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**Second Interim Evaluation**

**The Fisheries Development Project**

**produced for**

**The Omani-American Joint Commission**

**and**

**The Directorate General of Fisheries**

**by**

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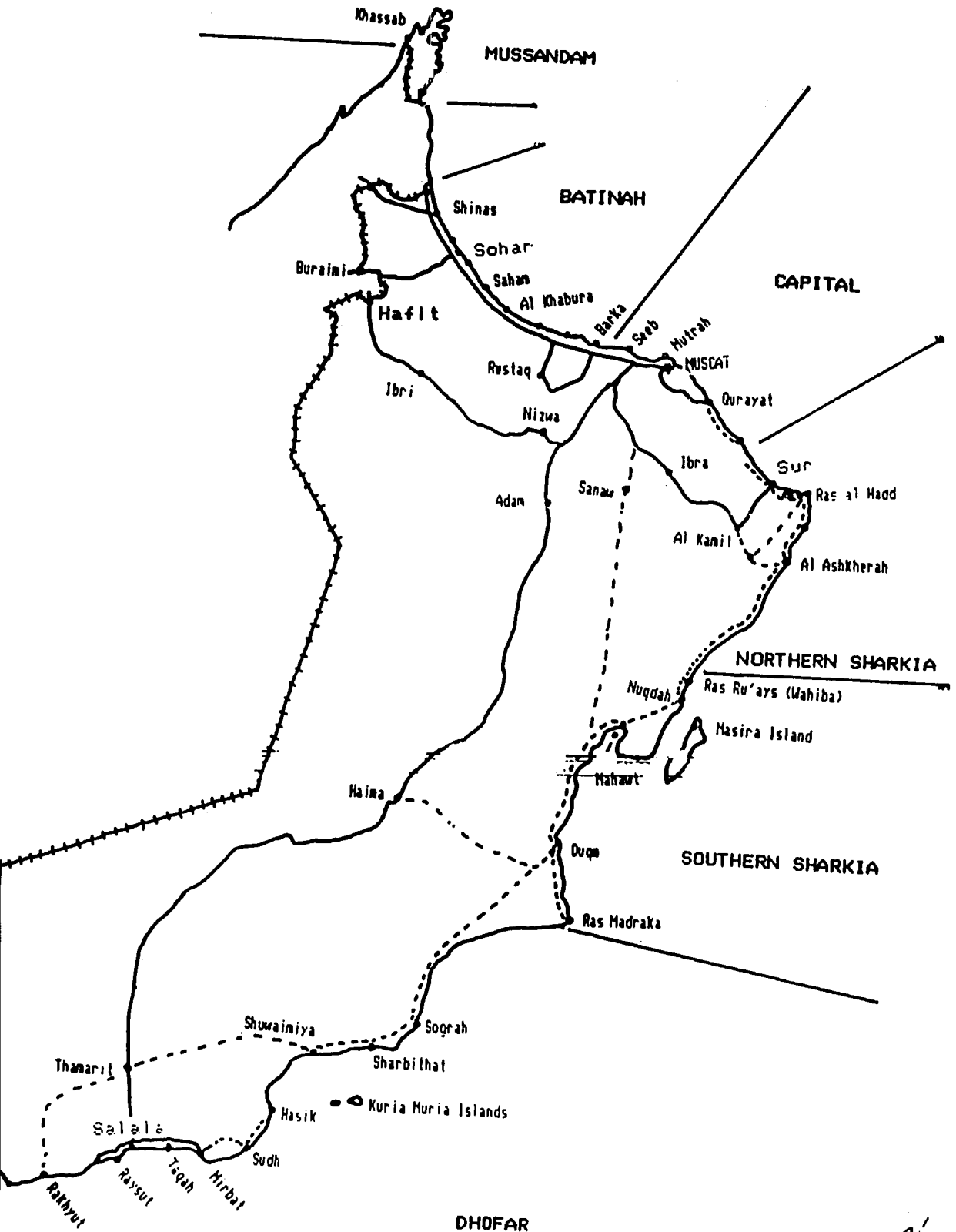
**Mr. Erling Oswald**

