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Socio-Economic Structure and Performance of Traditional Fishermen in the Sultanate of Oman

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Abstract *Understanding the basic structure of fishing communities is vital information for a country's economic policy formation. Basic information such as income, educational level, and age of fishing participants can be useful in determining socio-economic changes between different geographical locations and fishing communities. Market supply and demand information is essential for the promotion of fishing industry improvement programs, as well as for food subsidy policies. Social and economic data for traditional fishermen in Oman is very limited in scope. Available information indicates that Omani traditional fishermen may contribute as much as 80% of the country's total catch. Worldwide, this figure is only about 25%. There are currently a number of challenges facing the Omani fishing sector, such as fish quality improvement for markets and to what extent traditional fishermen are participating in government-sponsored programs.*

The findings of this study have practical policy implications. For example, preliminary data indicates that traditional fishermen are aging, many have very limited educational levels, there are minimal alternative employment opportunities, and there is a need to utilize more modern equipment.

Key words Traditional fishermen, fiberglass vessel, socio-economics.

JEL Classification Code Q22.

Introduction

It is often stated, "Oman is blessed with a long and productive coastline which has provided a living for local fishermen since ancient times" (NCS 1992; COA 1995). Fisheries continue to be an important part of the Omani economy. First, as of 2002, they provided employment for approximately 27,000 fishermen and more than 4,000 others working in associated industries, such as transportation and trade. Secondly, fisheries contribute significantly to the non-oil sector, which the government is trying to emphasize as it attempts to diversify the economy and diminish its

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dependence on oil exports. Finally, it provides nutrition as a functional food and plays an important role in the prevention and management of heart disease for a large portion of the population (Choo and Williams 2003). This study addresses the structure and performance dimensions of the traditional fishing sector in Oman. It focuses primarily on the social and economic characteristics of fishermen in terms of age, educational level, vessel managerial performance, and income distribution. Studies on the traditional fishing industry in Oman are limited in scope and most often pertain to production and marketing (Omezzine 1998; Al-Mazrooei, Chomo, and Omezzine 2003). This study is the first of its kind in Oman apart from the study conducted by Al-Oufi, McLean, and Palfreman (2000), which provided socio-economic information but was limited to three villages, Barka, Musanah, and Suwaq in the Al-Batinah coastal region. Results may have potential implications on the prospective development of the fish industry. Also, the private sector can benefit from such results when making investment decisions for distribution, processing, and marketing which require additional socio-economic data. This is particularly important in Oman today as it enters a new era of trade in world markets characterized by greater competition from free trade. Therefore, the purpose of this study was to review and analyze the results obtained from a socio-economic study carried out by the Ministry of Agriculture and Fisheries (MAF) with cooperation from the College of Agriculture and Marine Science at Sultan Qaboos University.

Methodology

The study started in 1999 and concluded in 2002. The traditional socio-economic survey of the Omani fishing industry used standard questionnaires that were distributed among 17 fish landing centers in six different regions (figure 1). This questionnaire was structured according to a sample of fishermen selected randomly for two main criteria. First, fishermen types: full-time and part-time. Based on the results of the boat survey conducted in 1995 by MAF, 66% of the fishermen were full-time and 34% were part-time. Second, the age structure of the fishermen was as follows: 60% of the full-time and part-time fishermen ranged between 35 and 54 years of age, 20% were above 55, and 10% were less than 35 (figure 2).

It is important to note that 38 well-trained surveyors supervised by the research team administered the questionnaires. In addition, this questionnaire covered about 12% of the fishermen and the six regions in the country. The corresponding number of complete questionnaires included: Al-Bitinah (24), Dofar (15), Wasta (10), Sharquyah (19), Musandam (14), and Muscat (19). Data was gathered from 1,589 part-time and full-time fishermen.

