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THE FISHERIES IN THE UNITED ARAB EMIRATES

by

Abdulrazzaq Abdulla Ahmad and Ahmad Abdul Rahman Al Janahi

Ministry of Agriculture and Fisheries, United Arab Emirates

ABSTRACT

Fishing in the UAE is carried out by artisanal boats and fishermen. Various species of fish are available in the waters of the country throughout the year, including pelagic and demersal species. On the supply side, for fresh fish the country is considered self-sufficient. The government provides incentives for national fishermen by subsidizing fishing boats, marine engines and fishing gear. Statistics show that the fish catch increased from 64 000 t in 1976 to 114 739 t in 1998. During the same period the number of fishermen actively engaged in fishing increased substantially, from 4 000 to 18 758, as did the number of boats, from 1 065 to 7 681.

Fisheries research, including the substantial emphasis on aquaculture, is outlined.

INTRODUCTION

The United Arab Emirates (UAE) is a coastal country extending along both the Arabian Gulf and the Gulf of Oman. The country has numerous islands and lagoons, which provide an ideal environment for an abundant growth of living marine resources. Before discovery of oil, the people living along the coastal regions of UAE depended on the sea for their livelihood. Maritime trade, boat building, fishing net and trap fabrication, pearl fishing, fisheries, etc., were the locals' occupations. Following the discovery of oil, however, the country witnessed great economic and social changes from the 1970s on. Although oil is the main revenue source of the country at present, due importance is given to the agricultural and fishery sectors by the government.

PRESENT STATUS OF FISHERIES IN THE UAE

Fishing in the UAE is carried out mainly by artisanal boats and fishermen. By decree, modern large fishing boats are not allowed to fish, thus conserving the marine environment and protecting the fisheries of the country and the interests of artisanal fishermen. The waters of the UAE are characterized by a diversity of species. Pelagic, demersal, and migratory species are available at different periods of the year. Production of fresh fish is considered sufficient to satisfy the local demand for this commodity.

Under the patronage and wise leadership of His Highness Sheikh Zayed Bin Sultan Al Nahyran, President of the UAE, the Government of the UAE is taking a keen interest in the protection and development of fisheries. The government is providing many incentives to national fishermen through subsidizing fishing boats, marine engines and fishing gear. As a consequence, statistics show that fish catches increased from 64 000 t in 1976 to 114 739 t in 1998, a 79% increase. The number of fishing boats also increased, from 1 065 in 1976 to 7 681 in 1998, whereas the number of fishermen engaged in fishing showed an increase from 4 000 to 18 758 during the same period. Fish consumption per caput of UAE nationals (both fresh and

frozen fish) was equivalent to about 33 kg. This ratio is considered a high one in comparison with the consumption ratio in other Arab counties, or world consumption, which is about 16.4 kg/caput currently (FAO, 1998). Yearly data on the fish catch estimates are shown in Table 1, while Table 2 show the number of fishing boats and fishermen. Table 3 shows the estimated fish catch by species for 1998 (Ministry of Agriculture and Fisheries, in press).

Table 1. Estimated total fish catch in UAE

YEAR	TOTAL CATCH (t)
1976	64 000
1987	85 248
1988	89 500
1989	91 160
1990	95 129
1991	92 300
1992	95 000
1993	99 600
1994	108 600
1995	105 884
1996	107 000
1997	114 358
1998	114 739

Table 2. Number of fishing boats and fishermen in UAE

YEAR	FISHING BOATS	FISHERMEN
1976	1 065	4 000
1979	1 780	6 680
1982	2 212	8 258
1985	2 190	7 841
1988	3 162	10 375
1991	3 162	10 984
1994	4 303	14 143
1995	4 303	14 143
1996	4 464	13 411
1997	6 341	17 286
1998	7681	18 758