**November 30, 1987**

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ii. Basic project data

Name: Fisheries Development Subproject  
Number: 272-0101.1  
Project Paper approved March 30, 1982  
Project Agreement signed April 18, 1982  
PACD: June 30, 1990

Approved LOP funding	\$9.0 million grant	
Obligations to date	\$8.8 million	
Subobligations: RDA International, Inc.		\$5.8 million
Oregon State University		\$3.0 million

Counterpart agency: Directorate General of Fisheries  
Ministry of Agriculture and Fisheries

### iii. Summary of Major Recommendations

The project has made significant progress since 1983 in establishing extension, statistical, and research programs. The following recommendations are intended to accelerate implementation.

#### 1. Training

-- The training plan developed by the Scholarship and Training Project covers the next phase of U.S., third country, and in-country training for existing staff and is an excellent step towards a systematic approach to training.

-- The project should undertake a manpower assessment for the Directorate General of Fisheries (DGF) and Marine Science and Fisheries Center (MSFC) and expand the training plan to cover these additional training needs.

-- The Joint Commission (JC) and DGF need to make a substantial commitment to training and degree education over the next five years. Training should include program management training, including research management training for MSFC.

#### 2. Financial and logistical management of the project

-- The DGF project accountant should be replaced and the system of independent project accounting be reinstated; funding for the project implementation should be drawn only from the project account, and not co-mingled with general funds for purposes outside the project. At a minimum the accountant should prepare quarterly expenditure reports for DGF directors showing quarterly expenditures for their respective programs. Preferably each DGF director should prepare an annual program budget for his program (extension, statistics, MSFC research program, and marketing), and then, once the annual budget is approved, should authorize expenditures in collaboration with RDA and OSU chiefs of party in order to assist the Directors in budget planning and project implementation.

-- For faster implementation, the Ministry and DGF should assign a fleet of DGF vehicles to the project, specifically to the DGF Director of Coordination and the RDA or OSU chiefs of party for routine project use. DGF should ensure that adequate funds for operating expenses and routine maintenance are available to keep these vehicles operational.

-- The Ministry should allow project vehicles to remain in the field after normal office hours and overnight so that DGF staff and U.S. advisors can complete their work efficiently and accelerate implementation.

-- The Ministry should restore phone service between the MSFC and Sultan Qaboos University, between DGF, the MSFC, and the Southern Region, and for the Statistics Program and regional data bases for fisheries. The Ministry should ensure that Directors and advisors have telephones.

-- The Ministry should ensure that project vehicles, staff, and advisors are covered by adequate insurance.

### 3. Role of the MSFC

-- The JC and DGF should make explicit that the primary role of the MSFC is to undertake problem-oriented research (rather than pure research) that will form the basis for the Ministry's policy decisions. The MSFC should continue the type of research begun to date.

-- OSU staff responsibilities are excessive and should be changed to give priority to demersals (two advisors at the MSFC) and to lobsters and abalone (one advisor assigned to Salalah) with continued data collection for large and small pelagics at the MSFC. Two US technicians should be added to assist with stock assessments for demersals, lobster, and abalone. The JC should fund an American or expatriate executive officer to the MSFC to handle management and operations of the Center and to train an Omani counterpart. The OSU staff should prepare a preliminary stock assessment for selected species in the near future.

### 4. The Statistical Program

-- Project vehicles are unusable and those that are unrepairable have not been replaced; samplers are not collecting data because they cannot travel. The progress of this program to date will be lost if DGF does not make these vehicles operable immediately.

### 5. The Observer Program

-- The JC and DGF should establish a new at-sea sampling program as a biological data collection program in the trawling fleet, should train samplers on-shore, should ensure that samplers sample the catch on deck as the catch comes on board, and ensure that the samplers have access to the bridge. The program should be assigned to the demersals program at the MSFC as the most likely user of data from the program.

-- DGF should design its own enforcement program apart from the new MSFC at-sea sampling program. The JC should provide no U.S. advisor to the present observer program.

### 6. Cooperation with the Sultan Qaboos University (SQU)

-- The DGF and the JC should pursue signing a tripartite agreement with the DGF, the MSFC, and SQU for cooperation on resource surveys, use of research vessels, and research projects.

