

Proceedings of the Iowa Academy of Science

Volume 73 | Annual Issue

Article 22

1966

Observations on Fishery Management in Africa

Kenneth D. Carlander
Iowa State University

Copyright ©1966 Iowa Academy of Science, Inc.

Follow this and additional works at: <https://scholarworks.uni.edu/pias>

Recommended Citation

Carlander, Kenneth D. (1966) "Observations on Fishery Management in Africa," *Proceedings of the Iowa Academy of Science*, 73(1), 145-155.

Available at: <https://scholarworks.uni.edu/pias/vol73/iss1/22>

This Research is brought to you for free and open access by the Iowa Academy of Science at UNI ScholarWorks. It has been accepted for inclusion in Proceedings of the Iowa Academy of Science by an authorized editor of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.

to help the graduate program at Iowa State and to solve perplexing problems in game biology, management, or both. The contributions of the 81 graduate students who have completed wildlife theses at Iowa State University have helped immeasurably to improve our understanding of wildlife biology and management. The important positions now occupied by the majority of these graduates bear witness to their abilities and contributions to our program.

Observations on Fishery Management in Africa¹

KENNETH D. CARLANDER²

Abstract. Fisheries personnel in Liberia, Nigeria, Ghana, Sudan, Uganda and Egypt were visited in March and April 1965. Harvest of fish from the sea, lakes and rivers is being improved through improved boats, motors, and docking marketing facilities. High dams on the Nile and Volta Rivers are providing new fishery resources which will require research and development of new techniques. Flooded vegetation has caused oxygen depletion in the Volta Reservoir. The dams will also interfere with spawning of fish and clams downstream, and the Nile dam has already reduced the catch of sardines in the Mediterranean. Fish culture is hindered by lack of experience and research and by shortage of supplemental foods. Africanization of the fisheries departments has often displaced trained biologists before their counterparts could be trained. Attention is being given in each country to the training of fisheries personnel, but outside help will be needed for many years.

A 2-month visit in eight African countries does not qualify me as an expert, but my opportunities to meet fishery biologists gave me an insight into some of the fishery problems. In March and April 1965, my wife and I visited fishery laboratories and personnel in Liberia, Nigeria, Ghana, Sudan and Uganda. We also visited Ethiopia, Kenya and Tanzania but saw little of their fisheries. Then we were in Egypt for 7 months to develop a university program for training fishery biologists.

In each of these countries fish have been harvested for centuries by techniques that are still being used. The catch per fisherman is usually small, but in some localities the number of fishermen is so high as to harvest all the fish that could be taken

¹ Journal Paper No. J-5401 of the Iowa Agricultural and Home Economics Experiment Station, Ames, Iowa. Project No. 1374 of the Iowa Cooperative Fishery Unit, sponsored by the Bureau of Sport Fisheries and Wildlife (U.S. Dept. Interior), Iowa State Conservation Commission and Iowa State University of Science and Technology. This study was made while the author was on leave of absence. During 7 months of the year he was on a Ford Foundation assignment helping to establish a fishery biology training program in Alexandria, Egypt.

² Professor of Fisheries, Iowa State University, Ames.

with more efficient gear. The yield might be increased if there were less intensive harvest, but is it difficult to limit the fishing pressure because there is no other profitable employment available for the displaced fishermen. Furthermore, there are not adequate data on the fisheries to prove the value of less intensive fishing, nor the degree to which the effort should be reduced. That most of the fish are caught before they reach adult size suggests overfishing in some areas.

Protein is deficient in the diets of most of the poorer people in all of these counties, and improved fisheries could provide high quality protein. Improvement of the fisheries must usually be accompanied by improvements in agriculture, education, industry and other aspects of the economy.

Lack of freezers and ice means that the fish must be sold locally and quickly. The quality of the fish in the markets is usually very good because of the necessity of selling the fish within hours of their capture. The small sizes of the catches and selling of most fish in small lots facilitate maintenance of quality. In areas some distance from sources of fresh fish, the people are not used to fish and have to be educated in their use when supplies are brought in.

MARINE FISHERIES

Marine fisheries along the coasts of the West African countries have expanded significantly in recent years, through introduction of larger boats and of techniques for deep-water fishing. Since fisheries require significant capital, most of the advance has come through governmental help through a few large companies. Much of the offshore fishing is done by non-African vessels. Canoes made from large hollow logs are still widely used even in the sea, however.

The Fishery Department of Ghana has provided many facilities at the new fishing port in Tema. There is a boat-building facility where 40 and 60-foot trawlers are built of native lumber and sold under favorable terms and prices to commercial fishermen, and a shop where fishermen's motors are repaired free, except for the cost of parts. The trainees from this shop are then helped to establish repair shops in other ports. There is also a fisheries laboratory where biological data and catch statistics are collected to guide future management. Department biologists also collect fishery statistics at two of the six other marine fishing ports.

