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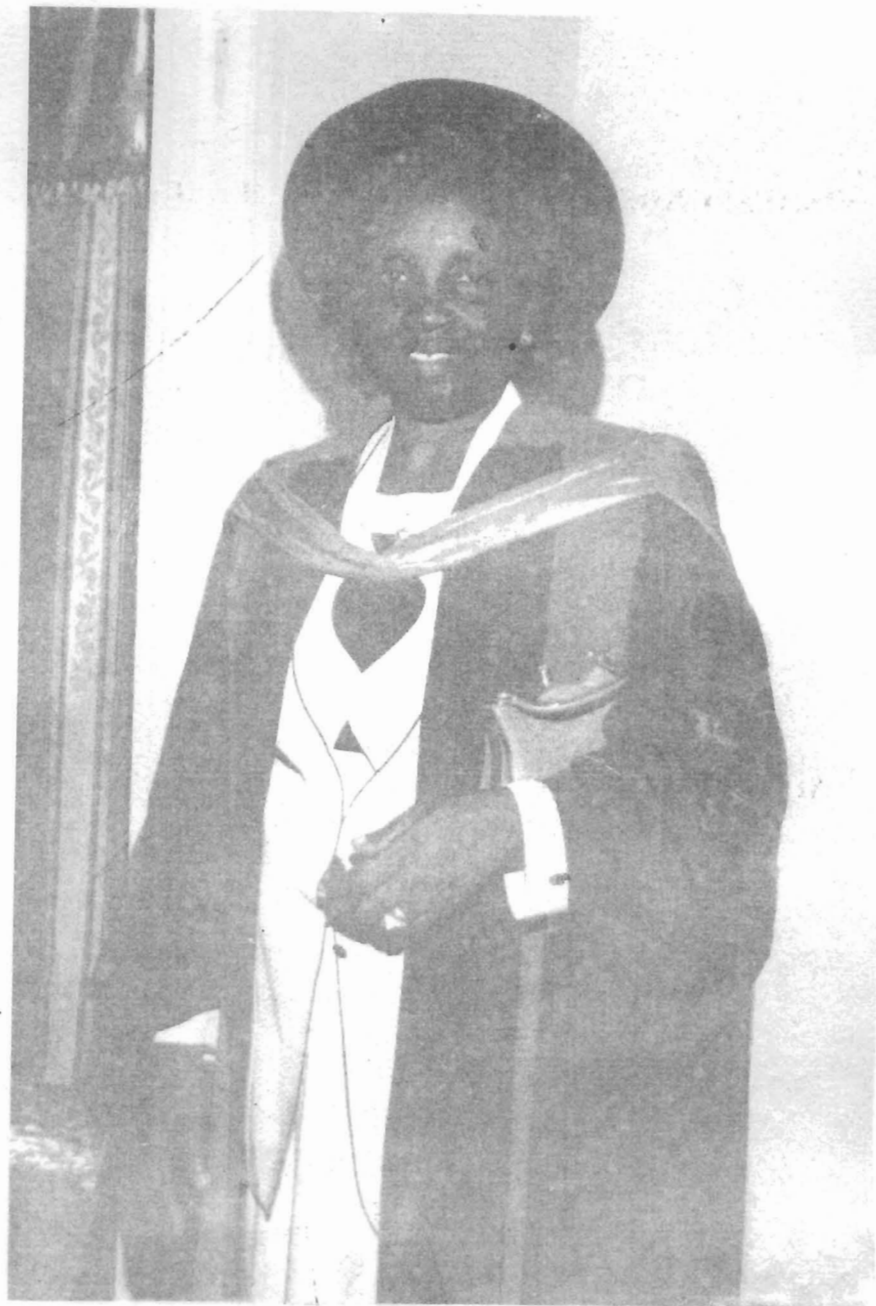
**FISHES: UNDER-WATER HIDDEN  
TREASURES**

**By**

**ESTHER A. ADESULU**  
Professor of Zoology



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# **FISHES: UNDER-WATER HIDDEN TREASURES**

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**An Inaugural Lecture delivered  
At Oduduwa Hall, Obafemi Awolowo University,  
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## INTRODUCTION

Mr. Vice - Chancellor Sir, academic and administrative colleagues, distinguished guests, ladies and gentlemen.