-- a coordinated seafood technology program should be established with SQU using the MSFC advisor to avoid creating separate duplicate programs, to benefit the DGF Marketing Program's assistance to Omani private sector firms in fisheries, and to enhance the contribution of the MSFC to the development of Oman's fisheries.

### 7. The Marketing Program

-- DGF, RDA, and the JC should re-establish the priorities of the marketing program in light of the shortage of DGF staff, including a full time Director and Deputy Director.

8. Southern Region Program

-- The Southern Region merits greater attention because of the wealth of fisheries resources there and because the fishermen there are not as technically advanced as those in the North.

9. Extension Program

-- DGF should continue efforts to acquire facilities for regional training of fishermen, possibly through periodic use of space in workshops or cold storage complexes. DGF should work towards establishing a core of well trained extension agents to plan and execute training programs for fishermen and field agents to maintain continuous contact with fishermen and monitor progress and impact of extension activities.

10. Fisheries Management

-- DGF needs to begin to build a capability to undertake fisheries management. DGF also needs to create the links with other Government of Oman agencies and officials to ensure enforcement of policies and regulations.

Summary of Recommended Changes in Technical Assistance Positions

The following shows positions only and does not endorse specific advisors. Blanks indicate no change in present circumstance.

<u>Team</u>	<u>Position</u> (Present work)	<u>Incumbent</u>	<u>Location</u>	<u>Recommended</u> <u>job</u> <u>description</u>	<u>Present</u> <u>position</u> <u>expir date</u>	<u>Recommended</u> <u>position</u> <u>expir date</u>
RDA	COP	Swerdloff			6/88	6/90
RDA	Sr. Statistician	McClure				6/90
RDA	Statistician	Moussalli				6/89
RDA	Extension	Jurick				6/90
RDA	Marketing	Jenkinson			4/88	6/90*
RDA	Master Fisherman	McFadden			6/88	6/90
RDA	Engineer	Tombari			6/88	6/90
RDA	Observer	(vacant)	-	-	-	-
RDA	Southern Advisor	Cox			6/88	(retiring)
		(to be named)	Salalah	extension, local supervision for samplers for marketing, stats extension	-	6/90
RDA	Arabic-speaking Extension (to be named)					6/90
RDA	Training Specialist (to be named)		Muscat	all training (U.S., SQU, in-country)	-	6/90**
GSU	COP	Dudley		demersals		6/90
OSU	Fisheries Biologist	Johnson	Salalah	lobster, abalone		6/90
OSU	Fisheries Biologist	Dorr		demersals		6/90
OSU	Seafood Technologist	Hilderbrand	SQU	food technology	8/88	6/90*
OSU	Sr. Technician	(to be named)	Muscat/MSFC	demersals (through on-board observer)		6/90
OSU	Sr. Technician	(to be named)	Salalah	lobster, abalone		6/90
OSU	Executive Officer	(to be named)	MSFC	management/administration	-	6/90***
OSU	Aquarium Curator	Mae				6/90
OSU	Librarian	Hoover				6/90

\*This position should not be extended without significant change in location and/or level of logistics support.

\*\*This training position is one option for coordinating training. Other options include using the Checchi contract, establishing a Training Officer in the JC, or assigning training responsibility to the MSFC Executive Officer.

\*\*\*Either American or expatriate.



iv. Acronyms

1. DGF Directorate General of Fisheries
2. FDP Fisheries Development Project
3. GovOman Government of Oman
4. JC Joint Commission
5. MAF Ministry of Agriculture and Fisheries
6. MOEY Ministry of Education and Youth
7. MSFC Marine Science and Fisheries Center
8. OAJC Omani-American Joint Commission
9. ONFC Oman National Fishing Company
10. R.O. Rial Omani
11. OSU Oregon State University
12. RDA RDA International, Inc.
13. ROP Royal Oman Police
14. SQU Sultan Qaboos University
15. UNDP United Nations Development Program
16. URI University of Rhode Island
17. USG United States Government