Background

Total landings for the last two decades (1985–2002) are summarized in figure 3. Nationally, the traditional catch in 2002 represented 81% of total landings (MAF 2003). As noted in figure 3, catch varied considerably between 1985 and 1997 and again from 1998 to 2002, as the former experienced a general decline of approximately 10%. The literature suggests a number of factors associated with this decline. For example, Al-Oufi, McLean, and Palfreman (2002); Omezzine, Zaibet, and Al-Oufi (1996); and Hooker and Parsons (1995) have all stated that overfishing during this period was the primary cause of the decline. They pointed out that this was likely caused by the government's fishery development plan initiated during the

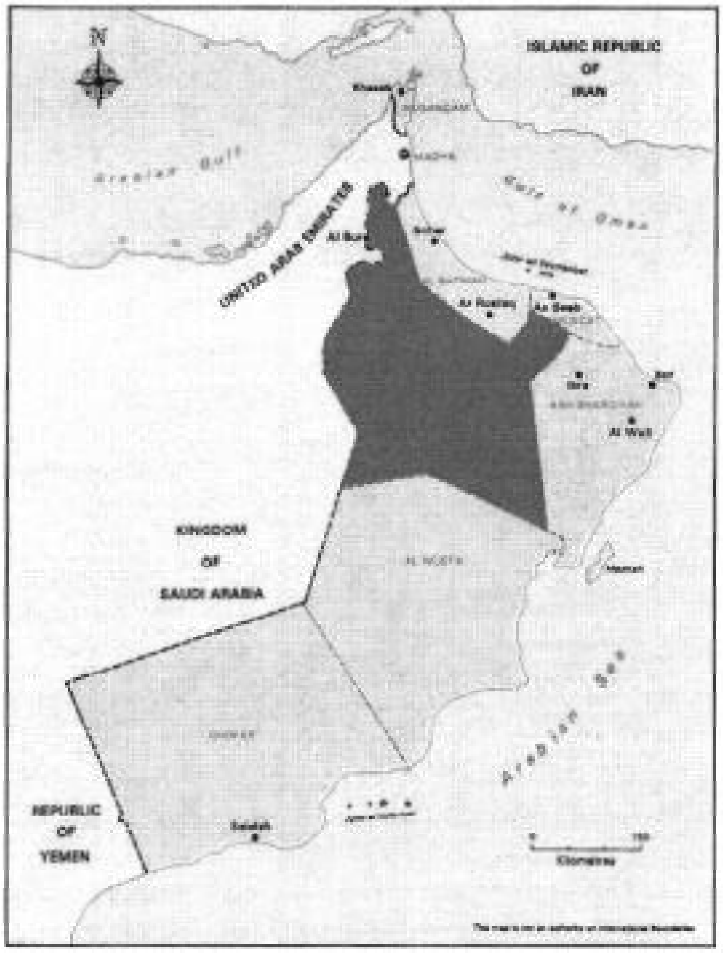

Figure 1. Major Fishing Regions in the Sultanate of Oman

1980s that subsidized the purchase of new fishing vessels. Other events, such as the degradation of coastal environments from industrial and commercial activities in the regions, coupled with marine pollution were also contributing factors. However, the period from 1998 to 2002 witnessed a rise in total landings. This may be attributed to the reduction in subsidized vessels and an increased emphasis on environmental and coastal management.

Table 1 summarizes the regional fishing activities (e.g, number of fishermen, vessels, landings, and population) in terms of distribution. As can be seen, the Al-Batinah and Muscat regions are the most populated in Oman. As a result, fishing is highly concentrated in these two regions. This fact has important economic implications. A major problem for Oman is an unequal distribution between supply and demand. The greatest catches tend to occur in areas with lower populations. For example, fishermen in Al-Batinah have several choices for selling their catch. These can be summarized as follows:

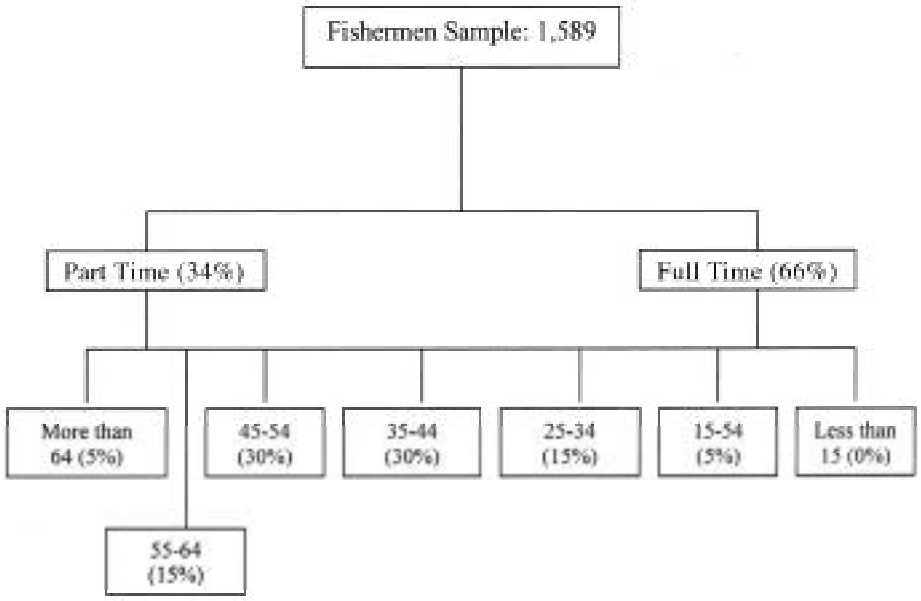

Figure 2. Fishermen Sampled Age Distribution

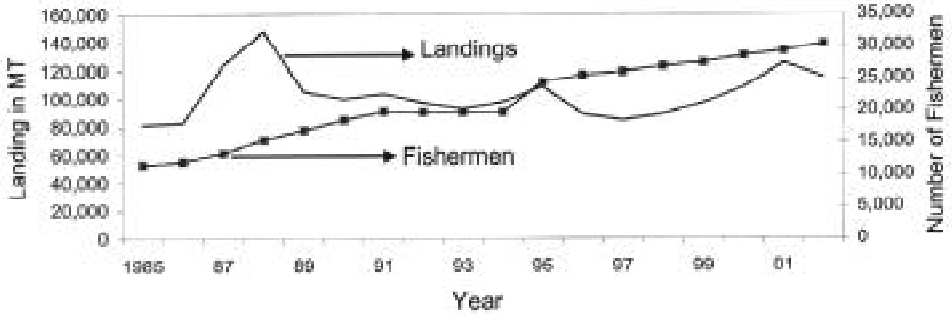

Figure 3. Total Fish Landings (MT) and Number of Fishermen, 1985 to 2002

Table 1
Regional Fishing Activity Distribution, 2002

Omani Region	Fishermen (%)	Vessels (%)	Landings (%)	Population (%)
Muscat	12.68	13.34	22.31	20.75
Batinah	32.93	34.43	17.88	31.34
Sharquyah	22.63	18.33	28.99	17.22
Wusta	10.33	10.84	14.15	0.91
Musandam	10.87	11.03	4.44	1.50
Dhofar	10.55	12.03	11.64	12.73

- Sell directly to consumers through Local Direct Bargain Sale (LDBS).
- Sell to local entrepreneurs (truckers) who then have three avenues for sale: traditional fish auction, consumers through LDBS, and fish traders.
- Sell in the traditional fish auction.
- Sell to processing companies if the quality is high enough.

The methods utilized by fishermen depend on a number of factors. These include: the size of catch, distance to fish markets, access to transportation, and their motivation and initiative.

Results and Discussion

Fishing Vessels

Traditional Omani fishermen are spread out along a coastline that runs for 3,420 km. They operate a number of different vessels, but there are five general types: fiberglass skiffs, aluminum, hori, launch, and shashah. The first two are modern types fitted with outboard engines and ranging in length from 3 to 10 meters. The other three are wooden, or as in the case of the shashah, made of fronds (palm tree leaf) and range in length from 3 to 5 meters. Hori are wooden dugout canoes. The launches are the largest traditional boats ranging in length from 12 to 16 meters and powered by inboard engines. They are used mostly for long fishing trips.

The type of vessel used by traditional fishermen varies depending on the region and availability. A summarization of vessel types is shown in table 2. By far, the most popular vessel type used in Muscat, Al-Wusta, and Dhofar is fiberglass, accounting for 100, 61, and 45%, respectively. Launch-type vessels were only found in the Al-Batinah, Musandam, and Sharqyha regions, accounting for 29, 25, and 26%, respectively.