It is a privilege and honour to deliver this inaugural lecture today, being the second inaugural lecture to be delivered by a lady in the Faculty of Science, of this University.

### Brief Comments on fishes

Fishes belong to the Class Pisces, the lowest class in the Subphylum Vertebrata, in the Phylum Chordata. Many words are derived from the word "pisces". For example, "pisciculture" means fish culture and the word "piscine" refers to fish-like behaviours.

Fishes are the only vertebrates that are unable to live on land. That must have been the reason why God created aquatic environments before fishes on the fifth day of biblical record of creation. Fishes are distinguished from other aquatic vertebrates by the possession of fins for locomotion and gills for respiration. Their environments range from freshwaters through brackish to marine waters. Fishes are the richest vertebrates in terms of species with over 21,000 species already described (Young, 1988). Nelson (1984) cited by Groombridge (1992) claimed that 4,000 species occur in Africa. Adesulu and Sydenham (2007) described 400 species in the freshwaters of Nigeria, with sizes ranging from 0.25gm to 85kg as exemplified by the clupeid, *Sierrathrissa leonensis* and *Lates niloticus* of Niger system, respectively.

### Uses of fishes

- (a) Fishes are rich in proteins that are important in the repair of damaged and worn out cells and formation of new ones. Fish proteins contain essential amino-acids. Although there are various other sources of

protein namely beef, poultry products, bush meat, domestic animals and plants, fish is unquestionably the best source. Many fishes are also rich in lipids (oils and fats), and depending on the amount, fishes are grouped into fatty and lean fishes. Minerals, polysaccharides, collagen are also abundant in fishes. They are also rich sources of vitamins, notably vitamins A and B<sub>2</sub>. The distribution, quantity and quality of all these nutrients vary with species of fish and their parts.

### **Fish Parts noted for Special Nutrients**

<b>Fish Parts</b>	<b>Nutrients</b>
Head and eye	Polysaccharide which helps to keep blood vessels and skin flexible
Bones	Calcium and other minerals
Skin	Vitamin A and B <sub>2</sub> . Vitamin B <sub>2</sub> is especially concentrated in dark skin.
Dark meat/regular meat	High grade of protein and vitamins
Internal organs	Vitamins and minerals

Murray and Burt (1969) referred to the materials that can be extracted from fish with water or water-based solution as extractives. They include sugar, free amino-acids and nitrogenous bases chemically related to ammonia. These extractives contribute to flavours and odour characteristic of particular species, thus making fish acceptable as food.

Muscles of fish lack connective tissues. The muscles are not tough, a feature that makes their flesh or fillet easy to chew and ideal for infants and the aged with their weak and fallen teeth. Fish muscle is low in cholesterol. This makes it good for people with hypertension, cardiac problems, obesity and those with tendencies for arthritis. Fishes can be eaten fresh (as in many parts of Asia), smoked, sun-dried, powdered, cooked or canned. Fish powder is a component of animal feeds. Because of its high cost, researchers are actively working on fish replacers, with a view to supplementing fishmeal in animal diets with cheaper plant materials and maggots (Adesulu and Mustapha, 2000). The most important use of fish is as food for man mainly, and for other animals.

- (b) Fishes are valuable in traditional medicine- in antenatal treatment, treatment of the eyes and various other diseases.
- (c) In cultural ceremonies – as part of requirements for wedding engagement, chieftaincy titles and burial. I personally witnessed a ceremony in the Eastern part of the country where many baskets of large and smoked fishes were donated as a matter of custom by relatives for burial rites.
- (d) In drinking water pots – Before the use of refrigerators, women put live clariids and electric fish in water pots to keep the water cool, and the electricity generated from the electric fish kept the children with their dirty hands away from such pots.
- (e) As animals for recreation – Many people spend long delightful hours taking care of their aquaria as a pleasurable recreation or hobby. Many countries export aquarium fishes. Ornamental fishes (mainly in the family Cyprinodontidae) constitute great source of wealth to many nations, while the building of

aquaria provides jobs for thousands of people all over the world. A fishing and cultural festival which takes place in Argungu in Sokoto State annually has drawn people from many parts of the world to Nigeria, and

This is good for the economy of the country. Similar festivals occur in the Philippines and in Japan and many other parts of the world.