LARGE PELAGIC SECTION

Head : Dr. Richard Dudley (OSU) Ph.D  
R.A. : Arundati Prabhakar (also small pelagics) MSC  
L/A or T/A: Mohammed Al Areimi  
R/A : Shamaa Bint Dhakidin (BSC)

DEMERSAL SECTION

Head : Dr. Don Johnson (Ph.D) OSU  
R/A : Thabit Zahran Alabdisalaam (leaving by Sept.)  
Saleh Al Balushi (Overses)  
L/A or T/A: Yousif Al-Harthy (Also large pelagics)  
L/A : Moh'd Ahmed Al-Harthy

SMALL PELAGICS SECTION

Head : Dr. John Dorr (Ph.D) OSU  
L/A or T/A : Mohammed Al Hijri  
R/A :

OCEANOGRAPHY

Head : Dr. Sharma (Ph.D India)  
R/A : Nashuwa Al Harthy  
R/A : Hilal Mohammed Al-Mukheni  
T/A :

MARINE ECOLOGY

Head : Dr. Thangaraja (pH.D) India  
R/A: Ahmed Al Asiry  
R/A: Lubna Hamud Al-Kharusy  
L/A : Ali Sheikhan Salim Al-Riyami

SEAFOOD TECHNOLOGY

Head : Mr. Hilderbrand (MSC) OSU  
R.A : Adil Al Qasimi (Also large pelagics) BSC  
L/A or T/A : Samiya A. Zadjali (also library)  
T/A : Sabra Al Mugheiry

LIBRARY

Head : Mr. Joh Hoover (OSU, MSC)  
A/L : Noorjahan Mohammed (BSC)  
A/L (BSC Documentation Incharge)

Aquarium

Head : Mr. Jonathan Mee (OSU MSC)  
R/A : None  
L/A or T/A : Dawood Al Wahaibi

Diver/Boat attendant : Ali bin Salim bin Ali  
" " " Fayl bin Freish

REMARKS

1. Operations and Administratively the person/employee comes under the section in which his/her appears
2. The section heads should work out arrangements for personnel use within their respective sections for those personnel whose responsibilities are indicated as covering other sections

\* Resigned

CHEMISTRY LAB

ON TRAINING

Thabit Bin Zahran Alabdisalaam  
Saleh bin Khudabakhsa  
Ali bin Saleh Al-Harasi

## I. Introduction and Overview

Oman is about the size of California and has an equally long coastline (about 1700 kilometers or just over 1,000 miles). Oman has anywhere from 900,000 to 1.5 million people (no census has ever been taken), of whom almost 12,000 are fishermen operating about 9,000 boats. Oman's economy is dominated by oil, which accounts for about 95% of GDP, though Oman only began pumping oil in 1967. (Saudi Arabia began pumping oil in 1906.) Oman's development as a modern nation began in 1970 with the accession of the present Sultan. The Government of Oman has chosen fisheries development as a means of diversifying its economy to lessen its dependence on oil, improve the welfare of traditional fishermen, and assure a supply of fresh fish to the domestic market. AID, through the Joint Commission, has collaborated with the Government of Oman's Directorate General of Fisheries in this project since mid-1982.

The team's review of preliminary landings and research data suggests that Oman's fishery wealth is substantial and can provide long-term income to Omani fishermen, businesses, and the Government, if managed responsibly from the outset. Because the project is laying the foundation for responsible fisheries management, the team finds the project relevant to Oman's needs and responsive to AID policy goals (institution building, technology transfer, policy dialogue, and private sector development).

The team notes the following fundamental issues that the project needs to address:

a. the project is described in official documents and by nearly all concerned as a sector-wide development program. Not only do the activities undertaken to date not attempt to develop the entire sector, but the team recommends in this evaluation a scaling back and refocusing of activities because DGF does not have the staff and resources to handle as many activities as have been attempted to date. The team recommends that all project participants not think in terms of sector-wide development program, that they focus more closely on certain key areas and take a much longer view of this project and this development process. It will be at least five more years for the Statistics and Extension programs and ten to fifteen years at least for the MSFC to develop a functioning Omani staff that can operate without substantial U.S.-type technical assistance.

b. There seems to be a wide variety of opinions among all participants as to whether this project is an institution building project or a turnkey project, or in what proportion it is a blend of the two. Project participants need to develop a unified view on this point to ensure that design and implementation decisions are consistent with the project's character and intent and not inconsistent and distracting from that character. The most immediate decisions that require a clear view of this question are ones on a possible extension of the RDA contract and possible additional advisors for both the

RDA and OSU contracts. How many positions it is reasonable to add is a function of the JC's and DGF's view of the character of the project.