FISHERIES RESEARCH

The Marine Resources Research Centre (MRRC) was established in 1984, at Umm Al Qaiwain, by the Ministry of Agriculture and Fisheries. Since then, the Centre has been engaged in various studies on the fisheries and marine environment of the country. The main activities of the Centre include experimental studies on aquaculture of fish and shrimps, feeding experiments on certain important fish species, pond culture experiments, effect of oil on survival of certain fish species, hydrographic and larvae surveys in UAE coastal waters, mangrove cultivation experiments, etc. MRRC propose the regulations to be implemented by the Ministry of Agriculture and Fisheries in order to protect the marine resources and the marine environment in the territorial waters of UAE. Responsibilities of the MRRC have increased with the development of the offshore oil exploration and export industries, due to the increased threat of marine pollution. Marine pollution hazards because of oil spills, tanker accidents, discharges from ships and industries, wastes from offshore oil exploration and exploitation, dumping of non-degradable materials, etc., have caused anxiety among scientists, environmentalists and others concerned in the country. Special studies at MRRC have been devoted to cover this important topic.

Since aquaculture has a vital role to play in the development of fish production locally, MRRC has given special prominence to aquaculture experiments in its programme agenda. Some of the areas where MRRC has directed its research activities are considered below.

Table 3. Estimates of fish quantities caught by species in 1998

LOCAL NAME	SPECIES	TONNES	LOCAL NAME	SPECIES	TONNES
	Pelagic fishes			**Demersal fishes**	
Nummar	*Chanos chanos*	54	Hamor	*Epinephelus* spp.	7 256
Mien	*Arius* spp.	150	Naisar	*Lutjanus* spp.	3 725
Beyah	Mugilidae	1 458	Andaq	*Nemipterus* spp.	424
Sechel	*Rachycentron canadum*	57	Sheari	Lethrinidae	12 283
Ooma	*Sardinella* spp.	13 321	Baciha	*Gerre* spp.	1 324
Barreya	*Stolephorus* spp.	10 329	Safi	*Siganus* spp.	580
Kanaad	*Scomberomorus* spp.	7 133	Gabot	Sparidae	2 846
Tebban	*Auxis thazard*	620	Nagror	*Pomadasys* spp.	1 916
Gebab	*Thunnus tonggol*	5 665	Other		5 008
Seda	*Euthynnus affinis*	526	Total		35 362
Garfa	*Rastrelliger kanagurta*	4 669		**Crustacea**	
Sala	*Leiognathus* spp.	784	Rubyan	*Penaeus* spp.	–
Jed	*Sphyraena* spp.	2 269	Um Rubyan	Lobster	268
Anfalos	*Coryphaena hippuris*	61	Gabgob	*Portunus* spp.	60
Hef	*Chirocentrus dorab*	78	Naichar	*Sepia* spp.	27
Delaa	*Scomberiodes* spp.	2 147			
Diayoh	*Megalaspis cordyla*	1 022			
Yaryor	*Carcharhinus* spp.	1 682			
Semah	*Decapterus* spp.	1 939			
Jash	*Carangidae*	7 403			
Khadra	*Selaroides leptolepis*	3 118			
Zeraidi	*Gnathanodon speciosus*	364			
Other	—	14 173			
Total		79 022	Total	–	355
		GRAND TOTAL	**114 739 t**		

Aquaculture of selected fish species

A prime objective of MRRC has been to develop aquaculture techniques for certain important fish species, suitable for the conditions prevailing in UAE. Rabbitfish, sea bream and grouper were obvious candidates.

Induced spawning technique, using hormones, was adopted in rabbitfish (*Siganus canaliculatus*) culture, whereas eggs collected from specially maintained broodstocks at the MRRC were used for the culture of sea bream and grouper. These broodstocks were fed with special diets for three to four months prior to the spawning season. MRRC has five broodstock tanks, each with a capacity of 50 m^3 and there are six larvae rearing tanks of 100 m^3 capacity each. The number of rabbit fish fingerlings produced in 1999 was around 82 650. Sea bream fingerlings produced in 1999 were 21 180 fingerlings. All these fingerlings were released to the sea in an effort to enhance the natural stock of these species (Zarouni *et al*., 1999).