These uses of fish were in God's mind when He gave man a comprehensive dominion over the fishes (Gen 1:26). We can eat them, use them in other forms and manipulate them in various ways. The researchers destroy some to improve the lot of others. Fishes are very prominent in the bible, much more than any other animal.

"And the fish in the Nile died" (Exod. 7:21) as a result of blood pollution. Pollution of various types, especially petroleum and petroleum products, still militate against fishes even today in Nigeria. This is very evident in the Rivers State, as a result of oil spillage.

"We remember the fish we ate in Egypt" (Number 11:5) proved Africa to be home of good fishes.

"They gave him a piece of broiled fish to eat" (Lk 24:42) Jesus ate fish not beef or pork, or chicken after His resurrection.

On good Friday, some Christians eat fish instead of beef. Muslims, Christians and traditional worshippers eat fish, unlike few other vertebrates which some people, on the basis of their religion do not eat.

I wonder how many people ever thought of why Jesus ordered Peter to go and catch fish and to open the mouth of the first fish caught and bring out the money in it. Why fish?, Why not a toad, a lizard or any other animal or from any other place. God that can make something out of nothing could

have asked him to put his hand in his empty pocket and bring out money. He said "go and catch fish". With the opportunity God gave me to visit some countries where the economy is based mainly on fishes and fisheries (e.g. the Philippines and Israel) I am of the view that the answer to the question "Why fish?" is 'fishes can form a mainstay of the economy of any serious nation'. This is the basis of the title of this lecture. "Fishes: under water-hidden treasures".

### **Nigerian Natural endowment for flourishing fisheries**

Nigeria is richly supplied with water bodies. According to Ita (1985) the country is blessed with vast amount of waters which should produce enough fish for the needs of her teeming population. There is a long coastline of about 960km along the Atlantic ocean, an intricate and extensive network of rivers and tributaries. The major rivers include Niger, Benue, Ogun, Bonny, Cross River, Akwa Ibom, Imo, Owena, Oluwa, Katsina Ala, Siluko and Anambra Rivers. Rivers Niger and Benue join together at Lokoja to form a large water body with its outlet into the Atlantic Ocean forming the Niger Delta, part of which is freshwater while part is brackish due to contamination by sea water.

There are lakes in Nigeria, consisting of natural and man-made types. Lake Chad is the main natural lake, and there are smaller ones in different parts of the country. Lake Chad is an international lake, shared by Nigeria, Chad Republic, the Cameroons and the Niger Republic. It has an area of 10,000 – 25,000km<sup>2</sup> (the wide range in the area is brought about by seasonal drought that exposes the basin almost half way or more in some years. The part of Lake Chad that is within Nigeria is 5,500km<sup>2</sup> (about 25% during the "normal Chad" phase. However, during "little Chad" phase the waters of the lake are concentrated entirely within Cameroon and Chad.

There are many man-made lakes in Nigeria with Kainji Lake being the largest with an area of 1280km<sup>2</sup>, maximum length of 136km and depth of 55m. Middle size reservoir include Tiga reservoir, Ede water works, Shaki reservoirs. Ita *et al* (1985) recorded 348 lakes and reservoirs and 677 fish ponds and flood plains with a total of 12,47,617.65ha of water surface area available for fisheries. There are many waterbodies I know that were not recorded by Ita and his co-researchers. The true figure should therefore be higher than the estimated 12,487,617.65ha of freshwater surface area in Nigeria. What then do we say of the marine and the brackish (lagoons) waters with which Nigeria is abundantly blessed.

In terms of personnel in fisheries discipline, Nigeria has enough to perform better in fish production than we presently do. We have some Universities turning out graduates in fisheries and wildlife annually, but many of our Universities still include fisheries as a course in Zoology Degree Programmes, instead of establishing Department of fisheries. We also have graduates of freshwater fisheries school at New Bussa and of marine school at NIOMR in Lagos.

