CRITERIA FOR FISHERY REGULATION

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INTRODUCTION

Fishery regulation is as complicated as life itself, being concerned with the ordering of the lives of aquatic animals useful to man. It is not entirely a modern activity but had been in vogue even in ancient times, in enlightened countries like India. Only intuition and common sense were the guiding factors then and regulation was often intended mainly to protect the spawners. However, with the growth of biology, the scientific basis for it grew sounder, and regulation became the concern of the fishery scientists. Now-a-days, regulation has many aspects-limitation of catch, limitation of fishing effort, protection of young fish and spawners, imposition of closed seasons, reservation of certain areas to particular classes of operators etc. Fish has also become an international commodity of exchange. Fishery regulation has therefore ceased to be the exclusive preserve of fishery scientists. Lawyers, economists, political scientists, administrators, and leaders of public opinion, all have a say in the matter, and rightly so, as will be shown presently, although the fishery biologists serve as the connecting link for these varied interests. The purpose of this article is to indicate some of the main principles that should govern regulation of marine fisheries and to show why it should be based on the largest possible area of agreement among varied interests. But first, some of the properties of the fish stocks, relevant to regulation may be considered, even though these are well known and may appear as truisms.

SOME PROPERTIES OF THE FISHERIES RESOURCES

Marine fish stocks are a common property resource and can be made use of by all the citizens of a nation bordering the sea (good grounds for quarrel among lawyers). But then there is a limit to the area of the sea wherein a nation can claim exclusive fishing rights (domain of constitutional law pundits). It may also be that a fish lives for only part of a year within an area of national jurisdiction. Secondly there is a maximum to the annual catch that a stock can sustain indefinitely although the definition of that quantity has proved very elusive (food for thought for biologists). A fish may breed or grow in international waters (point of polemics among biologists). Thirdly, fish being a perishable commodity and subject to sudden price fluctuations, economic factors should, to a large extent, determine the type and content of regulation (economists' paradise). At the same time employment opportunities and the requirements of

good living standards for the producers should be safeguarded (the plank of the leaders of public opinion).

These bring to the surface the question : in whose interest, regulation?

REGULATION, IN WHOSE INTEREST ?

This is an important question the fishery scientist should not be asked to decide, a point which the critics of fishery scientists often do not seem to appreciate. We might say that regulation should serve the interests of the following :

1. Mankind as a whole.
2. The nation concerned.
3. The producers.
4. The consumers.
5. The sellers.

International interest

Sometimes, survival of a species itself may be at stake, and then common action has to be taken to preserve it for posterity. When the antarctic whales (common property of mankind) were threatened with commercial extinction, international action was initiated to regulate the catches. Similarly some other aquatic animals also (e.g., some types of turtles, dugong etc.) require to be protected against excessive human predation.

National interest

In national fisheries problems, the crux of the question is : whose interests are to be protected ? It is of course a truism to state that the national interests should supersede all others. Then, it is the Government that has to decide what the national interest is, and the natural consequences will follow. This can be illustrated by considering the case of the prawn fishery of the south-west coast of India. It is generally agreed that this fishery tends to be unremunerative for the producer, because of decreasing catch-per-boat. The catch-per-boat is decreasing mainly because the fishing effort (number of boats, number of fishing hours etc.) is increasing. At the same time the total catch is only tending to level off, instead of decreasing (that is, biologically speaking, there is no over-fishing). If the national interest is to get as much foreign exchange as possible, then obviously the maximum possible catch has to be taken, in which case the fishing effort should not be reduced, even if it means loss to the producer. But then action will also have to be taken to compensate producers for the loss, which is a problem that should lie in the economists' lap. The question of employment chances complicates the issue further. But then lack of authentic data on the economics of prawn fishing is a handicap. Let us examine this question by making some assumptions.

Let the costs in the prawn fishery be proportional to fishing effort and income (value) proportional to catch as represented in Fig. 1. The straight line

