Fresh Water Fishery Resources

By

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1. Extent and type of Fresh Water Bodies

The Inland fresh waters of the island can be roughly divided into the following as far as fish production is concerned:—(*a*) Perennial shallow irrigation reservoirs of the low-country, comprising about 120,000 acres. (*b*) " Villus " or flood lakes of the low country many of which are perennial, comprising about 30,000 acres. (*c*) Seasonal village tanks, mainly in the low-country, comprising about 30,000 acres. (*d*) Deep reservoirs (irrigation as well as hydro-electric) occurring in up-country and low-country comprising about 50,000 acres. (*e*) Rivers and streams comprising about 20,000 acres. The total area of all these waters is about 250,000 acres.

2. Production of fish from these waters

Perennial shallow irrigation reserviors of the low-country are rich in plankton organisms and are the most productive. The production of fish at Parakrama Samudra and Minneriya Tank is about 200 lb. per acre per annum at present. Others like Nuwarawewa, Kantalai Tank, Kalawewa, *etc.*, give a production slightly over 125 lb. per acre per annum. The estimated average production of all these low-country reservoirs at present is in the region of 100 lb. per acre per annum.

" Villus " or flood lakes come next in productivity. They are found mainly in the North-Central Province and are periodically fed by flood waters of the rivers during the rainy season. Many of the bigger " Villus " like Manampitiya villu and Karapalu villu retain water throughout the year. The estimated average production of all the " Villus " is about 75 lb. per acre per annum at present.

The seasonal village tanks, mainly in the North-Central Province, are also rich in plankton but their production is rather limited due to the fact that they retain water only for about 6-7 months of the year. The estimated average production of fish from these tanks at present is about 35 to 40 pounds per acre per annum.

The deep reservoirs of the low-country are situated mainly in the Gal Oya Valley, e.g., Senanayake Samudra, and others like Castlereagh and Norton Bridge in up-country. The up-country reservoirs are comparatively poor in plankton organisms, i.e., compared to those of low-country reservoirs. They are also not so productive. The estimated average production of these deeper reservoirs at present is about 25-30 lb. per acre per annum.

Rivers and streams are the least productive as far as fish is concerned. The estimated average production of fish from these waters is about 5 lb. per acre per annum.

3. Indigenous food fishes of the fresh waters

Fifty-six species of indigenous fishes have been recorded from our fresh waters. Of these about 17 species are important as food fishes. Amongst these 17 species eight occur in sufficiently large numbers to form a regular fishery in the low-country irrigation reservoirs. " villus " and village tanks. They are, three species of carps—*Puntius sarana* (Mas pethiya), *Puntius dorsalis* (Katu pethiya), *Labeo dussumieri* (Hirikanaya), three species of Catfishes—*Wallago attu* (Walaya), *Heteropneustes fossils* (Hunga), *Ompok bimaiulatus* (Walapotta), one species of Snake head—*Ophicephalus striatus* (Lula) and a species of Cichlid—*Etroplus suratensis* (Gan koraliya). [The local Sinhala name is given enclosed in brackets.].

The other nine species occur in relatively smaller numbers and do not form a regular fishery. They are, four species of cat fishes—*Clarias teysmanni* (Magura), the Macrones spp. vittatus, gulio and keletius (Ankuttas), one goby—*Glossogobius giuris* (Weligowwa), spiny eel, *Mastacembelus armatus* (Theliya), the giant snake head—*Ophicephalus marulius* (Gan ara), *Tor khudree longispinis* (Lehella), *Anabas testudineus* (Kavaiya). The seventh and eighth occur mostly in rivers and streams, and the last mostly in paddy fields.

4. Fishes introduced into our inland waters

Several species of fish have been introduced into the inland waters. The most successful of them is *Tilapia mossambica*. It is a prolific breeder and has established itself mainly in the low-country irrigation reservoirs, " villus ", village tanks and in some brackish water lagoons. Commercial fisheries in many of the low-country irrigation reservoirs are successful mainly due to this fish. Tilapia has not been successful in up-country waters due to the lower temperature of the water.

Trichogaster pectoralis is another introduced fish which has established itself mainly in shallow marshy areas and paddy fields of the Western Province. It seems to be quite happy in the *Salvinia* fern-infested waters where other fish do not normally thrive. This fish is not of commercial importance but it has contributed its share to fish production in some of these unproductive waters.

Giant gouramy, *Osphronemus goramy*, was at first an accidental introduction into our fresh waters when it found its way into Mahaveli Ganga from a pond where it had been stocked. In a few years time catches of this fish were recorded from the lower reaches of this river. Thereafter gouramy fingerlings were introduced into other fresh water bodies of the Island and it has now established itself in almost all the irrigation reservoirs of the low-country. The growth of this fish is slow and it is also a slow breeder and hence its impact has not been felt in the commercial catches.

Common Carp, *Cyprinus carpio*, is another fish recently introduced. It has fared well in the up-country waters where they are caught in fair numbers. This fish is able to stand the lower temperature of the up-country waters. Unlike Tilapia and gouramy, carp does not protect its young. This may be one of the factors why carp has not been successful in the low-country reservoirs of the North-Central Province where carnivorous fish are found in abundance.

