The Predicament of the Freshwater Fisheries and Aquaculture of Sri Lanka

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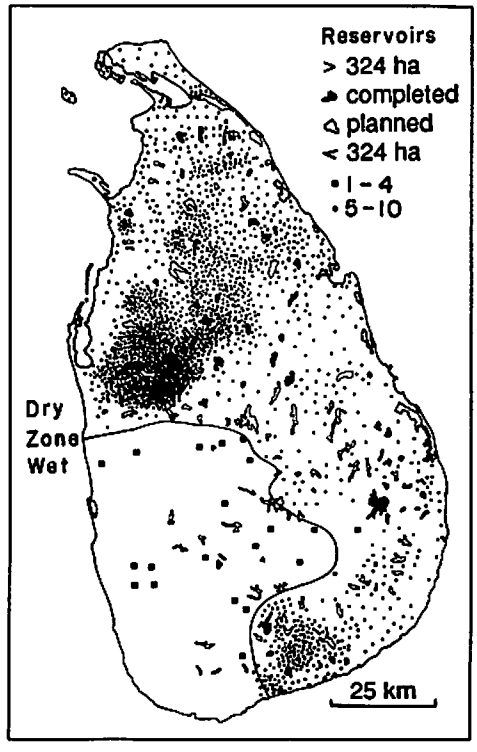
The recent decision by the Government of Sri Lanka to abolish the Inland Fisheries Division of the Fisheries Ministry (IFD) and to stop all goverment subsidies and aid programs to freshwater fisheries and aquaculture projects came as a great shock to fisheries biologists as well as to fishermen themselves. The decision of the government is based on the concept that such practices, namely, aquaculture and fish capture, are not in accordance with the history, tradition, social customs and aspirations of the people of Sri Lanka, the majority of whom (about 70%) are Buddhists.

Sri Lanka, an island of 65,600 km^2, has a recorded history of more than 2,500 years. The country contains no significant natural lakes but there are many irrigation reservoirs, perhaps more than 10,000, of which more than 7,000 are functional today. These reservoirs, on which the rice production of the island depends, were created before the 12th century in the dry zone, which extends over northern, eastern and northwestern sectors of the island. A few large reservoirs have been added during the last few decades for irrigation and hydroelectric purposes. The extent of the total reservoir area at the full supply level has been estimated as more than 175,000 ha (i.e., about 2.7 ha for every km^2 of land area), of which the perennial reservoirs form more than 136,000 ha while the rest are seasonal reservoirs and a few small flood lakes. With more reservoirs in the planning stage, this area will increase substantially in the future. Most of these reservoirs, the extent of which ranges from <10 ha to more than 7,000 ha, form an interconnected complex system of irrigation.

The country did not have a tradition of aquaculture or an organized freshwater fishery until recently, although there is evidence that a minor subsistence fishery existed from historical times. The very low fish yield owing to lack of true lacustrine species appears to be the main reason for the neglect of the reservoir fishery. With the (accidental) introduction of *Oreochromis mossambicus* in 1952 into the country's freshwaters this situation changed almost overnight. For instance, in Parakrama Samudra, a major irrigation reservoir situated in the eastern part of the country, the fish yield, which was less than 10 t/year prior to 1952, increased to more than 500 t by 1965.

The estimated yield at present of the capture fishery of the perennial reservoirs is about 27,000-30,000 t/year, while the per hectare production is variously estimated from 224 to 307 kg, the highest inland capture fisheries yield in any country in the region. IFD recently began a successful program of stocking the seasonal reservoirs, which are mostly <10 ha in area. The species stocked included tilapia, common carp, and Chinese and Indian major carps. IFD had also been overseeing the perennial reservoirs and was responsible for collecting catch statistics and regulating the number of boats operating and the mesh size of the gill nets used, gill nets being the main fishing gear in most of the reservoirs. IFD also stocked some of the perennial reservoirs with fingerlings of species mentioned earlier. Although the stocking of perennial reservoirs is of questionable advantage in terms of economic return for the cost of input because of the prevalence of well-established tilapia species in these reservoirs, it gives a variety to the catch which appears to encourage fishermen as well as the consumer. IFD also organized fishermen's cooperative societies and operated a subsidy scheme through which small fiberglass boats and gill nets were given to fishermen at a very low cost or free of charge. These activities had been continuing for more than two decades with little criticism or resistance from any sector.



