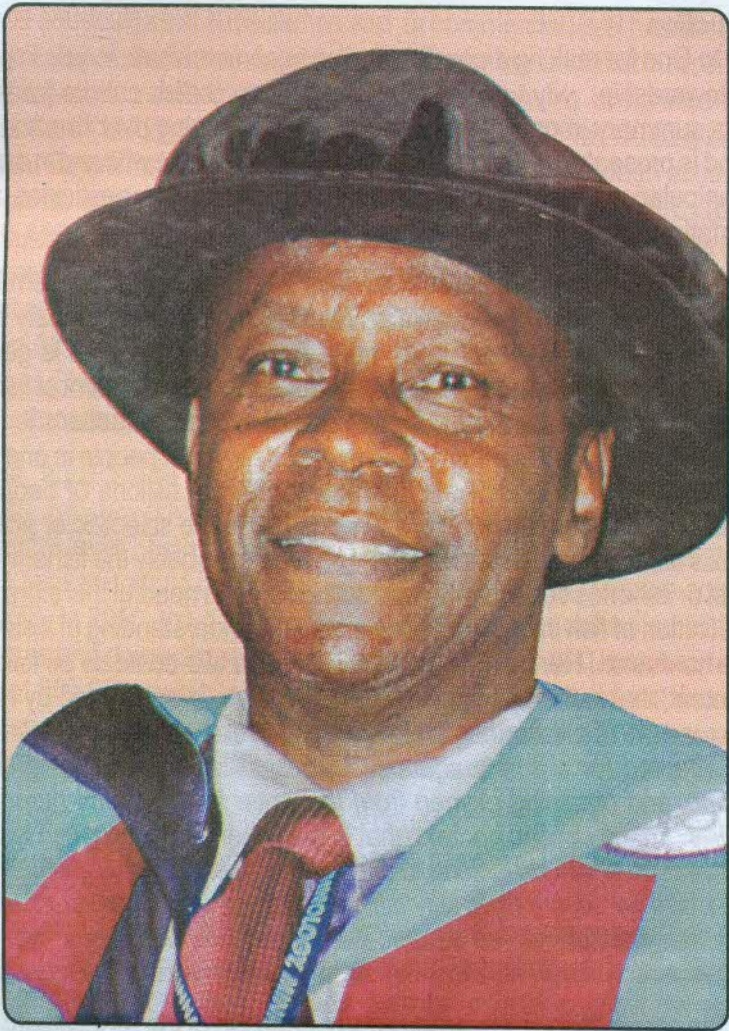


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Published by:
University Seminar and Colloquium Committee,
Federal University of Technology, Minna.

November, 2011

Design + Print:
Global Links Communications, Nigeria
©: 08056074844, 07036446818



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1.0. Introduction

I give glory to God for making it possible for me to communicate to you in part my research stewardship. My Lecture title: The African catfish culture for the 21st Century is a summary in part of my research work spanning over two and a half decades and is presented in 4 parts - The African catfish in the wild and in captivity, its sex manipulation, response to a representative of the pesticides and a recommendation for a 21st century culture system.

Fish is perhaps the most valuable item in water as far as man is concerned. It is almost inevitable that where there is water there is fish. And it is probably the first thing man looks for in any water body apart from water itself. It is generally observed that when there is a crowd near any water body the element of fish is the main object. It is no wonder therefore, that one of man's occupations is fishing. But then what is **fish**? Fish is a word used everyday by most people in one way or the other to convey messages. It is interesting that the billions of people that consume fish world wide may not know what fish is. In the scientific or academic world, there is still the confusion as to what fish is. It is probably the fisherman, the fish biologist or fisheries scientist that can define fish. It is needful therefore to give a proper definition of fish in order to provide a better understanding of it as well as remove the confusion. Hence, Fish can be defined in two contexts as follows: In the first context, that is the biological context, true fish, is as defined by Norman and Greenwood (1975). According to Norman and Greenwood, *fish is defined as a vertebrate adapted for a purely aquatic life, propelling and balancing itself by means of fins, and obtaining oxygen from the water for breathing purposes by means of gills.* In the second context, that is the fisheries context; *fish is defined as a collective term which in addition to the first definition includes shellfish, cuttle fish, starfish, sea horse, crayfish, jellyfish, mudskipper that is the sum total of the harvestable fish and fish related aquatic life.* From these definitions, the layman and any other person is now able to understand what fish is in the two contexts.