The team sees the project now as a turnkey project with consultants providing direct services as program leaders (though without line managers' authority). That character can and should change as Omanis return from U.S. training and take over line responsibility. Because we believe that the project should begin shifting towards an institution building project as soon as Omanis return from training, the team has recommended a relatively conservative increase in advisor positions and a shift in their responsibilities to focus more closely on key areas where there is already some progress and core DGF staff. The project also needs to ensure that an adequate number of qualified Omanis enter training in the next few years to allow this shift to take place.

The team finds the RDA and OSU advisors to be highly qualified and dedicated to their work. With the collaboration of equally dedicated Omani counterparts, they have been able to achieve significant progress to date in laying the foundation for fisheries development and management in Oman.

The team senses the need for all project participants to agree on a common vision or model for the project, such as the one described here, as a framework against which to evaluate the myriad implementation decisions required during the life of the project. Our sense is that there is no commonly held model now and that participant agencies are each moving in their respective directions: RDA doing or wanted to do fisheries U.S.-style, OSU wanting to do research, DGF moving at its own pace in its own direction, and the JC not taking a clear stand anywhere.

The team sees the project model as laying the foundation for active fisheries management (policy and regulation making informed by a reliable data collection and analysis system) to allow biologically responsible exploitation of the fisheries resources both by traditional fishermen and the modern private sector. The team sees the project developing fisheries in three geographical bands for different kinds of exploitation:

- a. in-shore fishing by traditional but professional, more modern fishermen in small skiffs;
- b. near-shore fishing by larger Omani-owned boats (dhows and modern boats); and
- c. off-shore fishing by large commercially owned vessels, probably foreign owned in the near term.

Finally, the team sees the project as developing distribution and processing systems to channel the catch in multiple forms from shore to domestic regional and international markets.

## II. Review of the Programs

### A. Statistics Program

#### 1. Overview of the Program

The fishing industry of Oman is scattered along the entire 1700 km coast with landings in a multitude of small ports and harbors as well as on the beaches in remote areas. Fishing is done with a variety of small boats up to the size of dhows, which run 30 to 40 feet in length, with eight foreign trawlers working offshore as part of the activities of the Oman National Fishing Company. Fish are sold locally at landing sites, transported to urban or interior markets, transported by truck to foreign markets in the Gulf or even sold to trading vessels moving along the coast( in the case of dried shark).

Little historical information of a quantitative nature is available on the fishing industry, and no systematic program for the collection of fisheries statistics existed within the DGF prior to this project. In recent years DGF has recognized the need to establish a statistical program and has taken necessary steps to establish a separate Department of Statistics and Data Processing under a departmental director. Because of the scattered and diverse nature of fishing and fish landings, the program is a complex one, requiring the services of a number of field agents and data processing staff. The Department is also making made use of the services of two RDA statistical/data processing advisors.

#### 2. Progress and Achievements to Date

The purpose of the Statistical Program includes the documentation of species and quantities of each that are presently being taken; this information is important as baseline data to determine how important fishing is to Oman. Also important are statistics on where fish are harvested and sold to determine who in Oman benefits from fishing. Measuring fisheries activities overall includes collecting data on processing, distribution, marketing, export and consumption, since benefits to fishermen, processors, dealers and consumers are part of the contribution of fisheries to the economy. Management of a fishery to maximize sustained benefits to the economy involves determining whether fishery resources are being fully utilized or overharvested, or whether increased harvests are possible. Statistical data from the fisheries are one important source of information required to make these decisions.

