

ON CONSERVATION OF CERTAIN COMMERCIALY EXPLOITED GROUNDFISH RESOURCES OF INDIA

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Abstract

Of the total annual marine finfish production of India, ground fishes have accounted for about 25% in recent years. Since the commencement of mechanisation in fishing, ground fish production has shown a marked increase. But, intensive trawling operations along shallow coastal fishing grounds within the 10m depth zone have also resulted in depletion of certain ground fish resources such as the Catfish, Whitefish, Ghol, Koth, Dara, Wam and Karkara. The indiscriminate exploitation of their juveniles and subadults in the coastal habitat has also resulted in recruitment - overfishing of the above resources. The large scale operations of purse-seines in the states of Kerala and Karnataka during the late seventies and the eighties have led to a massive destruction of spawning and brooding populations of Catfishes and the consequent wanton destruction of their eggs and embryos. Since this resource is migratory, the above has adversely affected the replenishing potential of the resource and a decline in its production from all along the Indian Coasts. It has also resulted in adverse changes in the species diversity of this resource. The present paper draws attention to the need for preventing indiscriminate exploitation of such vulnerable resources.

Introduction

Finfishes usually inhabiting the sea bottom are many and varied, such as jewfishes, perches, rays, catfishes, silver bellies, flatfishes, lizard fishes, flat heads and goatfishes, with characteristic morphological and physiological adaptations. Of the total 1,400 species recorded from the marine environment, more than 500 are from the sea bottom and less than 200 from regular component in demersal fisheries, some forming shoals. Their diversity is more in the Continental shelf region than on the slope; also more in the east coast than in the west. Many of them undertake vertical and/or horizontal migrations in response to environmental factors such as abundance of food, spawning behaviour, diurnal rhythm, upwelling, water currents, drift and the like. A large array of demersal finfishes are vulnerable to exploitation by a wide spectrum of artisanal and mechanised gears, especially the bottom ones.

Until the late fifties, exploitation of these resources was not adequately undertaken due to lack of efficient bottom gears. It was only in the late fifties that mechanised bottom gears such as trawl nets were introduced in India, including mechanisation of crafts. This has not only opened up the possibility of adequate exploitation of ground finfishes but also extending the areas of fishing beyond the then limit of about 20 m depth. During 1961-66, about 5,000 small and medium sized bottom trawlers of 7.5-14 m Overall Length (Overall Length) were in operation. Subsequently, the number has increased, including the ones using gill netting, purse-seining and long lining, to about 35,000 as at present. There was also motorization of traditional crafts, which number about 26,000 at present. Besides, there are about 1,80,000 non-motorized traditional crafts available.

With the progress of mechanization and the increasing efficiency of the crafts and gears, the range of fishing has extended to deeper waters, thus most of the medium sized vessels venturing upto 50-70 m depth. Simultaneously, the proportion of production by mechanised vessels has increased from 19% of the total in 1969 to 81% in 1989. The demersal finfish component also has increased steadily from about 0.19 million tonnes (mt) in 1961 to 0.25 mt in 1970, 0.42 mt in 1977, 0.45 mt in 1989 and 0.55 mt during

1985-92, forming about 25% of the total marine fish production. However, coinciding with and/or as a result of these advances, certain demersal finfish groups have undergone depletion. The present paper presents these facts and suggests ways and means of conservation and judicious exploitation of the resources.

Vulnerable Resources

(1) The Whale Shark :

Among the various demersal finfish groups, the Whale Shark Rhincodon Typus Smith (family Rhincodontidae) the world's largest fish is said to be the most vulnerable one. Since it is a rare fish, the earlier reports on it were only of its incidental catches and strandings. A minor harpoon fishery for this docile fish was first reported in Veraval, Gujarat. The fishery, mostly for its liver and fins has commenced during the early eighties there, improved thereafter and got established as a regular one during March-june period, probably the only one of its kind in the world. During 1988-91, 648 specimens in the length range of 5.6-12 m and weighing 3,520 t were caught from the depth zone of 30-45m. Although the Whale Shark may not be considered as an endangered fish, it is often treated as a vulnerable one; and wider use of its oil, skin and meat shall increase the efforts for its capture and may result in its depletion.

(2) Cat fishes :

This group is abundant in the muddy grounds of 20 - 70 m depth zone and most species migrate both vertically and horizontally parallel to the coast. Among about 23 species under three general Tachysurus, Osteogeneiosus and Batrachcephalus, about ten are commercially exploited by trawls, gill nets, hooks and lines, purse seines and a wide variety of traditional gears. They migrate from north to south during south - west monsoon and vice versa during post monsoon ; and are abundant in Gujarat, Maharashtra, Karnataka, Kerala and north east coast, Tachysurus tenuispinis (Day) 50-60 cm, T. Dussumieri (valenciennes) 70-80 cm, T. Song (Hamilton) 70-80 cm and Osteogereiosus militaris (Linnaeus) 30-40 cm are the important species which have undergone depletion.