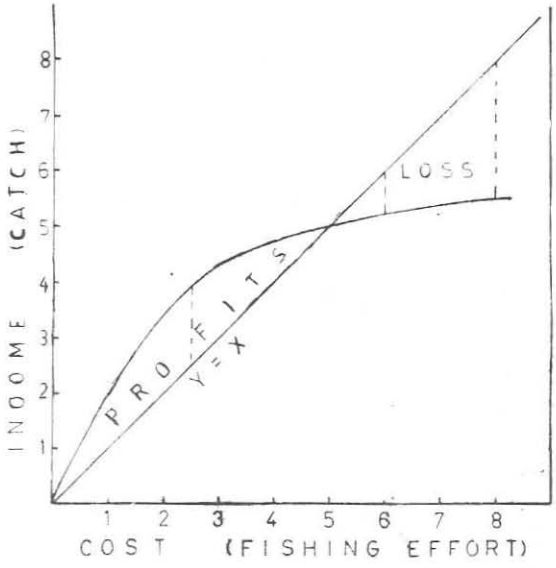

Fig. 1. *Hypothetical relation between cost (fishing effort) and income (catch) in a fishery.*

represents the points where income (value of catch) to the producer is equal to the cost (Y = X). The part of the curve

above the straight line represents profits. It may be seen that the maximum profit would accrue at a fishing effort of around 2.5. If producers' profit were the only criterion, then fishing effort above 2.5 would not be permissible. But that would mean (1) loss of a considerable amount of foreign exchange, and (2) reduction in employment opportunities. The figure shows that income would be equal to cost at a fishing effort of about 5 but even above this level of fishing effort, the total catch (and foreign exchange earnings) would be rising, although the producers would be losing. A 25% reduction in fishing effort from the level 8 would reduce the catch only by 5%, but cut the loss by 70%. But if the over-riding national interest is the increase in export earnings, it is obvious that the necessary measures to support the producers will have to be taken by the administrators; the necessary scientific advice will of course have to be tendered by the biologists. If with increasing effort the total catch tends to fall, then the necessity to reduce fishing effort will coincide with national interest and the scientists will have to suggest drastic remedies to nurse the stock back to the most productive level.

Producers' interests

In addition to the producers' interests referred to above, we have also to consider situations where the price slumps with increase in the catch, as indicated in Fig. 2. Here the producers get the same value (E) for two different levels of catch (C and D) and so would tend to restrict the production, as happens sometimes in the oil sardine fishery, although from the point of view of the consumers and of the nation as a whole that would be a mistake.

At the same time, different classes of operators may have conflicting interests. The marine prawn producers

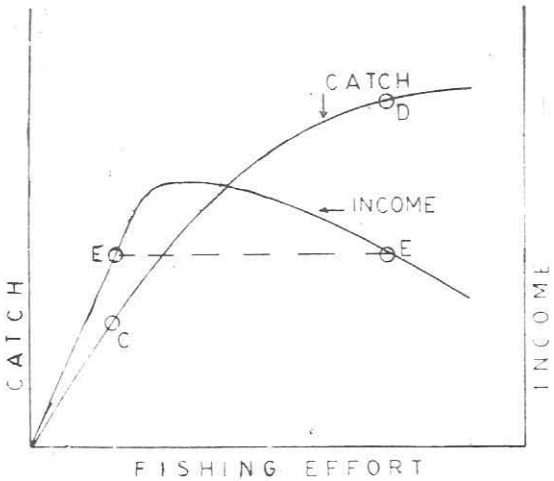

Fig. 2. *A hypothetical case where income decreases despite increase in fishing effort and catch.*

may complain that the backwater fishery for juveniles is harmful to their interests, and the latter may in their turn state that the excessive capture of mature and spawning prawns in the sea is reducing the recruitment of juveniles into the backwaters. Similar disputes may arise in regard to the exploitation of migratory stocks. Biologists' courts will not be able to give the scientific verdicts on such disputes, unless all classes of witnesses give them their fullest co-operation.

Consumers' interests

Consumers' interests would be to get fresh fish at the cheapest possible rates over as long a period as possible. Increase of production and a long duration of the fishing season would be in their interests. Catch quotas may, on the other hand, result in the fishing being restricted to a short period (as

happens in the Pacific halibut fishery). Consumers' preference for a particular type of fish (juveniles, immature, mature, etc.) may also upset the biologists' calculations regarding the stock level likely to give the maximum catch.

Sellers' interests

Marketing of perishable commodities is, needless to state, a specialised field of activity. Encouragement of this activity, with all the attendant advantages to the society as a whole, would be a criterion for deciding the management policy in a fishery.

CONCLUSION

Other interests may be added to those stated above. Often, moral and ethical questions may also arise. It would then be apparent that fishery regulation will have to be the subject of debate at various forums, although the biologists' forum would be the most important one. Very often trial and error method will have to be employed in this field, as in other fields of human activity. In developing countries beset with problems of hunger, malnutrition and unemployment, fishery regulation will have to be approached with considerable circumspection.