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Development and Progress of Aquaculture in Egypt with Special Reference to Cage and Pen Culture

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In Egypt, the need for increasing fish production is becoming a necessity in view of the high demand for fish as an excellent source of animal protein. Fish is a popular diet to many Egyptians and can be utilized to correct malnutrition, especially in rural areas where the production of other animal proteins is either expensive or low.

At present, the total annual production of fish is about 158,000 tons; annual importation is about 30,000 tons of frozen fish. This production is low considering Egypt's long coastal lines on both the Mediterranean and the Red Sea, the wide, shallow and fertile northern delta lakes, the inland and man-made lakes and the vast network of freshwater areas of the River Nile, its branches, diversion and irrigation canals. The present per caput consumption is rather low and estimated at 3.8 kg. Efforts are being made to increase fish production, at least to maintain this present level of consumption in view of the high rate of population increase that is roughly estimated at 2.4 percent a year.

Sixty-nine percent of the total fish production in Egypt comes from the inland waters. Table 1 shows fish production in 1976.

Table 1. Fish Production in Egypt (1976)

	Thousand Tons	Percent of Production
Marine Resources		
Mediterranean	18.3	12.7
Red Sea	11.5	8.0
High Seas	14.9	10.4
Total marine fishery	44.7	31.1
Coastal Northern Lakes		
Lakes	48.1	33.5
Inland Lakes	15.7	10.5
The Nile Network	24.8	17.2
Aquaculture	10.5	7.3
Total Production	143.8	
10 percent estimated consumption by the fishermen and their families	14.4	
Total Production	158.2	

Table 2 shows the different lakes in Egypt and the average production per unit area.

Table 2. Fish production from the different Egyptian lakes (1976)

Lake	Total Area Km ²	Average Production per Km ² (tons)	Total Production thousand tons
Manzalah	1450	19	27.4
Burollus	560	19	10.5
Mariut	160	36	5.8
Edku	130	31	4.2
Port Fouad basin	100	1	0.3
Nasser	5240*	3	14.0
Karoun	210	8	1.7

*Maximum level will be attained at 180 m above sea level.

Pond Culture

The Government is eager to develop inland fisheries production especially through fish farming. In 1968, the Inland Fisheries and Fish Culture Branch of the Institute of Oceanography and Fisheries started an active research programme to develop pond fish culture. The research activities included the use of fast growing fish, supplementary feeding, the use of organic and inorganic fertilizers and proper management techniques for pond culture aiming to obtain maximum possible yields of fish.

A polyculture system of mullets (*Mugil cephalus*, and *M. capito*), Tilapias (*Tilapia nilotica*, *T. galilea* and *T. zillii*), the common carp (*Cyprinus carpio*) and restricted numbers of carnivorous fishes (*Clarias lazera* and *Lates niloticus*) has been established. The average production varies according to the status of pond construction and management techniques and ranges from 800 to 2000 kg/feddans*/8 months.

Brackishwater fish farming is being developed and a composite fish culture system of mullets (*Mugil cephalus* and *M. capito*), bass bream (*Morone labrax*), sea bream (*Sparus auratus*) and *T. zillii* is being undertaken.

The total area utilized in fish pond culture increased from 500 feddans in 1968 to 15,000 feddans in 1978. The 5-year plan (1978-1982) is to develop 30,000 feddans of fishponds and the programme has already been started in an area of 5,000 feddans. The World Bank is also financing a project to establish fishponds of an area of 30,000 feddans.

Cage and Pen Culture

In 1977, IDRC suggested introducing other methods of aquaculture that are most suitable for the conditions in Egypt, i.e. cage and pen culture, to utilize the vast aquatic areas of good water quality and increase fish production in rural areas. A research program was subsequently formulated aimed at introducing these methods in Egypt.

For cage culture, the potential is great. This method of fish rearing can be practiced in irrigation canals, and in some inland lakes namely Lake Manzalah, Burollus, Ebku, Wadi El-Rayan, Karu, Aswan. There are several species that can be successfully

reared in cages for production of table-size fishes such as *T. nilotica*, *T. galilea*, *Cyprinus carpio*, the big head carp *Aristichthys nobilis*, the silver carp *Hypophthalmichthys molitrix*, and the bass bream *Morone labrax*.

A preliminary experiment on cage culture of the common carp, *Cyprinus carpio* has been carried out in Serow Fish Farm in one of the drainage streams in the vicinity of the Station.

Four cages of 4 m³ capacity (2 x 2 x 1 m) were used. The surface structure of each cage was made of galvanized iron bars. Floatation was attained by four metal drums and with outside synthetic netting. Fish was stocked at densities of 7 and 14 kg/m³. The duration of rearing period was three months. The fish were fed daily with a commercial pellet feed (for livestock of about 20 percent crude protein) at 5 percent of the fish biomass present in the cages. The results showed that the fish that were stocked at a rate of 14 kg/m³ grew from 73 g to an average of 193.5 g per fish in 3 months. On the other hand, fish that were stocked at a rate of 7 kg/m³ increased from 73 g to an average weight of 253.8 grams. The mortality rate was relatively high in the high density stocking. Further experiments are planned to be carried out in Serow Station using simplified designs of cages. It is also planned to be carried out in Serow Station using simplified designs of cages. It is also planned to rear the bass bream, *Morone labrax* in cages in Lake Karoun.

Pen culture

This method is practiced in the northern delta lakes in a traditional way called the "Howsha". However, this method of fish farming is considered illegal in Egypt since they occupy shallow areas which are the spawning and nursery grounds of several species of fish.

Improvement of the "Howsha" type fish farm should adapt the pen culture method, especially in the shallow delta lakes that are very fertile. The species of fish to be reared depends on the salinity of the water. However, the recommended species for brackishwater pen culture are mullets (*M. cephalus* and *M. capito*, *Morone labrax*, the sea bream *Sparus auratus* and *Tilapia zillii*). For freshwater pen culture, mullets, carps and tilapias are recommended. Research is to be directed to determine stocking densities and other management schemes.

*One feddan - 0.44 ha