

## EFFECTS OF OVERFISHING AND ABANDONING BOTTOM TRAWLING ON QATAR'S FISHERIES

By

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### تأثير زيادة معدلات الصيد مع توقف الصيد بالجر على المصايد القطرية

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أجريت هذه الدراسة لإلقاء الضوء على تأثير منع الصيد بالجر وزيادة جهد الصيد للقطاع الحرفي على وضع وديناميكية المصايد القطرية . وقد أجرى في هذا الصدد تحليل للإحصاءات السمكية التي تعدها إدارة الثروة السمكية التابعة لوزارة الشؤون البلدية والزراعة بدولة قطر خلال الفترة من ١٩٨٥ وحتى ١٩٩٤ .

أوضحت نتائج الدراسة أن الإنتاج السنوي من الأسماك في قطر قد أزداد تدريجياً ليصل إلى أعلى معدل له (٨١٦٠ طناً) في عام ١٩٩١، ثم بدأ في التناقص بعد ذلك ليصل إلى ٥٠٨٦ طناً فقط في عام ١٩٩٤ . وقد كان هذا التناقص نتيجة مباشرة لزيادة معدلات الصيد عن الحد المطلوب وكان من نتيجة ذلك أن تناقص حجم الصيد بالنسبة لوحدة الجهد (عدد وحدات الصيد العاملة) للقطاع الحرفي تناقصاً ملحوظاً .

كما أوضحت النتائج أن المحصول القائم الأعلى من المياه القطرية يبلغ حوالي ٦٠٠٠ طناً / عام ، كما حدث تغيير كبير ومستمر في توزيع وتمثيل الأنواع المختلفه من الإنتاج السمكي مع زيادة مستمرة في أسعار معظم الأسماك الاقتصادية . وأوصت الدراسة ببعض الإجراءات التي يجب اتخاذها للحفاظ على الثروة السمكية القطرية وتنميتها .

*Key Words:* Qatar's Fisheries, landing, fishing effort, maximum sustainable yield, species composition, Arabian Gulf.

#### ABSTRACT

The present study was conducted to overview the effects of abandoning bottom trawling and increasing fishing effort on the structure and dynamics of Qatar's fisheries during 1985-1994, using the fishery statistics data, issued annually by the Department of Fisheries, Ministry of Municipal Affairs and Agriculture, State of Qatar. The study indicated that the annual catch has been gradually increasing to reach a peak of 8160 t in 1991, followed by a sharp reduction afterwards. As a result, artisanal fishing effort (no. of fishing vessels) was sharply increased to compensate for the decreased catch per unit effort (CPUE). The catch and CPUE trends indicated that the maximum sustainable yield in Qatar's fisheries is about 6000 t/year. In addition, a dramatic change in species composition in the catch was observed, especially after abandoning bottom trawling and closing shrimp fisheries in Qatari waters since 1992. Meanwhile, the prices of most commercial fishes were increased.

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## INTRODUCTION

About 150 fish species, belonging to 50 families, are currently recorded in Qatari waters [1]. However, only about 43 species, belonging to 26 families are economically important. Qatar is among the Gulf countries close to self sufficient in fish consumptions, third only to Sultanate of Oman and the United Arab Emirates [2]. Both artisanal sector and governmental sector (Qatar National Fishing Company) (QNFC) have been fishing in Qatari waters. Fishing methods and techniques deployed by each sector have been described in details by Sivasubramaniam and Ibrahim [3]. The QNFC fleet consisted of 3 bottom trawlers, contributed between 11-39% of the total landing from 1980-1992. [4]. However, bottom trawling was stopped in Qatar in mid 1992. In addition, the number of artisanal fishing crafts is increasing progressively. Consequently, great changes in the structure and dynamics of Qatar's fisheries are likely to happen. This may lead to significant social and economic impacts on fisheries sector as a whole.