More recent data published by MAF (2003), given in table 3, shows increased movement toward fiberglass vessels, with about 81% of total fishermen utilizing them. Earlier studies, such as the Boat Survey by MAF (1995), indicated that 69% of traditional boats were fiberglass. Al-Oufi, McLean, and Palfreman (2000) pointed out that individual fishermen operated 4,158 vessels, 70% of which were fiberglass hulled. They also found that "in the decade from 1987 to 1997, the number of fiberglass skiffs and human resources operating in the region increased by 250 and 220%, respectively." This can be explained by the fact that the governmental development plan implemented during 1980s to subsidize the purchase of new fishing vessels may have initiated such an increase.

Table 2
Vessels Type (Percentage)

Region	Fiberglass	Aluminum	Hori	Launch	Shashah	Other
Muscat	100					
Batinah	23	20		29	29	
Musandam	21			25	28	26
Sharqyah	24		25	26		25
Wusta	61					39
Dhofar	45					55

Table 3
Vessels Type Regional Distribution (Percentage)

Region	Fiberglass	Aluminum	Hori	Launch	Shashah	No. of Vessels
Muscat	95	0.8	3.2	0.7	0	1,821
Batinah	73	1.7	3.9	0.7	22	4,701
Musandam	77	1.9	14	6.8	0	1,506
Sharqyah	74	3.2	11	11.7	0	2,502
Wusta	92	1.6	4	2.6	0	1,480
Dhofar	90	6.9	0.6	1.9	0	1,642

Source: MAF Annual Reports (2003).

Socio-Economic Characteristics

Table 4 summarizes the socio-economic characteristics of fishermen samples by region. Ages ranged from 20 to 70 years. Thirty-nine percent of all fishermen were in the 41–55 year range, while 13.5% were in the youngest group (<26 years of age). Little difference was noted between regions regarding age variation. It is important to note that the Al-Oufi, McLean, and Palfreman (2000) survey found 64% of the

Table 4
Socio-economic Characteristics

	Muscat (*n*=301)	Al-Batinah (*n*=373) (%)	Al-Wusta (*n*=156)(%)	Dhofar (*n*=237)(%)	Musandam (*n*=221)(%)	Sharqyha (*n*=298)(%)	Entire Sample (*n*=1,589)
Age (yrs.)							
<26	14.6	9.7	19.9	13	13.1	14.8	13.5
26-40	22.9	34.9	41.7	44.1	29.9	32.6	33.6
41-55	46.2	39.9	28.2	32.4	42.1	39.6	39.1
>55	15.6	15.5	10.3	10.5	14.9	13.1	13.7
Mean	43.8	43.95	38.61	40.33	42.82	41.7	42.27
SD	12.7	12.3	12.38	11.83	12.94	12.88	12.60
Education Attainment (yrs.)							
Illiterate	61.1	72.7	69.2	45.4	63.3	62.4	62.9
1-6	14	11.3	17.9	21.1	12.2	15.8	14.9
7-9	6.6	7	4.8	18.6	11.3	10.4	9.6
10-12	6	5.3	3.4	9.7	10	5.4	6.3
>12	3.3	3.8	3.2	3.8	2.7	4.7	4.2
Mean	1.48	1.402	1.40	1.96	1.64	1.66	1.583
SD	1.13	0.996	0.949	1.18	0.081	1.141	1.103
Occupation							
Fishing Only	64.4	63.8	81.2	66.9	62.7	75.5	68.2
Fishing + Other Jobs	35.5	36.2	18.8	32.5	37.3	24.5	31.6

fishermen within the 41–55 year range and only 4.6% in the <26 year category. An earlier survey found the average age of all fishermen was 35 (University of Durham 1978). This difference from 1978 to present may be accounted for by the mere fact that fishermen are aging and fewer young people are entering the occupation. This may portend important socio-economic implications. As the older generation retires or leaves the fishing industry, the total number of fishermen may decline because the younger generation seems to have considerably less interest in fishing as an occupation.

Educational level of fishermen is also shown in table 4. In general, Omani fishermen were educationally challenged, the vast majority being illiterate with a mean of 62.9% for the entire sample. Variation in literacy rate was apparent between fishermen among different regions, with Dhofar exhibiting the highest level, followed by Muscat and Al-Sharquiyha. However, this finding should be carefully interpreted for two main reasons. First, the level of the fishermen's education is very much linked with age. The educational program in Oman started in 1970, with only three schools and a total of 909 students in Muscat and Dhofar (Ministry of Information 1989). The majority of fishermen sampled, as mentioned-above, are in the 41–55 age group, suggesting that this group faced greater difficulty finding educational opportunities. Second, fishermen possess considerable knowledge about their fishing environment and fishing techniques, enabling them to be successful in their profession.