The Statistical Program is now fully operational; a comprehensive, functional and correctly focused statistical sampling program for the fisheries sector has been designed and implemented. Field agents and data processing staff have been trained and are operating the program with RDA assistance. The first major activity, a one-year sampling program to establish baseline data and to determine the relative importance of various fishing grounds and landing areas, was completed in June 1985 and published in early 1986. Following completion of the one-year program, the long-term statistical sampling program was

begun using experience gained during the initial study. Eight field samplers are now collecting data at sites along the coast, following carefully planned schedules to obtain representative samples. DGF's plans call for increasing the field staff in the near future to meet implementation requirements for gradual expansion and improvement of the statistical coverage. Plans call for 20 field sampling agents and 4 area supervisors by June 1990.

In DGF, data are entered into computers for storage, summarization and tabulation, and for later analysis. In addition to statistical data collected in the field (quantities landed by species and location, estimates of fishing effort, gear, fish size and vessel information), data on licensing and fishermen's loans are also being stored in computer files. During 1987, fishing effort statistics have been collected to make the statistical data base a better source of information for stock assessment purposes.

A complete survey of the coast of Oman was conducted by helicopter in 1985, the first such survey ever conducted, to obtain a total count of boats of each type and to record accessibility of landing sites by road. This survey was the source of valuable baseline data on fleet size, characteristics, and distribution. It is expected that a boat count will be undertaken every three years, and the data, which are an important component of statistics, will be used to recalibrate area adjustment factors, to help evaluate and interpret effort statistics and to monitor trends in vessel usage among other applications.

Additional special activities in support of the program include the compilation of offshore trawler data for the period 1976 - 83, the provision of statistical data summaries to other Omani agencies and to foreign users (e.g., FAO), the computer entry of data from foreign fishery observers for analysis by a UNDP expert, and completion of a training course for fishery applications of computers. Progress to date in data collection and analysis is described in greater detail in section 5 below.

These achievements cover all activities slated for completion by October, 1987, in the Implementation Plan.

### 3. Impact to Date

The most important impact of the program has been in the institution building area. A statistical department has been established and is functioning well. A data base of statistical information has been established that is critical to future management of Oman's fisheries resources to ensure sustained productivity at optimum levels.

Little, if any, impact has been realized on the fishing industry, though none was anticipated at this stage. Long-term application of statistical data to the industry will require development of stock assessments, fisheries management, and fisheries law enforcement.

#### 4. Policy and Management Problems of Implementation

This program's most serious problem has been the shortage of trained Omani professional staff who can interact with the expatriate advisors. Developing a core of Omani fisheries professionals who can direct and manage the statistical program in the future is dependent upon such interaction. Every effort should be made to increase and expedite the training of Omanis for this purpose, both through short-term training (e.g., the Rhode Island certificate program) and through longer-term education at the B.S. and M.S. levels. The complexities of fisheries management and the level of sophistication required to utilize this natural resource fully and wisely will increase in the future. The evaluation team emphasizes that increased numbers of trained professionals will be required at the earliest possible data and therefore has made specific recommendations to provide for additional training in section 6 below.

DGF's failing to provide timely repair and/or replacement of program vehicles required for routine data collection work has recently resulted in a major failure of the statistical data collection system. At present seven of the eight field data collection agents are working without vehicles and are therefore unable to reach many of the landing sites as scheduled. At present the program has been reduced to a near standstill for lack of functional vehicles.

The performance of Omani field sampling staff is variable, ranging from good to poor. Accuracy of total landings estimates at present is estimated to be  $\pm 25\%$ . The evaluation team believes this is a reasonable estimate. There is a need to continually train field samplers and to motivate them to upgrade the accuracy of statistics and to improve the thoroughness of their coverage. The failure to provide vehicles, unfortunately, has the opposite effect - sending a message that the efforts of the field samples are not really important or valued. Regular procedures for spot checking and verification of data being collected have been established and been properly designed into the sampling system to appraise the accuracy of data. This element of the program should be sustained on a regular basis, but is now not being implemented satisfactorily due to lack of vehicles.

Computers in this program are heavily utilized, and demand for more computer capability is increasing. Expansion of computer capabilities should be considered periodically to increase utilization of this labor-saving technology.

#### 5. Probability of Achieving Objectives by June 30, 1990

In general terms the program can be expected to achieve stated objectives by 1990. Specific components are evaluated below according to the categories established in the Implementation Plan.

