

Northern Delta Lakes, Egypt: Constraints and Challenges

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Results and Discussion

Introduction

Egypt derives its fish yield from three chief resources; marine (Red and Mediterranean seas), inland (lakes and River Nile) and aquaculture (Fig. 1). These fisheries are one of our chief sources of wealth. If we give them due care, we can increase our national income and solve many of our problems such as the food deficiency especially animal protein and unemployment.

The lakes' fisheries play an important role in Egyptian economy, where they provide about 39% of harvested fish in Egypt. The Egyptian Mediterranean coast exhibits six lakes or lagoons which are situated along the Nile delta coast (Northern Delta lakes) and to the east of the Suez Canal (Fig. 2). These lakes are namely, from west to east, Mariut, Edku, Borollus, Manzala, Port-Fouad and Bardawil. All of them, with the exception of Lake Mariut, are directly connected to the sea. The following of catch and effort statistics showed that there is a steady decrease in fish abundance and annual fish production harvested from the natural resources of Egypt.

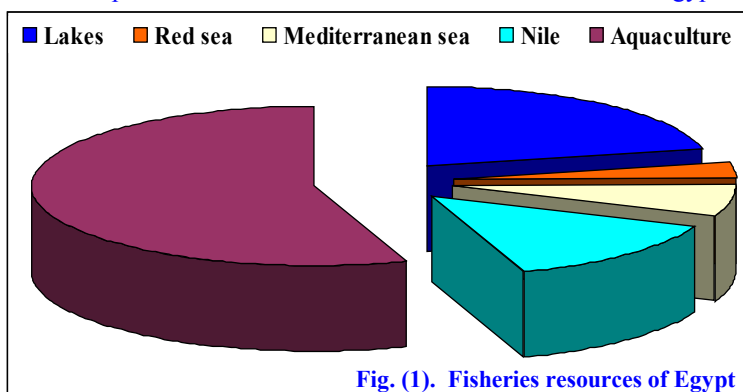


Fig. (1). Fisheries resources of Egypt

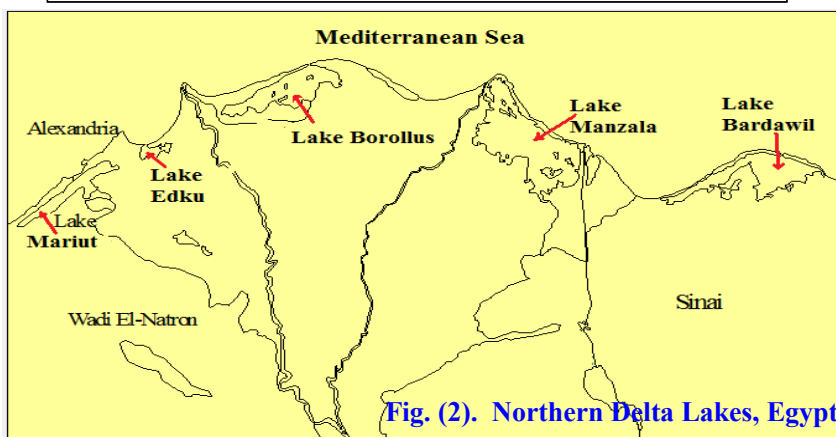


Fig. (2). Northern Delta Lakes, Egypt

Objectives

The Northern Delta lakes are the most productive Egyptian lakes (Fig. 3). Also, they are internationally important sites for wintering water birds, providing valuable habitat for them. The present study was undertaken to:

- Evaluate the current status of the fisheries of Northern Delta lakes
- Summarize the main problems facing the development and management of these valuable fish resources and how to overcome them.

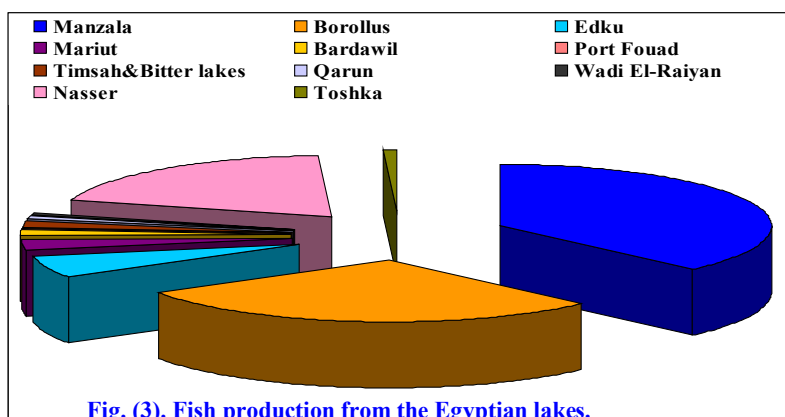


Fig. (3). Fish production from the Egyptian lakes.

