IS THERE OVER-FISHING IN INDIAN WATERS ?

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In view of the vast expanse of the sea it was believed that the resources of the sea are almost inexhaustible and we can put in more and more fishing effort to get higher and higher yield. Sufficient evidence has, however, been accumulated to show that this belief is not true. With the advent of steam trawling, several nations began intensive fishing in the North Sea towards the end of the nineteenth century and this resulted in rapid decline in the abundance of most of the species. Again during the First World War in 1914-18 when there was great reduction in fishing in the area, a vast increase in the stocks of most species resulted. The abundance began to decline when regular fishing was started again in 1919. The same phenomenon was witnessed during the Second World War period in 1939-45. The stocks of some of the species in 1945 increased by several times due to almost virtual closure of fishing during the Second World War period. Their abundance started declining as soon as regular fishing was started after the war period.

Again there used to be a very prosperous sardine fishery in California. Excessive fishing during the thirties and early forties ruined the resource of this fishery so much that anchovies have replaced today the once lucrative sardine fishery. These observations leave no doubt that increased fishing activity affects exploited fish stocks and fishing intensity cannot be increased indefinitely without adversely affecting the exploited fish stocks.

Stage of Overfishing

In Indian waters, till very recently marine fishing was restricted to a comparatively narrow coastal belt. Fishing is now being gradually extended to comparatively deeper areas of the continental shelf. During the last decade more than 5000 mechanized fishing vessels have been introduced for fishing in the marine waters of India. Seventeen thousand and odd indigenous vessels have also intensified their fishing activity in their drive to catch more fish for solving the acute food scarcity of India. The annual catch of marine fish has gone up from 585,000 tonnes in 1959 to about 933,000 tonnes in 1968, i.e., an increase of about 60 per cent in 10 years. Plans are afoot to further increase our fishing effort in order to increase the magnitude of our catch. But the question is, can we go on increasing our fishing intensity indefinitely or is there a limit up to which our fishing intensity be increased beyond which we reach the stage of overfishing which will adversely affect our fishery resources? What are the criteria for judging if there is overfishing and judged by these criteria are we overfishing in Indian waters?

There are more than one fishery resource in the Indian waters. Loosely, one may consider that all varieties of fish inhabiting the marine waters of India form one single resource available for exploitation. But it will not be correct to do so. Some of the species are bottom-living fishes while the others are mid-water and surface living fishes. Most of the latter group of fishes have a wide migratory circuit and they are caught only when they become accessible to our fishermen within the severely restricted coastal belt in which they generally fish. Some of the bottom living fish have restricted habitat while others move about in a wider area. Some of the ground fishes have their main habitat beyond the range of our present fishing grounds and are almost unaffected by the present fishing operations. Since different types of gear are used to catch different types of fish, the extent of fishing intensity on each species is not the same. Besides, each species has different growth rate, longevity, food habits and spawning behaviour and as such they react differently to the same amount of fishing intensity. Even within the same species, there may be more than one genetically independent stocks. In such cases, the effect of fishing on the constituent stocks may not be same. Thus for assessment of the effect of fishing, we have to consider each independent stock of each species as a separate resource.

Effect of Increased Fishing

Let us now consider the effect of increased fishing on a fishery resource. If the minimum size of capture is not altered and fishing intensity is increased, the number of fish caught will also increase until the level of fishing reaches the point when all the fish are caught as soon as they become of capturable size. Thus with increase in fishing intensity, the catch (in number) of fish will increase but will ultimately tend to the asymptotic level, at which all the fish will be caught as soon as they become capturable. As fishing increases, the increased fishing mortality will decrease the average expectation of life of each fish and hence the average age/size of an individual fish in the commercial catch. Thus as fishing intensity increases, though the number of fish caught will increase, the average size of a fish in the catch will be reduced. Hence, as fishing increases, the weight of the catch will also increase but very slowly

as the size of the fish in the catch falls off. Generally, the weight of the total catch attains a maximum at certain fishing intensity and with further intensity in fishing, the total weight of the catch comes down.