The present study throws the light on the trends and characteristics of Qatar's fisheries during 1985-1994, with emphasis on the effects of abandoning bottom trawling, closing shrimp fisheries and increasing fishing effort by artisanal sector on fish populations structure and dynamics. In addition, the MSY of hamoor and shaery, the most important commercial fishes in Qatar, were also estimated. In addition, market trends of important fish species were investigated.

## MATERIALS AND METHODS

The data used in the present study were obtained from the "FISHERY STATISTICS YEAR BOOK" (1985-1994), published by the Department of Fisheries, Ministry of Municipal Affairs and Agriculture, State of Qatar.

The total annual catch, effort, catch/effort, and revenue have been analyzed. It should be mentioned that only the catch per unit effort (CPUE) of the artisanal sector was known. However, the total effort was calculated by dividing the annual catch by the calculated effort. The trends in annual catch and CPUE were analyzed and maximum sustainable yield (MSY) was predicted by plotting the catch against the effort using Walter's (1986) method [5].

## RESULTS AND DISCUSSION

The results of the present study revealed that total fish landing in Qatar has been increasing progressively from 2484 tons in 1985 to reach 8136 tons in 1991, followed by a sharp decrease to reach only 5086 t in 1994 (37.5% reduction) (Fig. 1.). The re-

duction in annual landing was more pronounced in the economically important species (Fig. 2). In the meantime, the total (estimated) effort has increased from 309 in 1985 to 483 in 1994. This increase in fishing effort in recent years has resulted in a significant reduction in CPUE (Table 1).

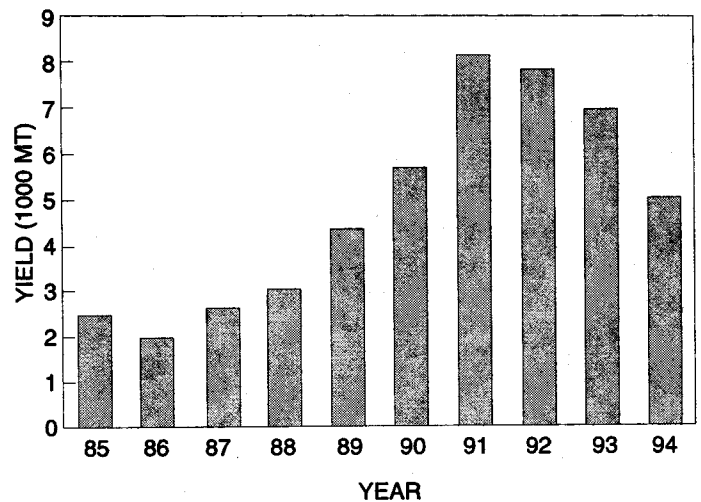


Fig. 1. The total catch of Qatar's fisheries during 1985-1994.

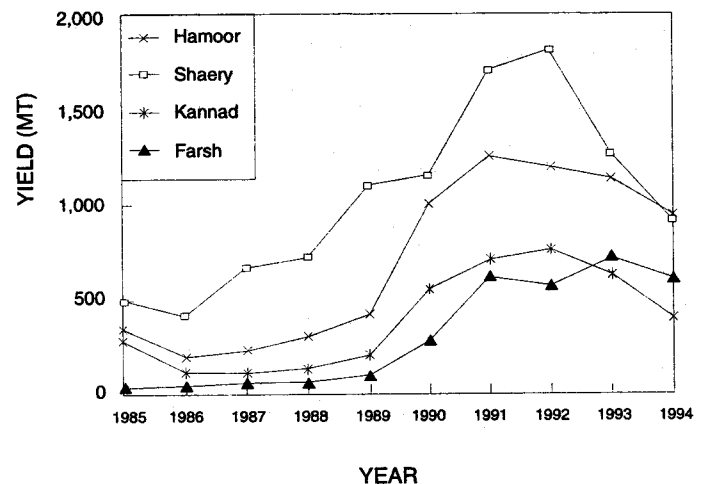


Fig. 2. The yield of economically important fish species in Qatar during 1985-1994

The proximate analyses of the current data indicated that the MSY is about 6000 t/year (Fig. 3). This amount is likely to be obtained by about 450 fishing vessels. The MSY of Hamoor and Shaery were about 1000 and 1200 t/year, respectively (Figs. 4 and 5). It should be clear, however, that these values are preliminary estimates since information about fishing efforts (number of traps, gill nets, fishing lines, engine powers, fishing days, ... etc.) is very limited. That is why the number of operating vessels was used as a unit of effort.