Data gathering for landings and effort is proceeding and can meet objectives if vehicle problems are resolved soon. If



these problems are not resolved, the resulting gap in the data will compromise their value as long-term, time series data.

Data analysis is proceeding well and is expected to be on schedule in 1990.

Computerization of all data is proceeding with some problems related to insufficient personnel to enter data expeditiously (e.g., the size data collected by statistical agents).

Data compilation and preparation in publishable form is becoming routine. Delays have been due to the failure of senior DGF managers to approve the reports for publication or for distribution, and not due to lags during report assembly. It is expected that dissemination of data will become routine and prompt as private sector users become accustomed to receiving and using the data, and pushing for its prompt publication. Data publication should be on schedule in 1990.

Data coordination will be on schedule in 1990; however, steps should be taken to coordinate data collection with the MSFC to facilitate the Center's use of these data for resource assessment. Some adjustments of data collection procedures may be required for the Center's purposes.

Quality of the data now collected was judged by the team to range from poor to good; continual upgrading of data collection procedures is required to ensure data of optimum usefulness. Special DGF attention will be required to ensure the implementation of procedures for sales ticket forms for recording sales transactions. (Regulations to force their use by industry may be required.) The collection of complete and reliable data from sales tickets and export documents is an ambitious goal that need not be fully realized by 1990 to achieve the intended objectives of the program.

#### 6. Recommended Strategy for Use of Existing and Additional Resources

The services of two expatriate advisors will be necessary for the next year, and the services of the senior advisor should be extended through 1990. If the project is extended beyond 1990, one U.S. advisor should continue to assist the statistical program. A U.S. advisor will be necessary to supervise this program until the following benchmarks have been reached:

- a. the system can demonstrate that sampling is representative;
- b. the production of tables, graphs and publications is routine; and
- c. a quality control system is built into data collection and analysis that effectively detects inaccurate data inputs.

Additional funding should be made available for short-term training, including two-year certificate training such as that offered by the University of Rhode Island and shorter study tours to observe the statistical programs of other nations' fisheries departments. Educational opportunities for additional scholarships to pursue M.S. degrees in the U.S. should be offered in the future, as soon as candidates with B.S. degrees are available.

## B. Marine Science and Fisheries Center: the Research Program

### 1. Overview of the Program

The GovOman formally opened its Marine Science and Fisheries Center (MSFC) on December 29, 1986. Design and equipment of the Center, the research objectives and the emphases were decided in Oman before a contract was let in June 1986 to Oregon State University (OSU) to staff the MSFC. The stated purpose of the OSU contract was to "provide technical assistance to staff and assist in managing the Marine Science and Fisheries Center."

Research programs were established within the OSU contract for Oman's large pelagic fisheries, the small pelagic fisheries, the demersal and shellfish fisheries combined and for seafood technology. The OSU contract also provided an aquarium curator to establish a public aquarium at the Center and a professional librarian. Implementation plans for the programs for which OSU staff was responsible were completed in October 1987 (but are not yet approved). In addition to these six programs, DGF has also established at MSFC a Marine Ecology Program and an Oceanographic Program, independent of the OSU contract. Dr. Richard Dudley, leader of the research program on the large pelagics fisheries, was also designated Chief of Party and given further specific responsibility for providing MSFC management advice to the MSFC Director.

An Omani Director was named early in the planning process for the MSFC, and an administrative staff named from without the Center by DGF. Omani and non-U.S. expatriate research assistants and technical assistants as well as field staff have been employed. Equipment needs have been identified by the OSU researchers and some purchases made. Further staff support needs have been identified in the recent OSU Implementation Plan. No counterpart Omani researchers at the graduate research level are yet available to work with the OSU biologists.

However, as will be detailed below, serious shortcomings in staffing, logistic support, administrative procedures, a changing view of the role of the OSU team and the lack of focused research priorities have considerably limited the ability of the OSU team to contribute maximally to the DGF and the MSFC's objectives. The OSU team has, however, identified areas in which it can work relatively effectively and has made reasonable progress toward its stated objectives.