### **Present position of fish production in Nigeria**

Table 1 shows the amount of fish produced between 1987 and 1996 (a period of ten years), in Africa, Asia, in Nigeria and in the world (in metric tonnes). It is ridiculous to think that the average percentage of fish produced in Nigeria for this period is 0.095% of the world, and 16.3% of the amount produced in Africa. It is disturbing to state that while Africa and Nigeria were recording these low figures, Asia was producing an average of 84.5% of world fishes. Moreso there was a marked annual increase in the Asian tonnage of fish.

**Table 1: Fish production (in metric tonnes) for the world, Africa, Nigeria and Asia between 1987 and 1996**

Year	World pisciculture production	African pisciculture production	Nigerian pisciculture production	Nigeria % of the world production	Nigeria % of Africa production	Asia
1987	10,635,187	58,204	6,002	0.06	10.31	8,528,599 (80.19% of world production)
1988	11,737,160	70,322	10,631	0.09	15.12	9,570,457 (81.54% of world production)
1989	12,358,966	95,346	25,840	0.21	27.10	10,079,661 (81.56% of world production)
1990	13,128,771	80,960	7,347	0.06	9.07	10,750,412 (81.88% of world production)
1991	13,767,122	90,844	15,365	0.11	16.91	11,445,699 (83.13% of world production)
1992	15,519,565	97,098	17,088	0.11	17.60	13,145,906 (84.70% of world production)
1993	17,926,937	89,882	17,090	0.10	19.01	15,549,878 (86.74% of world production)
1994	20,774,754	92,331	15,030	0.07	16.28	18,256,092 (87.87% of world production)
1995	24,276,398	100,290	16,619	0.07	16.59	21,527,710 (88.67% of world production)
1996	26,384,583	116,754	17,944	0.07	15.37	23,454,915 (88.89% of world production)
Average				0.095	16.33	84.61% of world production

of fish produced internally (from the above figures) and the fact that Nigeria is a heavy fish importer.



The conclusion from table 1 is that Nigeria produces 16.3% of the total fish produced in aquaculture in Africa and less than 1% (specifically 0.089%) of the world aquaculture production. These show that aquaculture is yet to take off in Nigeria in the true sense.

**Table 2: Domestic fish production supply and annual deficit in supply**

Year	Projected population million	Per caput consumption	Projected fish demand production (mt)	Total domestic fish (mt)	Deficit (mt)	% Domestic fish upon Fish Demand
1985	77.34	11.0	850,740	304,229	546,511	35.8
1986	79.20	11.0	871,200	372,301	493,399	42.7
1987	81.06	11.0	891,200	498,150	393,510	55.8
1988	82.92	11.0	912,120	463,540	443,580	50.8
1989	84.78	11.0	932,580	675,739	25,581	72.4
1990	86.64	11.0	953,040	434,579	518,461	45.5
1991	88.50	11.0	973,500	596,630	376,370	61.2
1992	90.36	11.0	993,960	721,492	272,468	72.5
1993	92.22	11.0	1,014,420	619,211	395,209	61.0
1994	94.08	11.0	1,034,880	515,135	519,745	49.7
1995	95.94	11.0	1,055,340	500,000	553,209	47.3
1996	97.80	11.0	1,075,800	500,000	575,300	46.4
1997	99.66	11.0	1,096,260	500,000	596,260	45.6
1998	101.52	11.0	1,116,720	500,000	616,720	44.7
1999	103.38	11.0	1,117,180	500,000	637,120	44.7
2000	105.24	13.0	1,368,120	500,000	868,120	36.5
2001	107.10	13.0	1,392,300	500,000	892,300	35.9
2002	108.96	13.0	1,468,100	500,000	916,480	34.0
2003	110.82	13.0	1,440,660	500,000	940,660	34.7
2004	112.68	13.0	1,464,840	500,000	96,480	34.1
2005	114.54	13.0	1,489,020	500,000	989,020	33.3
						61.7%

Source – Population based on 1991 census and Federal Department of Fisheries.