Distribution of reservoirs in Sri Lanka.

More recently, the IFD embarked on a program to popularize pond aquaculture of freshwater fish. A subsidy and loan scheme was organized for providing assistance in pond construction, and advice was provided to the farmer on various activities relating to pond culture. The aquaculture scheme, from its inception, came under heavy criticism from the Buddhist leaders. Their point of view, understandably, is that killing of any animal is against Buddhist principles and that rearing animals for consumption is particularly abhorrent to Buddhists. As Buddhism is the state religion in Sri Lanka, the leaders pointed out that it is not proper for the government to encourage activities that go against Buddhist principles. The government agreed, and the result was the closure of the IFD. However, the government pointed out that any private individual or organization is free to engage in these activities, but that the government will not help them in any way; neither will it hinder such activities by private enterprise. Surprisingly though, the state involvement in the marine fisheries sector was not curtailed in any way; the government continues to operate its subsidy schemes for distributing fishing boats and gill nets and its program to develop existing fishing harbors and to establish new ones. Buddhist leaders also do not seem to have much objection to marine fisheries.

It is interesting to note that in Thailand, a country in which 95% are Buddhists and a country in which the Buddhist philosophy, teachings, customs and traditions are very much akin to those in Sri Lanka, there appears to be no conflict between the religion and the State's involvement in the development of freshwater fisheries and aquaculture.

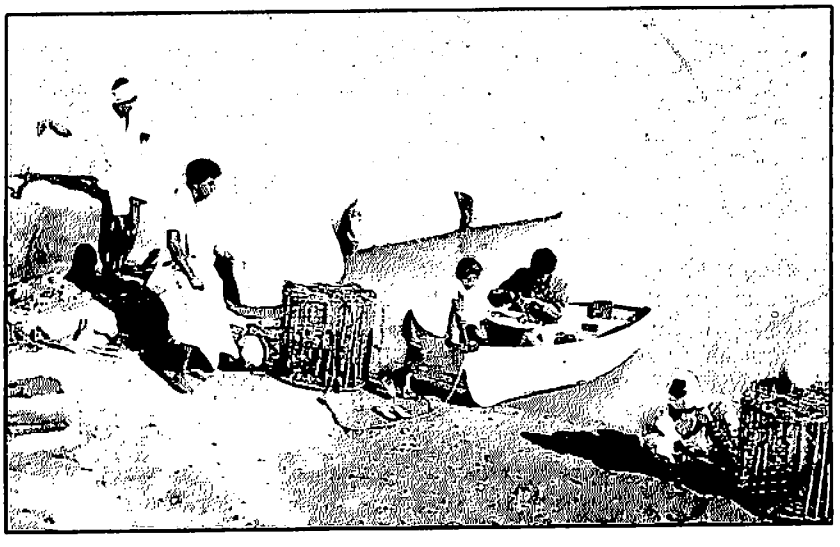
Without the government subsidies, help and regulation, freshwater fisheries and aquaculture are in grave danger of complete collapse. Without the government fish breeding centers operating, there is little possibility of obtaining adequate supply of fingerlings for stocking either ponds or reservoirs. Chinese and Indian major carps do not breed naturally in Sri Lanka. Any individual small-scale farmer cannot establish and operate profitably a hatchery and other facilities for fish seed production. Even if some private enterprise does undertake this, it is doubtful whether the farmers could afford to purchase fingerlings as the profit margin in pond culture is rather narrow in the country. Some farmers may now use their constructed ponds for ornamental fish culture, in which several private enterprises are interested and distribute fingerlings free of charge on condition that farmers will sell back the grown fish to the particular private enterprise. However, this is not an answer to the country's increasing demand for fish as a protein source.