Related to the above, is the term **aquaculture** because of the association; and its being the subject of this lecture. The term aquaculture is almost as old as man as the Chinese have been in it well before 1000 BC (Nash, 2011), though it has improved and developed to such an extent that it has become an art. According to the Food and Agricultural Organization (FAO, 1998) aquaculture is defined as, *the farming of aquatic organisms including fish, mollusks, crustaceans, and aquatic plants. Farming organisms implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from*

predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated.

Traditional aquaculture at subsistence and or commercial level has for a long time been in existence in China, Japan, South East Asia and more recently Israel where fish protein ranks high in their diet hence having a significant Fishery Industry. Bard (1972) and Huet (1972) traced the art of Fish Culture in ponds to the ancient Egyptians and the Chinese. However, the first written account of fish culture ponds was by Fan Lai, a Chinese Fish Farmer in 475 B.C. (Chackroff, 1976). In Africa, Hecht and Britz (1990) and Hoffman *et. al.* (2000) have described it as a recent event, even though Nash (2010) reported that the earliest practice was started by the British colonial government in Kenya in 1924. Today, Fish Culture in Africa is practiced in central and Southern Africa, the Congo Basin, Cameroon, Ghana, Sudan, Egypt, Uganda, Ivory Coast, Nigeria and a host of other countries, but these are not as successful as in the far East and tropical Asia.

In Nigeria, aquaculture is generally practiced mainly at a subsistence level by individuals, very few private small-scale entrepreneurs and by Government at the experimental level. Fish alone contributes on the average 20 -25% per Capita animal in take and could be as high as 80% in coastal and riverine communities FAO (2000). In 2010, the demand for fish in Nigeria was estimated at 1.2 million metric tones and domestic production stood at only 600,000 metric tones leaving a deficit of 600,000 metric tones that was met by importation at the cost of N35 billion or as recently stated by the new Agriculture minister and reported by one of The Daily Newspapers at N75 billion for the same period.

The aim of aquaculture is principally to produce food fish for human consumption. It is also to enhance Culture-Based fishery by providing fingerlings for re-stocking open waters like natural and artificial lakes, reservoirs and running streams in order to prevent the extinction of commercially important species of fish especially when and where there is over exploitation. Fish Culture provides additional income to farmers and their families thereby alleviating poverty, particularly among the rural populace. At the national level, it can serve as a source of foreign exchange like in China.

It is noteworthy to state here that fish is one of the most traded commodities in the world today and the contribution of aquaculture to food security, human health, general well being and employment generation can not be over emphasized. Globally, the fisheries sub sector employs about 500 million and sustains the livelihood of more than 3 billion world-wide.

Recirculating aquaculture system represents a new and unique way to farm fish. Growing public demand for a healthy, tasty and affordable fish is stimulating the boom in this industry. The decline in wild fish populations as a result of overharvest and other factors including water pollution has promoted the culture of farmed fish that are grown in contaminant-free waters in indoor tank system.

1.1 .The origins and abundance of fish

Except for the Bible record of Gen.1:21, which states that *“So God created the great creatures of the sea and every living and moving thing with which the water teems, according to their kinds,”*(NIV), geological record has so far provided no evidence as to the origin of fishes either from fossils or living forms. Except that different groups appeared at different geological time periods (eras, periods and epochs) in their evolution. Broadly speaking, fishes (both fossil and living forms) belong to two large super classes: Agnatha (Jawless) and Gnathostomata (with jaws). For their distribution and abundance, fishes are the most numerous of the vertebrates. As at January, 2010 the estimated total of recently described species stands at 31,500 species making it the largest single vertebrate group on Earth. They have been able to keep pace with development of places of abode and now live almost wherever there is water, both on the surface and in the surface-connected subterranean waters. They occupy everything from Antarctic waters below freezing to hot springs of more than 40°C, and from soft freshwater to water saltier than the seas. They are present in sunlit mountain streams so torrential that neither man nor dog can wade or swim them, in waters so quiet, deep, and dark that they have never been inhabited by other vertebrates or thoroughly explored by man (Lagler *et.al.*, 1977).

1.2. Fish and Humanity

The relationship of fish to man has been that of prey-predator until recently when the art of ornamental fisheries came into being. Fish as food, medicine, ornament or weapon must have found favour with man at a very early stage. From the remains of Stone Age kitchen middens, archeologists have been able to identify the species that were most commonly eaten by early man (Nash, 2010). Fishing as an activity has engaged man from time immemorial. Fish was one of the earliest natural resources to be exploited by man (Norman and Greenwood, 1975). Since early times, fish was exploited by man for the reasons stated earlier using very simple gears with inestimable catches as stocks seemed inexhaustible then. This trend continued for centuries until a few decades ago when the signs began to indicate rapid decline in stocks. Man at this point realised that the