**Table 3: Estimated fish demand and supply in Nigeria (1995 – 2005)**

Year	Estimated population (million)	Fish demand (million MetricTons)	Fish supply (Metric Tons)	% Fish supply on Fish demand
1995	98.2540	1.1062	0.6966	62.97
1996	98.2970	1.1796	0.7592	64.36
1997	100.3830	1.2047	0.8626	71.60
1998	102.5130	1.2302	0.8204	66.68
1999	103.3810	1.2566	0.8732	69.48
2000	105.2413	1.3786	0.9016	65.40
2001	107.1031	1.4312	0.9713	67.87
2002	108.9616	1.4811	0.9930	67.04
2003	114.5420	1.5062	1.0024	66.55
2004	118.9800	1.5769	1.0112	64.12
2005	120.1201	1.5901	1.0143	63.78
				66.35%

Source: Adapted from (Tobor, 1992 and FAO, 2004)

Tables 2 and 3 show that on the average, domestic fish produced from aquaculture and from the wild is barely 60% of the fish demand in Nigeria.

### **Visible evidences that Nigeria is not producing enough fish**

1. Nigerians are large fish consumers with a total consumption estimated at 1.3million metric tonnes in the year 2000 (FAO, 2004).

Fish supply in Nigeria comes from two main sources – domestic production and importation.

The fact that Nigeria is not producing enough fish to feed her teeming population is evident from the low amount of fish produced internally (from the above figures) and the fact that Nigeria is a heavy fish importer

Nigeria is one of the largest fish importers in Africa with more than 1,000,000 metric tonnes yearly. There are five major drawbacks in fish importation.

- i. Loss of jobs for indigenous fishermen.
- ii. There is a negative impact on the balance of trade.
- iii. Draining of foreign reserves.
- iv. Imported fish which we have unattractively branded "Oku-Eko" is not acceptable to some people, especially the elderly ones. A study carried out in my laboratory some years ago showed that the "Oku-Eko" brand, though does not differ significantly in chemical components from fresh fish, yet more than 20% of Nigerians detest it for fish meal.
- v. When this brand of fish gets to Nigeria, handling is very poor. Fish mongers bring them out daily for sale, and return what is left unsold to the cold room or freezer at the end of the day, with nutrients draining out gradually. Hundreds of houseflies cover them, especially the smoke-cured ones.

2. High prices of fish make it difficult for average Nigerians to have access to good fish.

3. Overfishing

Most of our large waterbodies are already overfished. This is the act of taking more than scientifically permissible amount of fish from a waterbody. There are many reasons to show, for example, that Lakes Chad, Kainji, Rivers Benue, Niger etc. are already overfished.

a. General decline in catch per unit effort and observation that increase in fishing effort does not result in proportional increase in the catch.

- b. Decline in catches in larger mesh nets and consistently high catches in small mesh nets.
- c. Low productivity of the littoral zones.
- d. High concentration of fishermen per unit length of shore line or surface area of the waterbody.
- e. Rise in the cost of catching a unit weight of fish associated with increase in effort without relative increase in the catch.
- f. Decrease in market landings as compared with previous years or seasons.
- g. Exorbitant increase in the prices of fish in an area, which could be a sign of low harvest resulting from overfishing.

Overfishing ruins the fishery industry. It is always more serious with relished fishes.

4. Symptoms of kwashiorkor and other protein related diseases on our streets and hospitals. What do we expect when majority of Nigerians do not have the financial capacity to buy poultry products, beef or pork, because of their high prices, and cannot afford the prices of fish. Gigantic heads, protruding abdomens and collapsed buttocks are bound to be rampant.

Malnutrition has long been recognized as a major factor affecting the health, well-being and socio-economic development of people in developing countries. It is a major cause of childhood morbidity and mortality, very high proportion of low birth-weight-babies and poor outcome of pregnancies and maternal health. FAO, as far back as 1977, has declared that at least one billion people in developing countries do not have adequate nutrition, 36% of children under the age of 6 years suffer from moderate to severe under nutrition. A survey for Nigeria (ND and HS, 1992) indicated

that 43% of children under 5 years were stunted, 9% wasted and 36% underweighted. This shows that under-nutrition among children in this country is very high. Another survey by Federal Office of Statistics (FOS, 1990) found that 43% of Nigerian pre-schoolers were undernourished. This compares less favourably with 29% for Ghana and 30% for Zimbabwe for the same period (ND & HS, 1992). The period of military rule (Junta in government) has been the worst in the history of Nigeria in terms of economy and feeding standard.