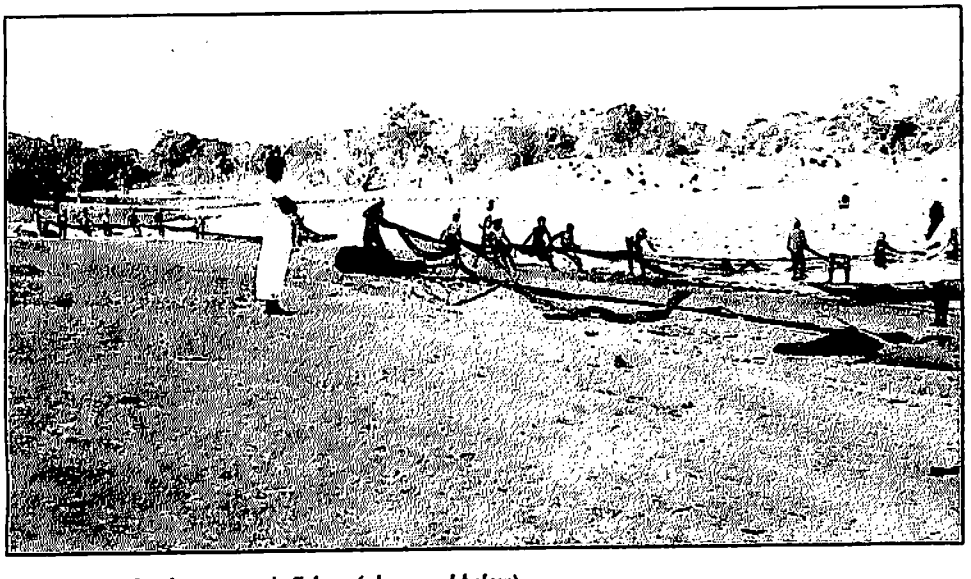
Although stocking is not important for the capture fishery in perennial reservoirs because of the well-established tilapia fishery, the lapse of regulation measures such as the minimum mesh size of gill nets, number of fishermen operating in a particular reservoir, etc., will tempt fishermen to use small mesh sizes, thus bringing down the mean size of capture and with it the profit margin; small fish (for instance, tilapia) are not in great demand and sell at a lower price. Already such decrease of mean size in the catch has been noted (personal observation).

The average income per fisherman is about Rs129.50/day. Although this may just be adequate for daily requirements of a family in Sri Lanka, it is not sufficient to cover the cost of purchasing new gill nets, new boats, etc. Therefore, if the inland fisheries are to continue as a viable industry, it is very necessary for the government to continue the loan and subsidy schemes for these fishermen, who number about 13,600. With four individuals to a family (an underestimate for Sri Lanka), more than 50,000 individuals (i.e., about 0.3% of the population), probably more, are dependent on the perennial reservoir fishery alone.

Although it appears possible for the fishermen to organize cooperative societies through which regulation measures could be implemented, experience shows that such cooperative societies are doomed to failure, sooner or later, unless supervised by government officials, such as the inspectors of the Fisheries Department, because of disputes and other problems among fishermen.

Sri Lanka needs its freshwater fishery, which contributes about 20% to the country's total fish production, to supply adequate protein to its lower-income groups. What is more important is that it produces fish in remote areas of the country where other sources of animal protein are not easily available or are too expensive for the lower-income groups to obtain. There is widespread protein malnutrition in Sri Lanka, especially among the lower-income groups in the areas remotely situated from the sea and the cities. The daily individual protein requirement in Sri Lanka appears to be about 45 g, but the average daily individual intake is only about 28 g. About 70% of the animal protein consumed in Sri Lanka come from fish and the country produces about 80% of its fish requirements at present.





Aspects of Sri Lankan reservoir fishery (above and below).

In most of the Asian countries, including predominantly Buddhist Thailand, the freshwater fisheries and aquaculture sectors are highly developed and provide most of the fish requirements of the respective countries. Sri Lanka, in this respect, is only beginning to realize the potential of freshwater fisheries and aquaculture. What is required now is for the policymakers to understand the socioeconomic problems involved and, for the benefit of the lower-income groups, to endeavor to develop a comprehensive management plan for the multiple use of the reservoirs.