

CONSEQUENCES OF EXCESSIVE FISHING EFFORT ON FISHERY RESOURCES IN THAILAND

by

Yingyong Meemeskul

Department of Fisheries

Ministry of Agriculture and Cooperatives

Bangkok, Thailand

Marine fisheries play a vital role in Thailand's economy as a source of cheap protein as well as foreign exchange earnings from exports. Within the marine environment, there are no clear signs of over-exploitation except for the trawl fishery. After its successful introduction by the Department of Fisheries in 1962, the trawl fishery produced the largest quantity of catch. The number of registered trawlers rose from 99 in 1960 to 10 057 in 1982 and resulted in an increase of the demersal catch from 58 852 mt in 1960 to over 800 000 mt in 1977, as given in Table 1. The rapid development of the trawl fisheries placed Thailand among the 10 major fishing nations in the world.

Information on the catch per unit of effort has been obtained from regular surveys by the research vessel PRAMONG 2, which has conducted trawl surveys in the area within 50 m depth in the Gulf of Thailand for over 20 years. The abundance of demersal fish stock measured in terms of average catch per unit of effort has shown a steady decline. A similar decline has occurred in the biomass (Table 2). The total biomass of the demersal fish stock in 1961, which is believed to be very close to the amount of biomass in virgin state, was estimated at 1 331 989 metric tons. This decreased to only 172 872 metric tons in 1983. This decline in biomass of 87 percent indicates severe depletion of the stock during the 20-year period of the fishery. Significant drops can be noted in the years 1966 and 1971.

In determining the state of exploitation it is essential to compare the total catch with the maximum sustainable yield. On the assumption that all species in the demersal fish stock as a whole are a single stock, attempts have been made by scientists to assess the potential of the demersal resources in the Gulf of Thailand during the past decades. The figures of maximum sustainable yield are estimated as 500 000 - 750 000 metric tons (Menasveta 1980 citing Gulland 1972; Shindo 1973; Boonyobol and Pramokchutima 1982). Hence the catch from the trawl fishery (as shown in Table 1) reached the maximum sustainable yield in the early 1970's and has since become overfished.

The decline in catch per unit of effort and in biomass of the demersal stock is mainly due to the excess fishing effort of the trawl fishery. It should be mentioned that the number of registered trawlers (as given in Table 1) is not the actual number of fishing trawlers and, besides, does not take into account increases in size and efficiency of the trawlers. Without concrete evidence, it is believed that during the early period only small- and medium-size trawlers were fishing intensively in the inshore waters within a depth of 50 m. Since the early 1970's, a significant number of registered large-size trawlers has entered the inshore waters due, in part, to the increased demand for fish. The declaration of 200 mile Exclusive Economic Zones by neighbouring States, since the late 1970's, has forced the large-size trawlers to return to their home-waters, leading to increased excessive fishing effort in the Gulf of Thailand.

As mentioned before, by assuming all demersal fish as a single stock, the state of overfishing is very clear. There is little information on how excess fishing effort has affected each stock of individual fish species. At this stage, it can only be said that there are some species, e.g. white fish *Lactarius lactarius*, which have become endangered probably due to the small size of its virgin biomass or its inability to adapt to trawl fishing. For some groups of demersal fish, the biomass does not seem to have changed much but generally the mean length of all demersal fish in the trawl catch is decreasing.

Table 1. Catches in metric tons and number of registered trawlers operating in the Gulf of Thailand.

Year	Total marine catch ('000 mt)	Trawl catch ('000 mt)	%	Number of registered trawlers
1960	—	58.85	—	99
1961	227.74	106.55	46.8	201
1962	256.65	102.72	40.0	976
1963	314.96	198.20	69.9	1 026
1964	473.23	320.60	67.7	2 360
1965	510.10	343.10	67.3	2 393
1966	605.02	363.80	60.1	2 695
1967	617.66	437.42	70.8	3 077
1968	841.81	513.38	60.9	3 182
1969	909.42	518.65	57.0	3 185
1970	1 098.56	530.89	48.3	3 114
1971	1 232.72	608.58	49.4	3 338
1972	1 318.06	701.00	53.2	4 114
1973	1 246.82	753.42	60.4	5 284
1974	1 107.10	481.59	48.5	4 792
1975	1 172.42	694.33	59.2	4 530
1976	1 226.62	715.31	58.3	4 833
1977	1 690.89	817.67	48.4	5 834
1978	1 619.79	682.86	42.2	5 780
1979	1 452.71	786.96	54.2	7 930
1980	1 358.22	759.10	55.9	7 933
1981	1 518.31	816.44	53.8	6 633
1982	1 637.43	868.12	53.0	10 057
1983	1 763.23	810.89	46.3	8 366

Source: Department of Fisheries
Fisheries Records of Thailand

Table 2. Average annual catch per unit of effort in the Gulf of Thailand resulting from trawl surveys by PRAMONG 2.