As pointed out by Al-Oufi, McLean, and Palfreman (2000), there are three major consequences of low educational levels for traditional fishermen. First, employment opportunities outside the sector are substantially reduced. Even where employment could be gained, this would likely be unskilled and low-income based. Such a situation would likely result in the individual continuing to fish part time or returning full time to the fishing sector. Second, fishermen are more likely to undertake collective action with respect to managing fishery resources as their livelihoods depend on it. Third, the low level of literacy dictates that any training or extension programs must be specially designed to take account of their educational inadequacies.

Fishermen were also questioned concerning whether they held other primary or secondary employment. As seen in table 4, the vast majority of fishermen in Al-Sharquyah and Al-Wusta have little, if any, employment outside of fishing. Seventy-five and 81% respectively listed fishing only as their primary income source, while in Muscat, Al-Batinah, Dhofar, and Musandam, fishermen report having more opportunities for working other jobs along with fishing.

Vessel Operation and Management

The fishermen in the study were divided into two divisions according to whether they were working full or part time. Mean crew size was likely to be small, with the mean size being only 2.03 ± 1.63 SD. It has been found that less than a quarter of all full-time vessel owners fish alone, with 80.8% working with a crew of one to four people. Only 6% of all vessel owners reported working with a crew of more than nine (table 5). In contrast, more than half of all part-time and family full-time vessel owners fish alone, with almost 65% of part-time vessel owners, 72.4% of family full time, and 82.6% of part-time vessel owners fishing alone. This can be explained by the fact that full-time vessel owners tend to work for longer periods of time than part timers, and they usually hire more labor. On the other hand, family-based crews tend to utilize household labor.

Fishing returns are divided into three main categories. These are boat share, crew share, and owner share. The study found that more than half of the share ob-

Table 5
Crew Size and Type

No. of Crew Per Vessel	Full Time	Part Time	Family Full Time	Family Part Time
0	12.7	64.9	72.4	82.6
1–4	80.9	34.2	27.3	17.3
5–9	6.0	6.0	0.3	0.1
10–20	0.4			
Mean	2.03	0.672	0.41	0.27
SD	1.63	1.66	0.79	0.67

tained from all vessel owners sampled went to the vessel owner share, with a mean of 45.6 and a standard deviation of 3.6. The high standard deviation can be explained by the fact that the share is not always divided equally between the three categories. Sometimes, the share is only divided between one or two of the categories. For example, if the shares were to be divided between two categories at 50% each, one category would receive nothing. When this occurs, a zero value is used within the sampled fishermen.

Fishermen Returns

An examination of the data shows that an average of 8,007 RO (approximately US$22,491) was earned annually per vessel owner in this study (table 6). It is important to note that income received by traditional fishermen in Oman is influenced by several factors. These factors include the amount of catch per vessel, density of fishing activity, and type of fish. Fish species is important, as different species have different market values. In addition, it is well recognized that in Oman, the composition of fish populations varies by geographic region. For example, Al-Sharquyha, Musandam, and Dhofar are very well known for the availability of higher-valued species, such as kingfish, lobster, and shrimp, while fishermen in Al-Batinah very often are forced to deal in lower-value species.

Also noteworthy was the fact that Al-Batinah fishermen had much lower income

Table 6
Fishermen's Annual Average Income, Catch, and Price

Region	Annual Average Income US$	Average Fish Catch per Trip KG	Average Price US$/kg
Muscat	14,196	50.7	1.65
Al-Batinah	7,488	13.4	1.41
Musandam	314,002	92.4	1.88
Al-Sharqyah	36,153	141.3	1.49
Al-Wusta	15,543	76.6	1.39
Dhofar	25,264	99.6	1.48
Average	22,491		

levels than those in other regions. This can be attributed to the fact that the amount of catch per vessel was very low coupled with lower prices because of the lower-valued species. In contrast, the fishing communities at Al-Sharquyah and Musandam were more prosperous, as they had larger catches and tended to sell higher-valued species.

