

ARE NATURE CONSERVATION AND AQUACULTURE RECONCILABLE?

Aquaculture, or the husbandry of aquatic organisms, is at least as old as the Romans, who cultured oysters throughout the Roman Empire. Through the centuries, aquaculture has been practised in the Middle East and in various Mediterranean countries.

As developments in fishing technology have increased the fishing power of many countries and natural fish stocks have become depleted as a result of over-exploitation, the popularity of aquaculture has grown. Commercially intensive catfish culture has mushroomed in the United States in the last decade. Market researchers believe in America catfish can parallel chicken as a protein food.

In aquaculture programmes in south-east Asia, tilapia, carp, milkfish and mullet are the most important species. In Japan and China seaweed is cultured for use in animal feeds, fertilisers and various industrial processes. Valuable use is also made by aquaculture of waste products as foodstuffs and fertilisers. Thermal aquaculture utilises the waste heat from power stations to improve growth rate and yield. Aquaculture is also practised in conjunction with agriculture in, for example, ricefield culture of tilapia, carp or freshwater prawns, in which the cultured species fertilise the plant crop and the ricefield provides habitat and food.

Recognition of the importance of aquaculture to both industrial and developing countries by international agencies, especially the Food and Agriculture Organisation (FAO) of the United Nations, has led to the initiation of worldwide development projects aimed at protein production to combat hunger.

In South Africa the CSIR has proposed a national aquaculture research programme. The Cape Department of Nature and Environmental Conservation, which recently formulated an aquaculture policy, has formed a research group to implement this policy along the lines of the CSIR's proposed programme.

Freshwater fish management under the control of the Department was originally aimed at the culture and distribution of exotic fish species, seeing that anglers preferred species like trout and black bass to the indigenous species. When it was realised that exotic species pose a threat to defenceless indigenous species, the Department became concerned about the future of our river systems and their organisms. Today the Department is responsible for the conservation and recreational management of all inland waters in the Cape Province, including estuaries, and research is aimed at conserving indigenous fish species and their habitat. *The Department is at present classifying river systems as sensitive or non-sensitive conservation areas.*

Aquaculture is one way in which the continued existence of certain threatened species can be ensured. The Department aims to promote the use of indigenous species in aquaculture in order to reduce pressure to allow potentially dangerous exotic fish species to be imported for aquaculture purposes. The uncontrolled spread of predatory exotic fish species is one of the reasons why 16 of the 38 indigenous freshwater fish species in the Cape Province are presently classified as endangered.

Various indigenous fish species have great aquaculture potential, amongst them the sharp-toothed catfish, certain mullet species and tilapia. One of the Department's present fish research projects comprises an investigation into the use of the freshwater mullet *Myxus capensis* and the flathead mullet *Mugil cephalus* to increase the fishing potential of freshwater dams. According to the researcher undertaking the project, mullet culture today forms an important component of aquaculture in Egypt and Israel, and extensive mullet culture could have special significance for South Africa where intensive warm-water fish culture is virtually non-existent.

Because techniques for large-scale mullet culture are still being developed, the culture of the freshwater and flathead mullet depends on capturing supplies of fry in the wild. The main objectives of the Department's mullet project are:

- (a) to determine the growth rate of fry of both mullet species in the upper reaches of certain Eastern Cape estuaries;
- (b) to develop effective techniques for the capture, transportation and stocking of fry without incurring high mortalities;
- (c) to determine their growth and mortality rates in various impoundments, and to estimate the potential of these species for extensive fish farming and angling.

Both mullet species flourish after they have been stocked into impoundments. After a four-year period in an impoundment in the Eastern Cape, the average yield of the two species was estimated at 500 kg per hectare. The faster growth rate of the flathead mullet makes it, however, particularly suited to extensive aquaculture. If the average mass of the two species in all the experimental impoundments is compared after two years' growth, the mass of the flathead mullet (688 g) is nearly six times that of the mass of the freshwater mullet (119 g).

Researchers believe that mullet culture and other aspects of aquaculture have a promising future in South Africa. One large stumbling block is, however, the supply of sufficient fish for stocking purposes. Large-scale catching of wild fry can have a negative effect on their numbers. There is also the problem of a high mortality rate resulting from handling. The intensive research being done presently to develop successful artificial culture techniques in various countries is essential if the full aquaculture and angling potential of certain indigenous fish species is to be realised.

The description of the above project indicates clearly how important it is to conserve the river systems in which fry with aquaculture potential are found. The Department is concerned about the increasing pressures to which various Cape rivers are being subjected, in the form of water abstraction for irrigation, siltation of spawning beds caused by soil erosion, bulldozing of river banks and beds, agricultural and industrial pollution, infestation of exotic invader plants, building of dam walls which obstruct spawning migrations and the introduction of predatory exotic fish species into sensitive conservation areas, where they devastate indigenous fish populations.

Are nature conservation and aquaculture reconcilable? Experts say yes — provided that scientific and statutory control is exercised over aquaculture and that it does not have a detrimental effect on the natural environment.

(The italics are ours.—Ed.)