Fish was once the cheapest and most readily available source of animal protein in Nigeria diet. Today however, most Nigerians can no longer afford fish in their diet.

### **Causes of fish shortage in Nigeria:**

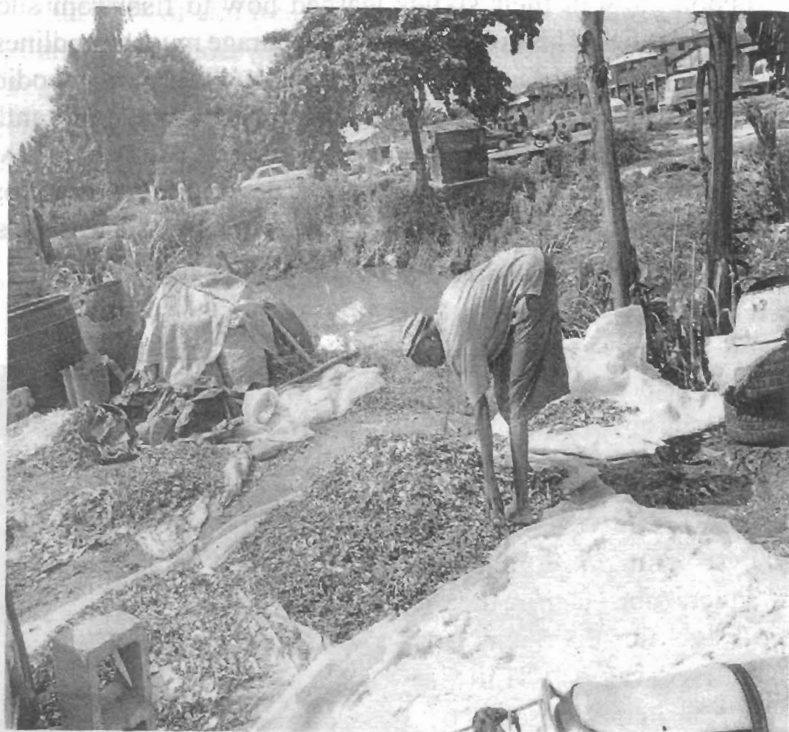
The scarcity and high prices are attributed to:

- a) Low productivity of large rivers and lakes that are already over-exploited and polluted
- b) The middle size rivers and streams that are already misused by fishing them with chemicals, explosives and are highly polluted with effluents from palm oil production mills and with cassava pollutants. In the past these are the small-sized rivers and streams that provided fishes, crabs, crayfish and molluscs for the villagers. People used to go in groups, especially during dry seasons to fish with simple fishing equipment which included calabashes for draining the water after building mud dam across the rivers in two places. After this manual draining, the water basin would be exposed and the organisms there collected. Other fish gears used were cutlass, baskets and hooks. Fishes brought home at the end of the day were enough for families to eat for many days. Neighbours too received gifts of such fishes. In fact many

people now in their sixties learned how to fish from such water bodies. This culture used to encourage much friendliness among children. The story is different now. These water bodies which were parts of the national assets have been ignorantly destroyed along with their organisms. Today, cassava processing sites, palm oil mills, mechanic workshops, butcher's slab and rubbish dumping grounds are sited on these rivers, and no fish can be found in them again.



Traditional Palm-Oil Factory along a middle-sized river



Cassava processing site along a middle-sized river

The villagers now depend on the “oku-eko” because fishes from fishing areas (like Ilaje – Ese Odo) are exported to big cities even outside Nigeria to the extent that these villagers don’t have access to them. The villagers are mainly crop farmers, not poultry farmers except the local chickens that take almost 2 years to develop to table size. There is no serious rearing of livestock. To the villagers, it is a waste of money to buy eggs. Children are mocked, even beaten if they are found buying or eating eggs. The little aquaculture products are not available for them.