Year	No. of Hauls	C.P.U.E. (kg/hr)	% of C.P.U.E. in 1961	Biomass (mt)
1961	133	297.80	100	1 331 989
1962				
1963	200	241.40	81.1	1 079 725
1964	182	225.60	75.7	1 009 055
1965	192	170.20	60.2	801 519
1966	713	130.77	43.9	584 903
1967	713	115.05	38.6	514 592
1968	719	105.92	35.6	473 755

.....

TABLE 2. (continued)

Year	No. of Hauls	C.P.U.E. (kg/hr)	% of C.P.U.E. in 1961	Biomass (mt)
1969	720	102.74	34.5	459 532
1970	718	97.44	32.7	435 826
1971	720	66.25	22.2	296 321
1972	720	62.82	21.2	280 979
1973	718	51.92	17.4	232 226
1974	540	57.68	19.4	257 989
1975	480	46.99	15.8	210 175
1976	261	57.22	19.2	255 932
1977	579	47.28	15.9	211 472
1978	436	52.15	17.5	233 255
1979	235	51.62	17.3	230 884
1980	245	48.18	16.2	215 498
1981	159	38.84	13.0	173 722
*1982	211	40.06	13.5	179 179
*1983	332	38.65	13.0	172 872

Source: Vadhanakul *et al.* 1985.

* Trawl survey data, Marine Fisheries Division, Department of Fisheries

The excess fishing allows less fish to escape from the fishery and grow to adult or maximum size. The proportion of trash fish in the trawl catch, as estimated from the data in the Statistic Records of the Department of Fisheries in the past decade, rose to nearly 70 percent without much variation among years. Trash fish generally means those fish whose maximum size is small, juveniles of large-size fish and large-size fish for which there is little demand. With the development of improved infrastructure within the country, it became possible to process many of the large-size unpopular fish into products for human consumption. Thus, trash fish in recent years is made up of mostly small-size fish.

Results from the trawl surveys conducted by PRAMONG 2 show significant decreases in the number of large-size fish in the catch. The proportion of large-size fish in the total catch fell from 40 percent in 1981 to 35 percent in 1985 (estimated from Table 1; Meemeskul 1986).

The Department of Fisheries has been well aware of the situation of the trawl fishery in the Gulf of Thailand but, as in other places, high policy decisions often cannot be made only on the problems of natural resources but must give serious consideration to the impact of fishery regulations on the socio-economic aspects as well. Many fishery regulations have been implemented to prevent further excessive trawl fishing by limiting the number of fishing licences, prohibiting trawling in coastal areas and by seasonal restrictions in some areas to protect juveniles. The adoption of regulations on codend mesh size for the trawl fishery is now under consideration to minimize the exploitation of the undersized fish.

References

- BOONYUBOL, M. and S. PRAMOKCHUTIMA, Trawl fishery in the Gulf of Thailand. Rep. of Demersal Fish. 1982 Invest. Unit No. 9/1982:7 p.
- GULLAND, J.A., Some notes on the demersal resources of south China sea. Proc. Indo-Pacific Fish Council. 1972 13(3):15-60.
- MEEMESKUL, Y., Mesh Regulation for trawl fishery in the Gulf of Thailand. Rep. of Resource Survey Unit 1986 No. 1/1986:8 p. (in Thai)
- MENASVETA, D., Resources and fisheries of the Gulf of Thailand. Text/Reference Book Training Dept. 1980 SEAFDEC (8):103 p.
- SHINDO, S., General review of trawl fishery and the demersal fish stocks of the south China sea. FAO Fish, 1973 Tech. Paper, (120):49 pp.
- VADHANAKUL, S., Y. Meemeskul and S. Pramokchutima, An analysis of demersal fish taken from otter-board 1985 trawl survey in the Gulf of Thailand 1981. Department of Fisheries. Demersal Fish Report No. 5/1985, 71 pp.