In popular language, if we exceed the level of fishing intensity corresponding to the maximum catch, we say, we are overfishing. Thus as we increase our fishing effort, the mean size of the mean weight of a fish in the catch is reduced. Since the weight of the total catch increases slowly and not proportionately with the fishing effort up to a certain maximum and then it begins to decline, the catch per unit of effort will also decline with increasing effort. The reduction in the mean size and the catch per unit effort are signs of expanding fisheries and by themsleves they do not indicate overfishing. Only when the total catch begins to decline along with the above two characteristics of catch inspite of increased output of fishing effort, we have a case of overfishing.

Judging by these criteria, only in case of a few fishery resources of some species, there are indications of overfishing. Polynemids (Dara and Shende) and Sciaenids (Ghol, Koth and Doma) form a sizable part of the total catch marine fish in Gujarat. The total catch of Polynemids from the inshore waters of Gujarat has declined from 4,572 tonnes in 1960 to only about 237 tonnes in 1967. The catch of Sciaenids has similarly declined from 2,291 tonnes in 1950 to 1,417 tonnes in 1967. The catch per 1000 man-hours reduced from 218 kg to 13 kg in case of Polynemids and 110 kg to 79 kg in case of Sciaenids during the period. The reduction in the mean size also took place. These clearly indicate that the resources of these fishes are being overfished. This is further supported from the data of offshore catch of the same species. The catch as well as the catch rates have known substantial decline. Since it is known that the same stock of these species form the inshore and offshore fisheries, it is necessary to adopt some conservation measures for these stocks. The Bombay duck resources of Maharashtra and Gujarat waters also need careful watch as the total catch has shown a tendency to decline in recent years, even though there has been no decrease in the average size of the fish indicating that the decline in catch may be due to changes in availability.

The boat-owners engaged in shrimp fishing in Kerala are complaining that there is overfishing of marine prawns along the coast as the return per boat has declined along with decrease in the mean size of prawns. But as pointed out, these are obviously signs of expanding fishing. Apart from random fluctuations, the annual catch of prawns has not shown any downward trend though it is not increasing commensurate with increasing fishing intensity. Hence we cannot say that the prawn resources of Kerala waters are overfished at present; though the situation needs careful watching. The fact that the quantity of catch is still increasing inspite of decreased size of prawns shows that more number of prawns are being caught now, indicating that adequate recruitment is being maintained.

Species Limited

It is well known that in temperate and cold waters the number of species is limited but the resource of each is large. But in the tropical waters there are a large number of species, the strength of each being not so abundant as in the temperate waters. In the Indian waters, about 200 species are exploited at present. Among these innumerable resources, apart from a few of those mentioned above, no indications of overfishing are noticed in case of others. As has been mentioned earlier, many of our pelagic resources have a wide migration circuit and we are exploiting only a small accessible part of them due to limitations of our fishing range. Any change in the migratory route due to hydrological factors alters the availability in the accessible region of fishing, causing sometimes wide fluctuations in annual catch—a feature associated with some of our great pelagic fisheries like oil sardine, mackerel and Bombay duck which together form 70 per cent of the total pelagic catch.

By expanding our fishing beyond the range of present fishing limits, not only a larger yield from these resources can be expected but the annual fluctuations in annual catch can also be avoided. In view of the rather larger resources of these three pelagic resources, the fishermen are devoting most of their time in exploiting them leaving the stocks of other small pelagic groups underexploited. Excepting for Maharashtra, Gujarat and Kerala, exploitation of ground fish is confined mainly to the adjoining coastal waters. Even in the three states mentioned above, the shelf area up to 40-50 m depth is being exploited at present to some extent, leaving the area between 50 to 200 m unexploited. Exploratory fishing operations carried out from various centres indicate that commercial exploitation of these hitherto unexploited shelf area will augment the catch of these ground fishes to a substantial extent. In fact, various studies indicate that the potential yield from the shelf area of India can be increased to at least three times the present yield.

Thus, when our fishing is restricted even now to a narrow coastal region covering only a part of the fishable area of the wide continental shelf of 415,000 sq km, it is rather hypothetical to raise the question of overfishing in Indian waters. While it is true that in case of a few local resources, the pressure of fishing may have gone beyond the point of optimum fishing, the vast majority of the resources are underexploited and indications are that a number of resources still remain to be exploited in areas where fishing has not yet been extended.