- c. Low or almost non-existence of fish farming (see table 1)
- d. Use of non-selective fishing nets and lack of fishing laws and regulations

- e. Invasion of our water bodies with aquatic weed most important of which is water hyacinths (*Eihhornia crassipes*)
- f. **Taboos:** Wastage of fish due to traditional taboos which implies that certain rivers and their fishes are sacred and that such fishes cannot be fished and in fact must not be eaten, because even at 1000°C, they cannot be cooked. A friend who visited Nwangene waterbody at Unuawa in Okigwe Local Government Area of Imo State in Dec. 1995 described how hundreds of big fishes were found dying or already dead and how they were left untouched because people were forbidden to eat fish from the water. Fishes in Ominla and Oloyin in Ifesowapo local government area of Ondo State must not be killed. Babalola and Adebayo (1987) reported that fishes in River Inachalo in Eastern part of Idah in Igala area of Benue State are forbidden to be fished and cooked, (Adesulu, 1999).
- g. **Petroleum pollution of the water:** The large national income Nigeria obtains from the petroleum products is at the detriment of aquatic organisms. My first physical contact with oil spillage was in 1981. It was Texaco Oil spillage in the Rivers State where thousands of fishes of various sizes were seen dead, floating on water. Fishing equipment were destroyed by oil and soil, kilometres away was heavily polluted with crude oil. Unfortunately, as long as Nigeria depends on petroleum as the mainstay of her economy, fishes and other organisms in water will remain victims. The future will show that such an approach is detrimental to the well being of the country.
- h. **Spoilage:** This is a major factor in fish production in Nigeria, as it is in other food products. Spoilage occurs even before the fish is removed from the nets and after processing and during storage or transportation or when they are exposed for sale in the markets. The way fishes are removed from the nets and the amount of moisture in processed ones are the



two main factors in the degree of spoilage that follows. Bacteria and fungi (e.g. *Penicillium* and *Aspergillus*), vermin and insects are important destroyers of fish products (Osuji, 1976).

(i) **Unimplemented research findings and lack of field workers:**

As has been said earlier, Nigeria has produced many fishery experts in various fishery disciplines – biology, ecology, breeding, nutrition, culture, physiology, marketing and so on. Libraries, departmental and personal offices are filled with dissertations, theses and reprints of published papers. Rarely has any of these findings been experimented in the field.

Many fishery experts are currently bankers, teachers, and accountants. I know a Ph.D. holder in fish and fisheries who is now a local government chairman and a student of mine who is a chartered accountant. Fishery personnel in the ministries stay in their offices projecting what the situation will be, how much fish Nigeria will produce in 2010 AD, and what will be the consumption per capita. Despite the fact that all the donor agencies supporting projects in fisheries – International fund for Agricultural Development (IFAD), the World Bank, FAO, ECOWAS, UNDP etc. have made their impact towards national accelerated fish production by giving generous fund to the ministeries, fish increase in Nigeria is not yet a reality, because people are still malnourished for lack of fish protein.

**My Research Efforts**

My research in Ichthyology commenced in 1971 with the family Cichlidae, with special reference to *Sarotherodon galilaeus*, the fish formerly referred to as *Tilapia galilaea* in Lake Kainji under the supervision of Prof. A.M.A.Imevbore.



Members of this family then formed the mainstay of Niger system. In every hundred fishes caught in the lake, about sixty would be cichlids. My early finding showed *S. galilaeus* to be a biparental mouth brooder, a filter-feeder, whose main food consisted of phytoplankton and bottom deposits (Akintunde, 1976).

After this basic study of the general biology of *Sarotherodon galilaeus*, I looked at the nutrition of this fish of great economic importance, a fish with good flesh, taste and of high demand. The proximate composition of the natural food of *Sarotherodon galilaeus* took quite sometime to determine. Some of the analyses were undertaken at the IITA, Ibadan and various other laboratories in the country, because my department had no facility to determine amino-acids, some minerals and vitamins at that time, and even now. The following preliminary results were obtained from my study on *Sarotherodon galilaeus*.