Table 7 shows the responses of fishermen concerning their occupation. A number of responses, such as low income, risk, and hard work, were identified in order to determine fishermen perceptions of those attributes. The nature of the questions that generated these responses was general. The survey found that 80% of the respondents indicated low income as the highest concern. Almost half of the respondents indicated that fishing was risky and hard work.

However, the results should be viewed carefully, as traditional fishermen do not necessarily have the usual perception of explicit costs and cash flow. To them, a cost may be arduous work, forgone leisure, or the pain associated with appearing to be different and below the average standards in a community with static traditions. The certainty of having enough food for their families is frequently considered as the most important of the returns. In addition, the pleasure of appearing safer and relatively wealthier than other community members is an important consideration. In short, traditional fishermen will adjust their individual time preferences against the expected flows of costs and benefits over their productive life spans. Overall, their output and incomes can only produce a minimal standard of living, as low incomes do not provide enough savings to invest in new, more efficient fishing methods in order to increase productivity.

Conclusions

This study reveals important social and economic findings as they relate to the traditional fishing sector in Oman. Social characteristics include low levels of education and limited employment alternatives. Second, the current economic situation dictates low levels of income from fishing. However, there are significant disparities in income between regions within Oman. Third, government assistance in encouraging cooperative fish enterprises among fishermen may raise fishers' income.

As training programs are implemented, these results assist traditional fishermen in improving their social and economic situations. They should also be useful for the government and private sectors as they plan for more investment and adjust existing policies. It is important to note that some developments or changes may be required if solutions are going to adequately address some of the higher priorities. Attempts to find solutions require careful consideration of prevailing social rules and habits. It is hoped that suggested changes which address existing problems don't simply create new, more complex ones.

Table 7
Nature of Fishing Activity

	Number	Percentage
Low Income	1,266	80
Risky	938	59
Hard Work	939	59.3
Social Status	212	13.4
Other	3	0.2

Clearly, the traditional coastal fishermen in Oman are pre-equipped with skilled techniques and experience necessary to initiate more comprehensive co-management. However, technological change, high regional population growth, and market linkages, each represent significant challenges that must be overcome for successful sustainability to be achieved. Therefore, these results indicate that further research in the areas of operational efficiency and sustainability of the traditional fishing industry is needed.

References

Al-Mazrooei, N., G.V. Chomo, and A. Omezzine. 2003. Purchase Behavior of Consumers for Seafood Products. *Journal of Agricultural Sciences* 8(1):1–7.

Al-Oufi, H., E. McLean, and A. Palfreman. 2000. Observations upon the Al-Batinah Artisanal Fishery, the Sultanate of Oman. *Marine Policy* 24:423–9.

Choo, P.S., and M.J. Williams. 2003. Fisheries Production in Asia: Its Role in Food Security and Nutrition. NAGA, *WorldFish Center Quarterly* 26(2):11–16.

College of Agriculture (COA). 1995. *Traditional Agriculture and Fishing in the Sultanate of Oman*. Sultanate of Oman: Sultan Qaboos University Press.

Hooker, A.J., and A.D. Parsons. 1995. Fishery Management Plan for the Traditional Kingfish Fishery in the Sultanate of Oman. Report submitted to the Directorate General of Fisheries Resources, Ministry of Agricultural and Fisheries, Sultanate of Oman.

Ministry of Agriculture and Fisheries (MAF). 1995. Final Result of the Boat Survey. Directorial General of Fisheries, Sultanate of Oman.

___. 2003. Fisheries Statistics Annual Report. Directorial General of Fisheries, Sultanate of Oman.

Ministry of Information. 1989. *Oman Review*. Sultanate of Oman: Oman Newspaper House.

National Conservation Strategy (NCS). 1992. *Ministry of Regional Municipalities and Environment, Vol. II*. Sultanate of Oman.

Omezzine, A. 1998. On-Shore Fresh Fish Markets in Oman: A Descriptive Analysis. *Journal of International Food & Agribusiness Marketing* 10(1):53–69.

Omezzine, A, L. Zaibet, and H. Al-Oufi. 1996. The Marketing System of Fresh Fish Products in the Masirah Island in the Sultanate of Oman. *Marine Resource Economics* 11:203–10.

University of Durham. 1978. Research and Development Surveys in Northern Oman. Final Report, *Fishing and Marketing*, Vol. 5.