LAKES AND RIVERS

There are few natural lakes in West Africa, but East Africa has many fisheries on their Great Lakes. We saw only Lake

Victoria, some parts of which show signs of being over-fished. The main body of the lake is too dangerous for small boats and has fishery resources not now being utilized. The Uganda Department of Fisheries has been experimenting with a catamaran, made by lashing two fishing boats to a frame, for greater safety in fishing the open waters. They have also developed an improved boat for Lake Victoria. The large trees used for dugout canoes are becoming quite scarce in the area. The new boats are being built of mahogany and are sold to the fishermen below cost. The carpenters, upon certification after 5 years of training, are helped to establish boat-building shops in other areas.

On these larger lakes the fish cannot all be sold fresh locally. Hickling (1961, pp. 186-192) described the large processing plants, for drying and for freezing fish and for producing fish meal at Lake George, established in 1949 by The Uganda Fish Marketing Corporation (TUFMAC). We did not see these but saw fish drying on racks at Entebbe and the pilot project for canning the abundant but small *Haplochromis* spp.

The East Africa Freshwater Fisheries Research Organization in 1947 established a laboratory at Jinja, Uganda, where the White Nile leaves Lake Victoria (Hiatt, 1963). The British Commonwealth supports the laboratory as a "Common Services" contribution to Uganda, Kenya, and Tanzania. Two of the five biologists we met were Ugandans, recent graduates of Makerere College.

Rivers are the principal natural freshwater fishing area in West Africa. Rivers are difficult to manage, and not much has been done to improve their fishery resources. The largest river fishery we saw was on the Nile at Khartoum. An improved fish market has been provided by the fishery department here. Where production is greater than the local fresh fish market can consume, fish are sundried or preserved with salt.

IMPOUNDMENTS

Several large dams are planned or are under construction to provide electrical power for industrialization. We visited the Volta River Project in Ghana and the High Dam at Aswan, Egypt, where two of the largest man-made lakes in the world are beginning to fill. Studies are started on each lake to aid in developing and improving the fishing. Fish show the fast growth typical in new impoundments. The fishermen, however, have to learn new techniques to fish the large lakes and need safer boats and new types of gear. Access roads, docks and storage facilities are needed for proper development of the fisheries on these reservoirs. The Volta River Reservoir floods a tropical

jungle area, and the inundated vegetation has already caused serious oxygen depletion and fish-kill. The flooded forests will also interfere with many types of fishing gear. A few small areas have been cleared before inundation so that they can more readily be seined. The Aswan Reservoir floods a desolate desert area with only a narrow band of vegetation along the river channel.

Many villages have had to be resettled to clear the area for the lakes (about 70,000 people in Ghana and 40,000 in Egypt). Many of these people fished the river and know little about fishing in lakes. As the lakes become established new villages will develop along the lake shore, where fishery facilities may be constructed. The dams also affect the fisheries below. Many of the river fishes spawn in the shallow areas following floods. Control of the floods may greatly reduce reproduction of these fishes. It is known that the Nile River floods are an important source of nutrients in the Mediterranean Sea and that the sardines concentrate in the enriched areas each year after the floods. This last year, when the Nile flood was controlled by the Aswan Dam, the sardine fishery was very poor. In Ghana, there is an extensive freshwater clam fishery that will probably be eliminated by the Volta River Dam, because the clams, *Egeria radiata*, spawn in the delta area during the floods, which will now be controlled. This clam fishery and others on the lower Volta are also threatened by a large tannery which expects to put its untreated wastes into the river. Increased industrialization will greatly increase the dangers of pollution in many waters in these countries. As yet, little attention has been given to pollution control.

FISH CULTURE

The raising of fish in small ponds would seem to have the greatest promise for increasing fish production in areas where more protein is needed in human diets. Locally produced fish do not need extensive storage and transportation facilities. In general, fish farming has not been particularly successful in Africa. We did learn of the Panyan fish farm in Nigeria where an Austrian fish culturist, Mr. Zwelling, has successfully reared carp and other fishes in 80 acres of ponds. Isolated ponds elsewhere have been quite successful, but much more research and public demonstration are needed. The most extensive research program we saw at the Kagansi Fishery Station near Entebbe, Uganda, where Yoel Pruginin from the F.A.O. is experimenting with hybrid Tilapia, and with Nile perch as predators to keep Tilapia from becoming overabundant. We also visited the brackish water fish culture station at Bugumo, Nigeria, established with help from the F.A.O.

Several fish culturists believe that supplemental feeding is needed to raise enough fish to pay the costs of constructing ponds. Most of the African areas lack excess food products which can be economically fed to fish. In Liberia, Peter Youn has shown that rubber tree seed, a surplus product in Liberia, can be used as a fish food, but efficient methods of harvesting and preparing the seeds have not yet been developed. One pond owner was using brewery wastes, which seemed to give good growth but which are probably too expensive for general use. In Ghana we saw ponds where Chinese fish culturists were feeding fish coconut meats from which oil had been extracted.

The best opportunities for successful fish farming are in areas where ponds can be constructed as part of the agricultural land use program. Near the Agricultural Station in Liberia, storage of water in ponds permits a second crop of vegetables or rice, with irrigation during the dry season. The cost of pond construction can thus be justified by the additional farm crop as well as the fish crop.