5. Fisheries of commercial importance

Fresh water fisheries of commercial importance are mainly found in the irrigation reservoirs and the " villus " of the low-country. The most important centres are at Parakrama Samudra, Minneriya Tank, Giritale, Kawdulla Tank, Kalawewa, Nachchaduwa, Nuwarawewa, Karapala villu, Manampitiya villu and Bandia villu in the north-Central Province; Senanayaka Samudra, Amparai Tank and Navakiri Aru Tank in the Eastern Province; Iranamadu Tank, Padaviya Tank and Giant's Tank in the Northern Province; and Wirawila, Ridiyagama and Badagiriya Tanks in the Southern Province.

In many places of the North-Central Province fishing is done throughout the year by fishermen who have settled around these tanks. In others fishing is done for about six to nine months of the year by fishermen who migrate annually into these areas from the coast. The main gear used by these commercial fishermen are gill nets, " madels " or shore seine nets, and cast nets.

Each gill net, made of nylon, is about 125-150 fathoms long and about one to four fathoms in height. Mesh sizes vary from $3\frac{1}{2}$ inches to 6 inches depending on the types of fish that are to be caught. These nets are usually laid in the tank by two men from a small boat (oru) late in the evening either as drift nets or bottom set nets. The fish which are gilled are collected early morning. Fish which are usually caught by gill nets are: *T. mossambica*, *L. dussumieri*, *Etroplus suratensis*, *Wallago attu*, *Ophicephalus striatus*, *Puntius sp.* and *Ompok bimaculatus*.

" Madels ", similar to but smaller than the beach seine nets used along the sea coast, are used in some of the irrigation reservoirs where the water levels are low. The use of these dragnets are limited to tanks which are free from submerged obstructions like tree stumps and

whose bottoms are fairly even. They are used about three to four months of the year during drought. Almost all species and sizes of fish are caught by these nets. An advantage of using such a net is that fuller exploitation of the fish population is possible.

Cast nets are used in shallow areas of tanks reached either by wading or in a small boat (oru). Fish usually caught are *T. mossambica*, *Puntius spp.*, *Ophicephalus spp.*, *Macrones spp.* and *Glossogobius giuris*. A special modification of a typical cast net, having a series of pockets around the periphery of the net, is used by certain fishermen is tanks of the North-Central Province to capture large numbers of the stinging cat fish, *Heteropneustes fossilis*.

6. Total production of fresh water fish of the Island

Fresh water fish production began to show a rapid increase from 1957. The estimated total production of fresh water fish for the whole Island in 1957 was one million pounds. By 1963 production had increased to 10 million pounds—an increase of 10 times in six years. The estimated production for this year (1965) is about 15 million pounds.

The following factors have contributed to this increase in production:—

(*a*) Intensive stocking of edible fish in the inland waters. e.g.. *Tilapia mossambica* which supports many of the commercial fisheries of the low-country reservoirs.

(*b*) Efficient methods of fishing adopted by the commercial fishermen, e.g., replacement of cotton gill nets with nylon gill nets around 1958 which gave four to five times the catch obtained from the cotton nets.

(*c*) A rapid increase in the number of fishermen migrating into inland fresh waters each year. A steady increase has been observed from about 1957 to the present time.

(*d*) Large-scale processing of fish caught by the commercial fishermen, e.g., drying. salting, and smoking. This has helped to a great extent in the better utilisation of the catch.

7. Some suggestions for future development

Production of fish from the large irrigation tanks can be further increased by the introduction of other species of fish which will make use of the unutilised fish food resources of these tanks. *Tilapia mossambica*, which has been a success is mainly a plankton and algae feeder. Introduction of another species of Tilapia, e.g., *T. melanopleura* or *T. zilli* which feeds on soft vegetation will contribute to an increase of production in these waters.

T. mossambica has not been a success in the up-country reservoirs due to it being a warm water fish. A cold water species like *T. galilea* if introduced should be able to increase the production of these waters.

For further exploitation of these tanks more fishermen should be encouraged to fish there. As an inducement they should be given loans to buy their fishing gear, boats, etc. They should also be given land around these tanks so that they will settle down permanently and do year-round fishing.

In very large tanks fishermen should be given aid to mechanise their craft. This is especially true in Senanayake Samudra at Inginiyagala where the fishermen lose much time travelling between their "waadies" and the fishing grounds. The gear carried can also be doubled or trebled if their orus are mechanised.

Apart from these large reservoirs the smaller village tanks (which are seasonal) can also be expected to make an important contribution to production. These village tanks provide subsistence fisheries to the village people. Investigations have shown that production from these tanks can be increased by stocking them with *T. mossambica* just after the rains when they are full and then harvesting the entire crop of fish during drought when the tanks dry up. This would be a sort of " pond culture " from which the villagers themselves could gain valuable experience.

Basic information regarding the types of fish that are present in the inland waters is available, but the life history studies of the important edible fish, including their ecology, have to be determined. These studies are especially important for management and fish culture techniques. Investigations are also necessary to find out the productivity of the fresh water bodies in different habitats so that improvements may be effected, if necessary, to increase production. Investigation into the marketing and processing of the fish caught by commercial fishermen is another important factor which will have a direct bearing on the production of fresh water fish. The answers, at least to some of these problems, will help to a great extent in increasing further the production from our fresh waters.