**Table 1**  
The characteristics of Qatar's fisheries during 1985-1994.

Parameter	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total catch (ton)	2484	1980	2678	3086	4374	5702	8136	7845	6994	5086
% self sufficient	70.4	69.1	85.2	93.0	84.5	87.3	91.9	87.6	84.5	83.2
Value (10 <sup>6</sup> QR)	22.7	15.64	19.85	23.97	33.99	41.36	61.22	63.89	63.19	44.43
Artisanal catch (ton)	1825	1210	1801	2270	3457	4911	72.73	6994	6994	5086
Catch of QFNC (ton)	659	770	877	816	918	791	900	851	---	---
Artisanal vessels	227	227	245	285	344	385	409	449	463	483
CPUE	8.04	5.33	7.35	7.96	10.05	12.76	17.69	15.58	15.12	10.53
Estimated Total Effort	309	371	364	388	435	477	460	504	436	483

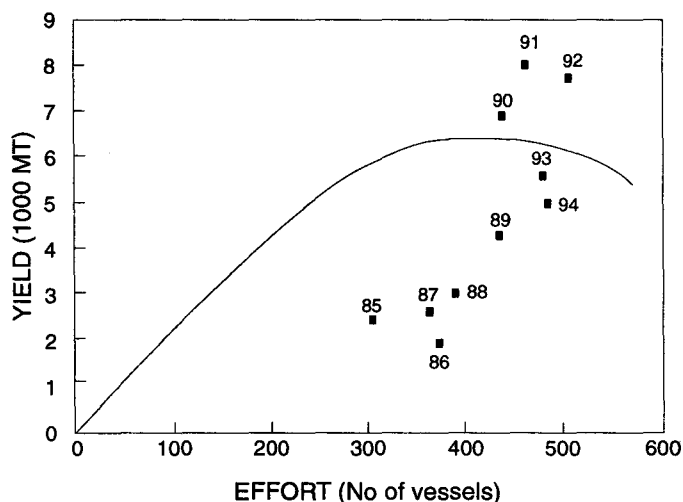


Fig. 3. Maximum sustainable yield and the trend of catch of commercial fishes in Qatar during 1985-1994.

The MSY obtained in the present study is significantly lower than that reported by Sivasubramaniam and Ibrahim [6] who suggested that about 18,000 tons of demersal commercial fishes could be landed from Qatari waters without any adverse effect on the stock. This figure may be questionable, since sampling techniques and data analyses may have been inappropriate. Meanwhile, FAO [7, 8] reported that the exploitable stock in Qatari waters is about 7000 to 10,000 tons, which is in agreement with the present results. From the foregoing discussion, it appears that the 1991 catch (8136 tons) was probably higher than the optimum sustainable yield (OSY). The continuous reduction in fish landing following 1991 may, therefore, be an indication that Qatar's fisheries have been overexploited. Discussions with vessels owners and fishermen have supported this assumption. They all indicated that the present level of landing is obtained by a very large increase in fishing effort.