FISHERY PERSONNEL

Fishery biologists and administrators in these countries are handicapped by the lack of information needed for adequate management and improvement of the fisheries. Basic life history data are unknown for many common species, and there are few keys or handbooks for identifying the aquatic flora and fauna. There are practically no scientific journals and few contacts between the biologists for exchange of information.

The demands for Africanization in these new nations have often meant the displacement of trained European biologists before their African counterparts could be adequately trained. Even at the best there were few fishery biologists in these countries. The British colonies each had a fishery officer, perhaps with a small staff. In Uganda and Nigeria, the British fishery officers were retained by the new nations, but each had an African assistant who was expected to take over the position before long. All the fishery staff in Ghana were Africans except for a Japanese biologist working on the sardine fishery. Two of the Ghanaians were graduates of the University of Washington and a third of the University of British Columbia. The fishery staff in Khartoum were all Sudanese. The chief fishery inspector was a graduate of St. Andrew University, where many of the British fishery officers were trained. The chief of inland fishery research was Mahmoud Mahdi, a graduate of Iowa State University. Peter Youn, another Iowa State graduate, is in charge of the inland fisheries program in Liberia.

Programs for training more fishery biologists are getting

started but need more staff, libraries, and research. In Liberia, Peter Youn is teaching one course in the biology department at Cuttington College as an introduction to fisheries work. At the University of Eastern Nigeria in Nsukka, the Zwelling College of fisheries was established, but the only biologist who taught the courses returned to the United States this year and has not been replaced. At the time of our visit, the Federal Fishery Office in Lagos was preparing a 2-week short course in marine biology and fisheries for biology students during their spring vacations from various Nigerian colleges. The University of Khartoum has some aquatic biology and fisheries but no extensive program.

In Ghana, students graduating from the university in biology and wishing to go into fisheries were given an additional year of training in the school of business administration before taking governmental positions. It was hoped that after a few years of work the best biologist would be sent to the United States or Europe for graduate study in fisheries.

In Uganda, Makerere College has trained several biologist who have gone into fisheries in recent years. The Assistant Fishery Officer, Mr. Soul Semakule, took a Master of Science degree from the University of British Columbia after graduation from Makerere, and three other biologists are now in the United States doing graduate work in fisheries. The Uganda Fisheries Department has recently raised entrance levels for their staff. Technicians for the collection of fishery statistics and other field work must now have completed Grade 12, whereas in the past some had completed only Grade 6. The Fisheries Office has also received an appropriation for a training school, where 2-year courses in fish biology and management will be given to classes of 20 staff members. The present field staff includes about 100 men who should complete the 2-year course. They also plan short-courses for about 30 fishermen at a time.

Dr. Hugh Lamprey, of the East Africa Wildlife School at Mewki, Tanzania, pointed out that fishery and wildlife management are not fields in which Africans are apt to seek an education. With their newly acquired education they want to leave the village and country life. Before they can be trained as conservation biologists, they must have an understanding of the importance of preservation and management of their natural resources. They must be instilled with a sense of mission and vocation.

Although real progress is being made in training Africans for work in fishery biology, a great deal of help will be needed for many years. In our travels we saw programs assisted by the United Nations (FAO, UNESCO and UNICEF), and by techni-

cal assistance programs of the United States, Russia, China, Great Britain, Canada and some other countries.

The future of our civilization depends to a great extent upon closing the gap between the "developing" and the "rich" nations. U. Thant, Secretary General of the United Nations stated (1965 p. 31), "No single idea has more profoundly shaped the modern economy than the belief that all citizens have the right to share in its resources and opportunities." Improvement of fisheries in these African countries is part of the development needed to close the gap. We, of the richer countries, must help in the development and must recognize that progress will not be as rapid as the Africans or we would like. Change is coming rapidly though compared with the development to our present condition in the Western world.

ACKNOWLEDGMENTS

It is not possible to list all the persons to whom we are indebted for time and effort spent in showing us the fisheries in their countries. We make special mention of only a few: Peter Youn of Liberia; Dr. Elizabeth Babbott, Samuel Wokoma and Donald Niven in Nigeria; E. D. Heinen, Dr. A. Meschkat and John Adjety in Ghana; Mahmoud Mahdi in Sudan; Peter Proud, Soul Seminacole and Youl Pruginin in Uganda. The following agencies should also be given especial thanks: the Departments of Fisheries of Ghana, Liberia, Nigeria, Sudan, Uganda, the Volta River Authority, the East Africa Freshwater Fisheries Research Organization, Legon University, and University of Eastern Nigeria.

Literature Cited

- Hiatt, R. W. (Editor.) 1963. World directory of hydrobiological and fisheries institutions. American Institute of Biological Sciences. Washington, D.C.
- Hickling, C. F. 1961. Inland tropical fisheries. Longmans. London.
- Thant, U. 1965. Turning point. UNESCO Courier 18(Oct.):4-5, 8-9, 30-34.