The Cat fishes have a long life span and very low fecundity ranging from 30 to 180 eggs, with the males gestating the eggs and embryos in their mouth. Recently, large-scale exploitation of Catfishes by purse-seines along Karnataka has resulted in mass destruction of the brooders. An estimate has revealed that in the case of T. tenuispinis, within the two months of September-October every year when it congregates the coastal waters for breeding, more than 8 million eggs and early juveniles alone, weighing about 13 tonnes are destroyed. As a result of this, the average annual production has declined from 8,060 t during 1979-86 to only about 4,070 t during 1984-87. This has also led to a considerable reduction in the recruitment to the commercial catches subsequently. Since the resource is migratory and as most of the species have long life span, the above impact is reflected in other parts of the country also, thus the annual production declining from about 56,000 t during 1979-83 period to a marked extent during 1984-87 and further so low as to 34,110 t in 1991.

(3) The Whitefish :

Lactarius lactarius (Schneider), the single species under family lacteriidae is a small carnivore growing to a maximum of about 40 cm and moving in small shoals in inshore waters. Although distributed all along the Indian coast, it has been supporting notable fisheries along the south-west and south-east regions. It has had an important fishery in Malabar area during 1949-50. On an all India basis the fishery has assumed importance from the late fifties coinciding with the commencement of bottom trawling. The production has gradually increased, reaching about 4,550 t in 1969 and an all time peak of 25,340 in 1985. Thereafter, there has been a steady decline reaching to 6,685 t in 1989 and 6,575 t in

1992. The decline has been so marked in the south-west coast that in a single centre, Vizhinjam alone, the production which was 62.4 t in 1970 has declined to a meagre 0.1 t in 1979.

(4) Threadfins :

This group belonging to the Family Polynemidae has been supporting minor fishery mainly in the north-west and north-east regions. Among the many species, Polynemus indicus (shaw) 80-100 cm and P. heptadactylus (cuvier) 20-25 cm collectively called "Dhara" are the most important. These formed about 1.2% of the total fish landings during 1956-60 but have declined to 0.46% during 1961-70 to 0.12% during 1977-85 and to a meagre 0.32% during 1988-92. In the beginning stages of mechanisation, P. indicus has had a high abundance in Gujarat, Maharashtra, West Bengal and Orissa. But, the steady increase of bottom trawling in the shallow coastal waters of Gujarat has led to a heavy exploitation of their juveniles called "Chelna" as well as indiscriminate harvesting of specimens in advanced maturity conditions. Since these species are hermaphrodites, the removal of advanced mature specimens has had its restrictions on the regenerating capacity of the stocks.

(5) Other resources :

Species such as the "Ghol" Pseudosciaena diacanthus, Weber and De Beaufort, 70-100 cm; "Koth" Otolithoides brunneus, Fowler, 90-150 cm, "Karkara" Pomadasys hasta (Bloch) 40-50 cm and "Muraensox cinereus" (Forsskal) 50-80 cm and Congresox talabanodies (Bleeker), 150-200 cm were common resources along Gujarat - Maharashtra waters till early sixties. Fishable concentrations of these species were reported from this region and they have contributed substantially to the fisheries of these two states. During 1957-'62 period, the average catch rate of pseudosciaena diacanthus was 41 kg/hour forming 5.5% of the total catch; and that of Otolithoides brunneus was 10.2 kg/hour forming 1.4% in Gujarat-Maharashtra region. The production rate of Pomadasys hasta was 63 kg/hour and it formed 8.4% of the total catch, whereas M. Cinereus formed 12.3% of the total catch and contributed at a rate of 91 kg/unit effort. A dominant demersal resource of the coastal waters is platycephalus maculipinna Regan, 20-30 cm, with a wide range of distribution along most of the shallow muddy bottom habitats. The production of all the above species has declined considerably in the coastal waters during the eighties. It may be pointed out that their heavy exploitation from the shallow grounds of Kutch, Dwaraka, Porbander, Veraval, Cambay and Bombay waters during the early phase of the mechanised era might be responsible for the decline in their production. However, quantitative data of many of these resources are not available for a critical evaluation of the status of these population.

Causes for Depletion

The demersal fin fishes and other benthic biota in the coastal ecosystem have been coexisting and interacting with one another as well as with the abiotic environment, to maintain an equilibrium. The maintenance of optimal level of population of each species is the major factor to keep the system in such a condition. Any rise or fall of individual component organisms due to anthropogenic effects or due to any other reason can cause ecological imbalances with disastrous effects on all the components. The continuous and intensive exploitation of the marine fishery resources with the help of advanced technologies has become significant in recent years. Consequently some of the species have reached the optimum level of exploitation and some have even become vulnerable or endangered.

Trawl fisheries

With the introduction and establishment of mechanised bottom trawling in the early sixties, there was a sudden spurt in the harvest of demersal resources. Attracted by the high production and returns, both from the domestic and the foreign markets, more and more trawlers have entered the fishing sector with