

Prospects of Developing Cage and Pen Culture in Sudan

Thomas T. George
Fisheries Research Center - ARC
Khartoum, Sudan

The Sudan, the largest country in Africa, has an area of 2.5 million km². This vast plain is isolated on the north by the desert through which the Nile flows and on the east by the elevated tract bordering the Red Sea.

By virtue of this geographical position, the fisheries resources of Sudan include both marine and inland. The Red Sea, with a coastline of approximately 480 km, forms the marine fisheries resources. The inland Fisheries resources include the White Nile, the Blue Nile, the main River Nile, several natural and man-made lakes and a swampy area of 100,000 km². Thus, there are about 6,500 km of river waters covering an estimated 2 million hectares. There are also the waters of the irrigation canals in agricultural schemes which extend to several thousand miles as well as the large perennial rain-water catchment areas or "haffirs" (reservoirs) in western and eastern Sudan which have a combined capacity of 10,160,000 m³.

The Sudan is an agricultural country with a great livestock potential. Because of this fact, fish has not been in demand for several years in the past. However, the increase in population and the policy of the Government to introduce integrated farming systems (agriculture, livestock, poultry and fish) with the aim of exporting livestock, caused the demand for fish to become great at present. The price of 1 kg first class fish like Nile perch is about one Sudanese pound and fifty piaster or US\$3. The per capita consumption is 1.3 kg. Hence, there is a significant need to increase fish production from natural water resources as well as through aquaculture — pond, pen and cage culture.

The International Development Research Centre (IDRC), Canada is now supporting an aquaculture project for developing freshwater polyculture in Sudan. Under this project, three indigenous

species (*Sarotherodon niloticus*, *Labeo nilotica* and *Barbus bynni*) and two exotic species (*Cyprinus carpio* and *Ctenopharyngodon idella*) are considered. IDRC is also supporting another project in Dongonabe Bay of the Red Sea on oyster culture (*Pinctada margaritifera*).

Pen and Cage Culture

The prospects for developing pen and cage culture in the marine and inland water resources are great and can stem out as an expansion of the work undertaken in the already existing IDRC projects.

Marine water resources

The Red Sea is the main marine water resource. This sea is considered to be poor in its fin-fish commercial potential because it is a closed sea with no river pouring into it. However, the prospects for developing coastal mariculture are great. There are several species of cultivable fin-fish such as *Mugil*, *Chanos*, *Siganous*, and shellfish such as *Peneaus monodon*, crabs and oysters. The culture of *Pinctada margaritifera* already under operation with the IDRC project can be considered, to some extent, a sort of cage culture. The prospects for the culture of cultivable species in cages and pens in the bays and along the coast of the Red Sea are great and, therefore, this technique is suggested to be immediately adopted.

Inland water resources

The inland water resources, in particular the White Nile, are very rich in fish potential. In 1964, an investigation team estimated the potential in the Jebel Aulia reservoir to be 30 kg/ha and in the swampy region to be 120 kg/ha. However, due to extensive fishing in this reservoir, the fish landings

have decreased during the last few years and fishermen have been moving southward, as far as Renk in the Southern Region, to supply the Khartoum market with fish. This being the case, it is recommended that pen and cage culture be practised in the stretch of the White Nile from Khartoum to Jebel Aulia reservoir. This operation can easily be undertaken as a research project since the Experimental Fish Farm where the IDRC aquaculture project is already in operation, lies on the White Nile between Khartoum and Jebel Aulia reservoir. It is strongly recommended that local species be used and that no exotics will be introduced until proper studies are undertaken.

Application of cage culture will play a significant role in the "haffirs" particularly of Western Sudan which is far removed from the country's great river systems, and in the main River Nile. These "haffirs" amount to several hundreds in number and vary from 25,000 m³ to 1,955,000 m³ in area and from 1.5-9 m in depth. Success of cage culture in

these "haffirs" will supply fish to a population of about 100,000 in Western Sudan. Both indigenous and exotic species are recommended to be cultured in these "haffirs."

Pen and cage culture is recommended in Lake Nubia, the southern part of Lake Nasser extending into the Sudan borders. As there are many ditches along the bank of this lake which is very rich in its natural nutrients, pen and cage culture can be applied. It is strongly recommended that no exotic species be introduced into the lake when practising the recommended techniques before proper studies are made since the lake is part of the River Nile system.

In Summary, it is recommended that a project for developing pen and cage culture techniques be started on the White Nile at the Experimental Fish Farm in Shogorro. As these techniques become feasible, they could then be adopted in the "haffirs" of Western and Eastern Sudan, Jebel Aulia reservoir, and Lake Nubia.