Micro-organism culture

MRRC has special tanks for the culture of *Chlorella* sp. and rotifers. The success of fish culture depends to a great extent on the production of micro-organisms, especially during the initial larval stages. MRRC has maintained a stock of *Chlorella* sp. and a rotifer (*Brachionus plicatilis*) since 1980. Mass culture of these organisms is based on these stocks ahead of the fish spawning season. Many factors, such as water temperature, pH and contamination with other micro-

organisms influence production. Seawater filtered through a sand filter unit is usually used for micro-organism culture and for all experimental purposes at the Centre.

Shrimp culture

Experimental seed production of two species of shrimp (*Penaeus semisulcatus* and *P. indicus*) has been carried out at the MRRC unit at Umm Al Qaiwain; they were found to be suitable species for culture under UAE conditions. Females of these species mature naturally.

EXPERIMENTAL STUDIES ON THE GROWTH RATE OF CERTAIN COMMON FISHES

Rabbitfish

Some of the rabbit fish larvae produced at the Centre were subjected to rearing experiments to study their growth rate under pond conditions. About three-month-old rabbitfish juveniles (average fork length 12.5 cm and body weight 37 g) were kept in a culture pond and fed with locally made compound feed. After 12 month's culture, the average length was 22.7 cm and body weight was 208.8 g. In general, rabbitfish could reach about 150 g in 8 months, which is considered the commercial size for this species.

Mullets

Valamugil seheli is very much in demand in UAE markets and comparatively expensive. Mullet fingerlings are available in the shallow areas and channels in the Umm Al Qaiwain area. The drain channel from the culture ponds at the Centre is one area where mullet fingerlings are found in abundance from January to March. A study was conducted by rearing fingerlings with an initial fork length of 3.4 cm and body weight 0.5 g in the pond. After about two years (632 days), the average fork length was 18.7 cm and bodyweight reached 283.9 g.

Liza macrolepis The growth of largescale mullet was found to be slow compared to that of *Valamugil seheli.* Pond culture studies indicated that fry of 0.5 g bodyweight reached only 110.5 g after 632 days of culture. Hence this might not be an economically viable species for commercial-scale fish culture.

Sea bream

Goldlined sea bream (*Rhabdosargus sarba*) of average fork length 9.4 cm and bodyweight 16.8 g were kept in the pond in order to study their growth. Monthly measurements on their length and weight were taken. After 12 months, the fish had reached 18.8 cm body length and 160.8 g body-weight on average.

Grouper

Greasy grouper (*Epinephelus tauvina*) is a species that could be cultured but their growth rate is very slow and further investigations would be needed to establish economic feasibility. Grouper larvae produced at MRRC in 1994 were the subject of growth studies. Average body length was 12.4 cm and bodyweight 36.3 g after 102 days. The length and weight were 23.8 cm and 207.1 g when they were 262 days old, which indicated a growth rate of 0.79 g/day.

OTHER RESEARCH ACTIVITIES AT MRRC

Experimental studies on the effect of sea algae on the growth and survival of rabbitfish

An experiment was carried out on six groups of rabbit fish by feeding them with compound feed and different quantities of sea algae. After 146 days of experiment, it was concluded that better

growth and survival rates could be achieved through a combination diet comprising compound feed and fresh sea algae equivalent to about 50% to 75% of fish bodyweight.

Experiments on lethal concentrations of Dubai and Abu Dhabi crude oils on mullet and sea bream

Bioassay studies were conducted on mullet (*Liza macrolepis*) and bream (*Rhabdosargus sarba*) to assess the effect of three types of Arabian Gulf oil, namely Dubai crude oil, Abu Dhabi (heavy) and Abu Dhabi (light) crude oils. The lethal effect of Abu Dhabi (light) crude oil was greater (LC_{50} 17 154.2 ppm for mullet and 15 367.3 ppm for bream) than Dubai crude (LC_{50} 23 623.6 ppm for mullet and 22 247.8 ppm for bream) or Abu Dhabi (heavy) crude oil (LC_{50} 19 723.1 ppm for mullet and 18 958.4 ppm for bream).