Materials and Methods

Fishery statistics during the period 1987-2006 were obtained from the fisheries offices of the General Authority for Fish Resources Development. These data were analyzed to estimate catch per unit effort (CPUE). The maximum sustainable yield (MSY) and the optimum fishing effort (f_{opt}) as biological reference points, for the four lakes were estimated using the logistic production model of Schaefer. The equation used is: $dB_t/dt = rB_t - r/K * B_t^2$ where B_t is the biomass of the stock at time t , K is the carrying capacity of the habitat where the stock lives and r is the intrinsic rate of growth of the stock. Schaefer's model has $K = -a/b$, B_{MSY} (the equilibrium biomass for MSY) = $K/2$, $MSY = aK/4$ and $f_{MSY} = a/2$. Subsequently, $2/3 f_{MSY}$ have been calculated as a precautionary reference point.

Lake Manzala

Lake Manzala, the largest of the Northern Delta lakes with total area of about 90 thousand feddans and the depth rarely exceeds two meters. Lake Manzala is the most productive lake in Egypt where the mean annual fish production from the lake is 60 thousand ton.

Lake Borollus

Lake Borollus, the second largest Delta lakes, with total area of about 70 thousand feddans with an average depth of 1.2 m. The mean annual fish production from the lake is 48 thousand.

Lake Edku

Lake Edku is situated approximately 35 km east of Alexandria. It is a shallow eutrophic lake rarely exceeding 1.5 m in depth, The mean annual fish production from the lake is 9,000 ton.

Lake Mariut

Lake Mariut is the smallest of the Delta lakes, occupies about 17000 feddan. It is actually isolated from the open sea. The depth ranges from 0.6 to 2.7 m and the mean annual production is 5,000 ton

Surplus production model

The obtained results (Fig. 4) revealed that, the fish stocks under the current fishing effort are overexploited and the estimated precautionary target reference points advised the reduction of fishing effort by about 57%, 43%, 44% and 47% for Manzala, Borollus, Edku and Mariut fisheries, respectively.

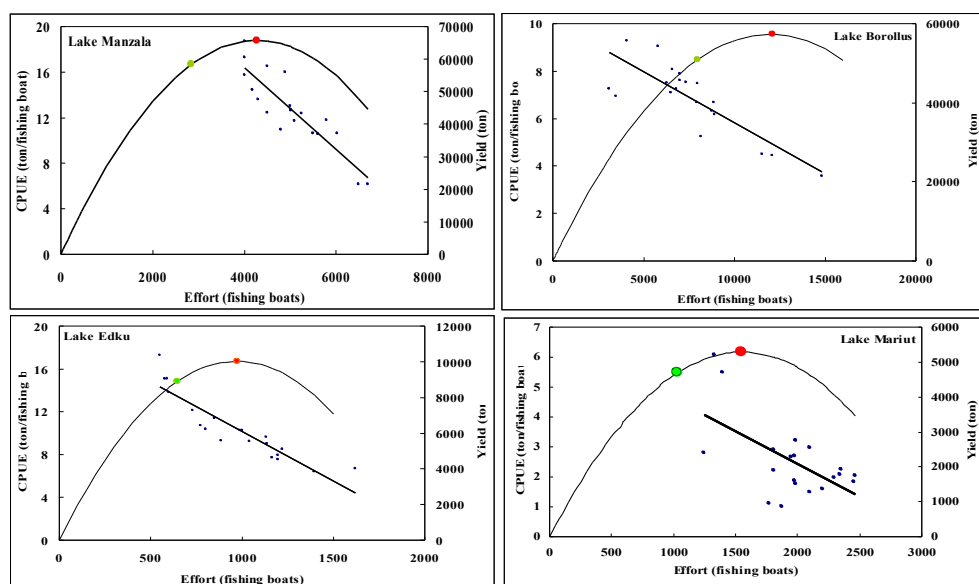


Fig. (4). MSY , f_{MSY} and $2/3 f_{MSY}$ for the four Northern Delta lakes.

Constraints

- Degradation, habitat loss, filling up and drought which lead to decreasing the area of all Delta lakes by more than 70% of their origin areas.
- Pollution: Delta lakes are the most polluted area in Egypt. They receive great amounts of industrial, municipal and agricultural wastewater without treatment
- Spread of aquatic plants which covered large areas from these lakes.
- Over-fishing, illegal fishing practices and illegal harvesting of fish fry.
- The blockage of Boughazes (the connections with open sea)
- High levels of eutrophication resulting from the increased nutrient influx from agricultural drains carrying large amount of washed and leached fertilizers and pesticides.
- The low awareness of fishermen about environmental issues and the importance of fisheries regulation measures.

Recommendations

- Studying the biology, dynamics and reproductive cycle of the commercial fishes of these lakes as this is an important step in establishing guidelines for fishery-regulation measures and construction a management policy for the rational exploitation of the lake fish resources.
- Controlling and optimizing the water quality of these lakes.
- Regulation of mesh sizes, controlling gear types used and prohibition of the destructive ones and developing suitable fishing gear for shallow lakes.
- Continuous clearance of Boughazes.
- Revision of fisheries laws and improving the system for collecting and compiling fisheries statistics.
- Examining the water inflow of the agricultural drainage canals and different drains regularly to control polluted water inflow into these lakes.

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