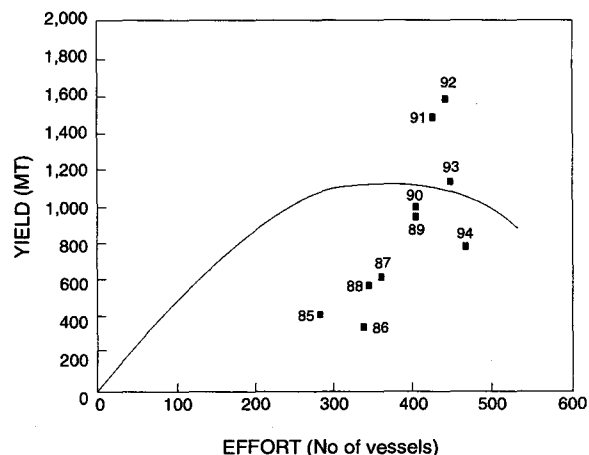


Fig. 4. Maximum sustainable yield and the trend of catch of Shaery (Emperor) in Qatari waters during 1985-1994.

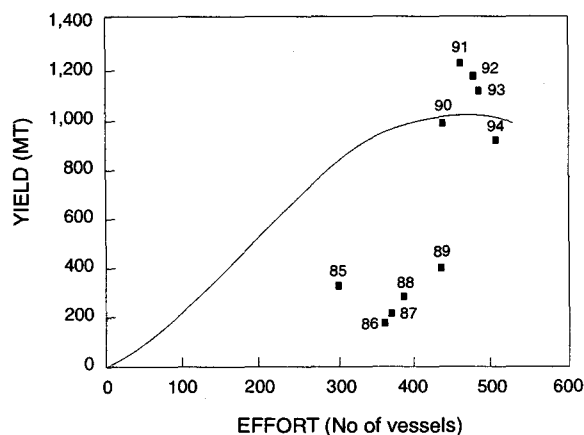


Fig. 5. Maximum sustainable yield and the trend of catch of Hamoor (grouper) in Qatari waters during 1985-1994.

The present study revealed also that the landing of commercial bottom fishes such as groupers (locally known as Hamoor) (*Epinephelus* sp) and emperors (locally known as Shaery) (*Lethrinus* sp) has been decreased in the last few years. In addition, the structure and species composition have been dramatically changed (Table 2). For example, the landing of three banded

grunt (locally known as Farsh) was increased from only 107 tons in 1989 to reach 612 and 730 tons, representing 12 and 10% of the total landing in 1993 and 1994, respectively. The commercial value and market price of this species was increased. Similar trends were observed in other species (see Table 2).

**Table 2**  
Annual landing (L) ( $10^3$  t) and retail prices (P (QR) of the major economical fishes landed in Qatar during 1985-1994.

Fish	1985		1986		1987		1988		1989	
	L	P	L	P	L	P	L	P	L	P
Grouper (Hamoor)	344.9	9.6	204.2	8.6	235.7	8.4	308.0	7.8	426	8.1
Emperor (Shaery)	492.5	7.0	418.2	4.8	671.9	3.6	728.2	3.8	1104	3.2
Mackerel (Kanaad)	288.6	13.4	124.4	14.0	113.9	12.2	142.6	12.3	213	11.8
Banded grunt (Farsh)	39.6	2.7	50.3	2.2	66.4	2.0	66.4	2.0	107	2.0
Cravalle (Karary)	155.4	6.3	186.5	4.5	174.6	5.0	135.5	5.0	485	4.9
Rabbitfish (Safy)	146.9	14.9	97.6	13.5	128.1	13.4	136.4	13.0	186	14.0
Malabar cavalla (Zubaidy)	100.8	13.1	76.3	10.6	105.0	9.9	105.0	9.4	150	9.4
Golden trevally (Rabib)	56.7	20.8	36.1	19.8	68.0	18.5	82.7	16.5	124	16.2
Jack caranx (Gash)	35.1	6.6	50.2	5.0	95.8	5.9	111.3	7.3	108	5.7
Red Snapper (Hamra)	83.9	4.8	88.7	3.6	98.0	3.3	98.4	3.2	149	3.5
Seabream (Gorgofan)	33.9	12.3	20.8	13.1	34.9	14.0	91.2	13.9	141	10.9
Picnic seabream (Faskar)	52.3	10.0	42.2	10.6	64.0	9.8	83.8	9.8	102	9.2
Longspine bream (Kover)	58.7	8.9	50.3	7.6	77.8	6.3	101.0	7.2	137	6.7
Common mojarra (Badh)	17.7	16.1	25.9	13.7	38.7	13.9	60.6	15.1	110	19.3
Parrotfish (Gein)	37.9	2.5	44.8	2.2	61.9	2.0	56.3	2.0	100	2.0