Studies on mangrove seed emergence and growth under various oil-contaminated conditions

Seed emergence of mangrove (*Avicennia marina*) is being studied through a set of experiments based on steeping the seeds in crude oil for different periods before sowing. The 6 groups were treated with oil for l, 3, 6, 12, 24 and 48 hours respectively, and sown in horticultural nursery bags filled with beach sand. Eighty days after the sowing, 18.8% of seeds had emerged in group 1, 12.5% in group 2, 6.3% in groups 3, 4 and 5, whereas no seeds emerged in group 6.

Another experiment was carried out by sowing the mangrove seeds in horticultural nursery bags containing beach sand contaminated with different concentrations of crude oil. In pots where the soil was less than 20% oil saturated, seed emergence was 50%; there was 12.5% emergence where oil saturation of the soil was 25% to 50%, while no seed emergence was observed when the oil saturation of soil was 75% to 100%.

FISHERIES EXTENSION SERVICES

MRRC also provides liaison services with the fishermen community. The fishermen are advised to use the right mesh size and mesh bar for their fishing gear, and they are also told about the need for keeping the marine environment healthy and devoid of pollution and clean of damage caused to the ecology by the use of trawlers. The Ministry of Agriculture and Fisheries provides boats and gear to national fishermen at subsidized prices as an encouragement to promote the artisanal fisheries sector in the UAE.

Marine engines of fishing boats are repaired at the ministry's Marine Workshops established in almost all major fishing villages in UAE. MRRC supplies cage nets to the national fishermen to give them incentive to try out cage culture and to enhance awareness of aquaculture systems. Many nationals are interested in this scheme and are managing cage culture in different parts of the country. MRRC supplies fry of tilapia and mullet to citizens interested in aquaculture (Al Janahi, 1996).

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APPENDIX A -- TEXT OF PRESENTATION ON SOME ASPECTS OF UAE FISHERIES

INTRODUCTION

The territorial waters of the United Arab Emirates (UAE) have remarkable fisheries potential which is not fully exploited. The Government of UAE has clear-cut objectives for the conservation and exploitation of its marine resources through scientific planning and management. Timely measures have been adopted to maintain a balance between exploitation and consumption based on annual catch statistics and market trends. The fisheries regulations proposed by the Ministry of Agriculture and Fisheries are implemented by the Government as and when required. The following are some of the steps taken by the government in the fisheries sector.

INPUT CONTROL

The government has restricted catch by implementing a minimum mesh size of 1.5 inches for fishing nets and 2 inches for fish traps. Use of bottom trawls is banned as it can cause environmental damage. Fishing operations by non-artisanal mechanized fishing vessels and gear are not allowed in the coastal waters of UAE.

OUTPUT CONTROL

The government has declared a closed season for the export of certain species during their off-season. This prevents depletion of such species from the local markets when the local demand is high and supply is inadequate.

TECHNICAL MEASURE S

Operation of gillnets *(hayali)* are not allowed in lagoons, creeks and other shallow coastal areas that are the breeding and nursery grounds for a variety of fish and shrimp.

Nylon nets are also not permitted as a rule in view of the environmental damage they can cause. Statistical studies regarding catch, number of boats and fishermen, gear, etc., are ongoing being to assess fluctuations in fish catch and fishing effort on an annual basis.

Enhancement of production of certain locally important fish and shrimp species is attempted through aquaculture by the Marine Resources Research Centre at Umm Al Qaiwain, UAE. The Centre is at present capable of producing rabbit fish, sea bream, grouper, *Penaeus semisulcatus* and *P. indicus*

Results of larva surveys and oceanographic surveys conducted by the Marine Resources Research Centre help to give a better understanding of the fisheries and environmental aspects of the coastal waters of UAE, which are essential for the proper planning and management of fisheries in the region.