- (i) This fish feeds between 6am and 8pm daily with no feeding at night. During the day however, variations in feeding intensity occurred with time, the peak period of feeding being between 1pm and 5pm (Akintunde, 1982).
- (ii) Hydrogen ion concentration along the gut was between 1.1 and 9.5, with the stomach maintaining an acidic state while the intestine was alkaline.
- (iii) The nature of food of *S. galilaeus* varied with size of fish. The fry (young fish) fed mostly on zooplankton, while the juveniles and adults fed on phytoplankton. Close to fifty plankton genera were identified in the stomachs of the fish, and these showed marked seasonal variations. Green algae were found to dominate the stomachs between January and April, diatoms between May and July, while blue- green algae were the main plankton in the diet for the rest of the year (i.e August –December)

- (iv) The food contained normal ranges of carbohydrates, protein, lipids, crude fibre and essential minerals common in fish diets. Twenty amino acids, including the ten indispensable ones for fishes were detected in the food of *S. galilaeus*. Phospholipids, fatty acids and triglycerides were present in the food. Sterols were found to be synthesized by the fish. The concentration of protein was very high in the food of the young, but decreased in the diets of adult fish.
- (v) Gut enzymes detected included carbohydrases, proteases and lipases. Amylase occurred throughout the length of the gut. Maltase was found only in the adult fish.
- Pancreatic tissues were the richest source of lipid-digesting enzymes (Akintunde, 1984).

From the above findings, I formulated diet for *S. galilaeus*. It is a common practice in Nigeria for people to feed their fishes with diet designed for temperate fishes or for fishes that are unrelated to their own fishes in feeding habits. This is the major cause of failures in pisciculture, i.e giving wrong food.

After the formulation of diets for various sizes of *S. galilaeus* and subjecting the fish to such diets, I extended my interest in ichthyology to obtain information on the freshwater fishes and fisheries of Nigeria. My reasons for this were many. When I was an under graduate in the Dept of Zoology of this University (then University of Ife), there were two major obstacles Zoology students in fisheries programme had to contend with. There were no textbooks on Nigeria fishes and fisheries. All the books recommended were on temperate fishes and they were not available locally. Luckily for me my brother, Engineer Ife Akintunde was in Britain at the time and he bought two of the books for me. Many students in my class depended on the books for our examination. The second obstacle was that we had no teacher in the area of Fish biology. The University had to employ temporarily Mr. Apanpa from the Ministry of Agriculture Ibadan to give lectures to my class. In my academic career, I have

through the Grace of God, written two textbooks in Fish and Fisheries for the use of students and others who are interested in fishes and fisheries. The books are:

1. Pisciculture: Essential Production Information, published by Eternal Communication Ltd, 2001; pp 120.
2. Fishes and fisheries of the Freshwaters of Nigeria, (with D.H.J Sydenham) published by Macmillan publishers Ltd. pp397, 2007

I have successfully supervised many Masters and Ph.D degree candidates and numerous B.Sc students.

### **Concluding Remarks:**

In conclusion, I will like to make the following recommendations:

- i) Agriculture (to which fisheries belong) has never been given its deserved pride of place, rather previous governments concentrated all efforts on petroleum, fish importation, Festac, soccer e.t.c. Government should pay more attention to the health of the citizens through production of good and affordable food for good and improved quality of life.
- ii) Fisheries should be introduced into the syllabus of secondary schools, so that children can appreciate the importance of the profession.
- iii) Establishment of a dept of fish and fisheries is very desirable instead of putting it in Zoology department as is the case in this University and some Federal Universities of Technology.
- iv) Research on fishes should be funded generously so that fishery biologists in the universities can practicalise their teaching skills in the field.
- v) Government should give soft loan to fish farmers

- vi) Electricity, potable water, hospitals, schools, good roads should be provided for the artisanal fishermen to improve their lot so that they can perform better.
- vii) Top priority should be accorded to reclamation of the middle and small-sized rivers and streams in Nigeria for fishery development.

At my free time, I have developed another talent God endowed me with. This is story writing for both primary and secondary schools and for general readings and the books are gaining popularity. Some of my literary works are on display outside this hall.

Mr. Vice-Chancellor Sir, distinguished ladies and gentlemen.

I wish to request your special permission to acknowledge some people today. First and foremost I thank the Almighty God for all the opportunities he has given me so far. God used my brother, Engr. Ife Akintunde to train me. He is not rich but he made sure I lacked nothing and he did all with love, not grudgingly. My husband, Chief Olufemi Adesulu gave me all the necessary support in my career. My young babies who I was leaving at Ife to be on the field in Kainji Lake deserve special 'thank you My teachers, my wonderful colleagues, and my friends who are here to grace this occasion, I thank you all.

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