**Table 2, Contd.**

Annual landing (L) (10<sup>3</sup> t) and retail prices (P) (QR) of the major economical fishes landed in Qatar during 1985-1994.

Fish	1990		1991		1992		1993		1994	
	L	P	L	P	L	P	L	P	L	P
Grouper (Hamoor)	1015	7.0	1256	7.4	1200	8.6	1145	8.4	951	9.4
Emperor (Shaery)	1157	3.1	1702	3.2	1811	4.0	1271	4.7	922	4.0
Mackerel (Kanaad)	562	10.8	716	12.2	766	11.9	636	12.8	406	14.3
Banded grunt (Farsh)	291	2.7	50.3	2.2	66.4	2.0	66.4	2.0	107	2.0
Cravalle (Karary)	259	5.2	198	5.7	169	6.3	204	7.5	119	9.5
Rabbitfish (Safy)	247	15.8	354	17.5	346	18.5	281	21.2	194	18.6
Malabar cavalla (Zubaidy)	179	12.4	116	12.3	220	12.2	207	14.6	101	16.7
Golden trevally (Rabib)	230	16.2	313	18.9	223	21.3	224	21.4	123	22.2
Jack caranx (Gash)	219	5.6	566	6.0	416	10.7	361	12.7	201	12.7
Red Snapper (Hamra)	140	4.0	185	4.0	159	4.6	129	5.4	114	5.3
Seabream (Gorgofan)	108	7.5	205	7.2	152	10.0	159	10.8	110	9.5
Picnic seabream (Faskar)	63	9.7	64	8.1	72	9.0	54	12.6	54	10.7
Longspine bream (Kover)	148	7.4	185	6.5	216	7.5	174	8.7	129	7.7
Common mojarra (Badh)	97	15.4	178	18.0	152	20.7	115	22.5	53	18.7
Parrotfish (Gein)	54	2.5	146	2.0	124	2.3	144	3.0	134	2.8

The change in species composition in fish landing may have been related-in part-to abandoning bottom trawling in Qatari water since mid 1992. The trawling fleet which belonged to Qatar National Fishing Company (QNFC) has been contributing significantly to the total fish landing, with an annual catch ranging from 10-39 % of the total landing (Table 1). It is, therefore evident that stopping bottom trawling had a significant impact on population dynamic, catch composition and fish prices. Closing prawn fisheries since 1992 may also affected Qatar's fisheries. It was reported [8] that prawn is used as a natural food for several fish species. Any changes in the population dynamics of prawn may therefore affect prawn's predators, and in turn, the fishery as a whole.

It is evident from the present results that Qatar's fisheries will face serious problems unless an immediate action is taken. The following managerial measurement are recommended.

- (1) No new dishing licenses should be issued.
- (2) Reducing fishing efforts. In this regard, the number of fishing vessels currently operating, operation time, number of fishermen... etc, could be reduced.
- (3) Closing season (s) and /or ground (s), specially during spawning seasons.
- (4) Discovering new fishing grounds.
- (5) Restoring bottom trawling is highly recommended. It was reported that fish density in Qatari waters increases with increasing water depth[9]. Bottom trawlers usually operate in the deep areas where gill nets or fish traps may not reach. It is assumed therefore that demersal stocks in deep water are increasing at the absence of efficient fishing methods (trawling) while other fishing areas are heavily exploited. It is clear that restoring bottom trawling in Qatar is inevitable.
- (6) Adopting and developing a national research plan for fisheries management and development.

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