ECONOMIC MEASURES

The Government of UAE has been providing incentives for the national fishermen by subsidizing fishing craft and gear. Also, the Ministry of Agriculture and Fisheries has established a number of marine workshops at various fishing villages in UAE, where marine engines are repaired free of cost.

COORDINATION OF ACTIVITIES

Fisheries cooperatives have been formed in various regions to coordinate the efforts of fishermen and assist the Government strategies through marketing of products in a better way and also to provide feedback on the problems facing the fishing industry from time to time.

The Coastguard Administration also contribute to the implementation of the fishing regulations by keeping a close watch on fishing activities in the territorial waters of UAE. Municipalities in UAE take keen interest, urging fishermen to strictly follow the regulations and penalizing those who deviate from them.

APPENDIX B – PRESENTATION ON PROTECTION OF THE MARINE ENVIRONMENT FROM CONTAMINATION IN UAE

INTRODUCTION

The Ministry of Agriculture and Fisheries is very keen to conduct studies on protecting the environment from pollution, since an environment free from pollution means that there will be a good chance for protecting and developing the marine living wealth.

The activity of the ministry in this field is represented through the activities of the Environment High Committee, of which the ministry is a member.

MINISTERIAL MEASURES TO PROTECT AND DEVELOP FISH WEALTH IN THE COUNTRY

Fish wealth is a natural wealth that can renew itself continuously if exploited properly in harmony with the sea's production capacity and fish reservation. So protecting the fish wealth from bad exploitation implies careful development, hence protection, as the most important and best means of fish wealth development.

Therefore, in order to protect and develop this wealth for fishermen themselves and for their county and coming generations, the ministry has implemented the following protection measures.

1. Executive Ministerial Council Decision No.158/22 of 1978 regarding banning of fishing nets with mesh less than 1.5 Δ 1.5 inches.
2. Executive Ministerial Council Decision No. 173/9 of 1988, with regard to banning the use of all types of nylon nets.

3. Executive Ministerial Council Decision No. 82 of 1989 regarding terms and conditions for exporting and importing local fish and re-exporting non-local fish.
4. Executive Ministerial Council Decision No. 220 of l990 regarding the ban on fishing under-size fish.
5. Executive Ministerial Council Decision No. 34 of 1991 with regard to banning use of bottom nets.
6. Executive Ministerial Council Decision No. 43 of 1991 with regard to terms and restrictions of manufacturing and using fishing gear.
7. Forbidding the use of bottom nets.
8. Banning fishing by commercial companies.
9. Other measures, including banning the use of explosives, poisons and chemical materials as fishing means.

WORKS PROPOSED TO DEVELOP THE FISH WEALTH SECTOR

Setting up more marine worships in areas that need the services of such workshops.

CONDUCTING STUDIES TO MAKE ARTIFICIAL SHELTERS FOR FISH IN SOME REGIONS OF UAE

There are large areas in the sea with flat, sandy bottoms, especially in the national waters of the Arab Gulf, and these areas are poor in fish. Therefore, establishing artificial shelters in these regions should improve the environment for fish and their reproduction, and consequently fish production should rise accordingly.

ASSESSING FISH RESORCES

The limits of fish resources, productive potential and fishing efforts and the type of these efforts, all these things are considered basic principles that must be known when setting plans and programmes which protect and develop the fish wealth.

CONCLUSION

Whereas the above studies which have been implemented by the Ministry through the cooperative survey project (1977 - 1979) are now twelve years old, the execution of them in the present time or in the near future remains a vital need and should be fulfilled.

That was a brief account of fish wealth in UAE in its present condition and what is planned for it and the country's efforts to develop this vital sector inherited from our fathers and ancestors and which forms a basic foundation for the national economy of the county.