

# ALLEVIATING POVERTY AND ENHANCING FOOD SECURITY THROUGH FISH PRODUCTION IN MAN-MADE LAKES

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## ABSTRACT

*Man-made lakes inhabit diverse species of which the fish fauna constitutes the most targeted species of exploitation. For man-made lakes to serve as means of alleviating poverty and enhancing food security through increased fish production in Nigeria, sound management of the lake is strongly recommended. It will include the maintenance of good water quality, stocking with good species, control of over fishing, conservation of extinction and declining species as well as adequate legislation to regulate fishing activities. Recreational and tourism facilities can also be incorporated along with fish production in these man-made lakes to provide additional income and revenue for individual and Government. Some other practical ways by which these water bodies can be improved for effective and sustainable fish production as well as alleviating poverty was discussed.*

## INTRODUCTION

Man-made lakes are formed by damming rivers to create an artificial impoundment for water storage, irrigation, hydro-power electricity etc. This brings about lacustrine condition which can be conducive to the establishment and maintenance of fish stocks appropriate for exploitation through capture fisheries and aquaculture.

In Nigeria, nearly all the major rivers have been dammed for either hydroelectric power generation, water supply or irrigation. Fish production in these lakes is usually a secondary consideration. According to Ita and Sado (1984), Nigeria has about 137,801 hectares of inland water reservoirs but with fisheries productivity of most of them underutilized due to non-stocking. Estimates of fish production from man-made lakes shows that they can yield several kg/ha/yr of fish if managed properly, this translating to several millions of dollars. Ita (1986), reported that Nigerian man-made lakes are capable of producing 512,000 metric tones of fish annually, but are currently producing less than 50% of their estimated potentials (about 150,000 metric tones a year). Jackson and Marmulla (2001) stated that construction of dams can result in productive fisheries especially in small shallower dams that have high concentration of dissolved solid while stocking of species will enhance yield. For man-made lakes to be sustainably exploited and provide increased fish production, fundamental considerations such as establishment and maintenance of habitats for spawning, recruitment and maturation of fish stocks, etc. (FAO, 1998) should be noted.

## FISH PRODUCTION IN MAN-MADE LAKES: AS A MEAN OF ALLEVIATING POVERTY AND ENHANCING FOOD SECURITY

Although, there is no man-made lake in Nigeria created solely for fish production, fisheries contribution to GDP and protein intake from these lakes sometimes surpassed the primary purpose for which the lakes were constructed. Over 150 fish species have been recorded in Nigeria inland waters (Holdeen and Reed, 1972) and have been exploited to decline and low production. To boost fish production, introduction and stocking of ecologically friendly species

should be done. Modern methods of aquaculture such as cage, pen or Happa system which increase fish production even above maximum sustainable yield possible in natural environment by capture fisheries (Otubusin, 1986) should be integrated. Sport fishing, angling, recreation and tourism could all be incorporated with fish production in these lakes to generate income and create jobs. 100-acre lake could generate business to the tune of 10 million Naira per year if the lake is fully developed in these directions. Ornamental fish production for export and local supply could also be a money spinning venture on the lake. This is possible through proper stocking, culture and management of the ornamental species. Fish production in man-made lakes have aided the economy and improved the standard of live of people living close to the lake. In many instances, markets, roads, houses, communication facilities have developed in these areas. Allied industries that are fisheries dependent such as net making, boat building, fish feed manufacturing, fish canning, aquarium construction could also spring up in such areas. These industries employ workers and generate income. Fish production in man-made lakes can surely alleviate poverty and enhance food security, if the above opportunities and potentials are tapped. The main challenges to it are fish habitat, environmental degradation, inadequate fish assemblage, inefficient harvesting systems, stakeholders conflict and insufficient institutional and political recognition (Miranda, 2001). Proper management of the lake therefore becomes imperative to achieve high fish production.

## **LAKE MANAGEMENT**

This should be aimed first at maintaining good water quality, because poor water quality may cause poor growth, low yield and fish death (Boyd, 1979; Bradka and Rehackora, 1964; Raymond, 1979). Workable fishery policy, good stocking programme and adequate legislation should be integrated into the lake management as was done in lake Kinneret, Israel – a man-made lake which yields 1,664 tonnes of fish/year/ha and which is also attractive for recreation and tourist activities (Gophen *et al*, 1999). Careful and guided introduction and stocking of juvenile native species which enhance greater yield should be done. Exotic and genetically modified species should be avoided. Identification and protection of spawning habitats of fish is necessary to increase yield. Control of man-made environmental problems such as eutrophication, sewage disposal and municipal uses of the lake should be done for effective fish production. Massive fish kill have been observed on Moro lake in Ilorin, Kwara State as a result of eutrophication (personal observation). Apart from man-induced problems, the lake itself can also hinder fish production through excessive weed growth, sedimentation, flooding, parasites and diseases. It is therefore necessary to control these problems. Excessive water withdrawal for irrigation and water supply can lead to loss of habitats, destruction of aquaculture system and consequently low yield. This should be checked especially in the dry season. Over exploitation and obnoxious fishing practices should be avoided.

Fisheries regulation should be formulated with biological and sociological objectives. Wellcome (1985) Noble and Jones (1993) have applied many type of regulations in man-made lakes some of which include license and permits to control fishing efforts, Mesh size limits, gear restrictions etc. Conservation of declining species and their habitat could also increase fish production. Management of the lake for recreations and tourism follows that of fish production. The water quality should be excellent, reservoir full, sedimentation controlled and weeds eliminated.

## **CONCLUSION AND RECOMMENDATION**

Proper lake management has been identified as the means of increasing fish production. Such management should be focused solely on specific needs of fish species. According to Nielsen (1993), fishery can be understood as a composite of three interactive components namely, (1) fish stocks (2) habitat and (3) people. If one of these components is missing, there

will be no fishery. Lack of fundamental knowledge of the limnology of these lakes has been one of the constraints of proper assessment of fish production. Sensitization on the potential benefits of man-made lakes as income generating and job creating sector is recommended. Regular collections of limnological data which will serve as a basis for monitoring changes in stocks, abundance and water quality as well as human and ecologically induced changes should be undertaken in these lakes. Adequate and workable legislation on the protection, misuse and abuse of the lakes and its resources should be fashioned out. Reorientation of the people to perceive the lake as their own property should be done. Restoration programmes should be carried out on polluted, eutrophied, or deteriorated lakes while conservation should be geared towards declining or extinction-prone species and the general water body.

Finally, the engineering designs of lake should take into consideration fish production as well. The lake should not be too deep because the deeper a lake, the less productive (Jenkins 1982). It is therefore necessary to bring limnologists and fish biologists into the initial planning and construction stages of dams to predict the extent to which potential fish yield is realizable depending on whether the lake is fishable and also to develop and regulate the fisheries.

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