### 2. Achievements to Date

The large pelagic fisheries program has established an ongoing market sampling program for kingfish and longtail and yellowfin tunas and has undertaken growth and spawning studies on the kingfish. Omani staff have been trained in field and laboratory procedures. Little analysis of fishery statistical data has been possible.

For the small pelagic fisheries, a fish identification program for the field and laboratory personnel has been put in place; publication of a formal identification guide is planned. A market sampling program has been designed and implemented within the limits of personnel available. Fish collected are being analyzed for biological information, and data are being entered in a computer base as part of a long-term monitoring program.

In the demersal fisheries, fish identification booklets for the 28 principal species in the trawl fishery have been prepared and placed aboard the Korean trawlers. To improve the routine sampling by the crew on the trawlers, more specimens of a fewer number of species have been requested. Trawler sample sheets from 1982 to the present have been cursorily scanned, but no serious analysis for resource assessment purposes has yet been undertaken. Limited sampling of the artisanal fishery has also been started.

For the lobster fishery, a commercial lobster sampling program has been started, again at a low level because of personnel and other limitations. Early analysis and the results of some experimental fishing suggest a continuous decline in capture size and that many undersized and berried female lobsters are being taken. An idealized lobster field and laboratory research program has been designed, but awaits implementation.

The seafood technology section has completed yield studies on 133 species of Omani fish and developed a computer data base for entry of the results. Organoleptic evaluations have been made for 52 species of fish, followed by computer entry of the data. Contacts have been made with local industry and with the food technology group at SQU for product development, with some trial runs made. The OSU advisor has also invested considerable time in establishing computer data bases and training Omani staff in computer entry procedures at the MSFC.

The aquarium program is progressing very positively. Collections have resulted in almost 100 species of fish being held in the aquarium in a continuing display of Omani fishes. A quarantine system has been developed, and a new graphics and display system has been installed as a guide for visitors. Particular efforts are being made to attract the public (off-hours opening, newspaper notices) and school groups. Twenty-five hundred people visited the aquarium during the third quarter of 1987. Informal relationships have been established with the Oman Museum of Natural History, SQU, and MOEY. Plans are in place and being implemented to make the aquarium an important part of the educational and cultural milieu of Oman.

In the library, 1100 books and reports have been cataloged and entered into the main library data base. Book purchases and acquisitions are being made steadily although slowly because of cumbersome administrative processes. Journal

subscriptions have been requested but not yet approved. Contacts have been made with other libraries in Oman, the region and other parts of the world. A library computer system called 'Bibliofile' has been ordered, and its installation will provide library capabilities available nowhere else in Oman. The facility is being developed as a major regional marine resource library.

### 3. Research Priorities and Plans

The research function of the OSU team has been shifted from the generalized one given in the June 1986 contract "provide technical assistance..." to two listed (among other objectives) in the October 1987 Implementation Plan:

- ° establish ongoing research programs in the six sections of the Center covered by the project
- ° provide initial research results to the GovOman which will be useful in making fishery management decisions

The MSFC's research activities are presently based on the original generalized protocol for the Center, which placed one senior OSU researcher each in the demersal and shellfish fisheries combined, one in the large pelagic fisheries, one in the small pelagic fisheries, and one in seafood technologies, without regard to the importance of the fisheries in Oman:

<u>Fishery</u>	<u>Potential Yield*</u>	<u>Current Catch</u>
Demersal	50,000 T	33,000 T reported 100,000 T actual ?
Lobster	?? (but less than 2000 T)	2,000 T or more
Abalone	15 - 30 T (dried) ?	5 T (dried) ?
Large Pelagics	48,000 T	31,000 T
Small Pelagics	260,000 T	35,000 T
Mesopelagics	1,000,000 T ?	0

\*Numbers are informed estimates, from a variety of sources.

The demersal fisheries are under increasing pressure for expansion, yet no reliable estimates of the demersal resources are available. Some 65,000 tons of catch may not be being reported. Lobsters in the Southern Region are under heavy fishing pressure for exports. Potential yield has not been determined, but the stocks are showing signs of distress: a decline in capture size and an accompanying decline in numbers growing to maturity. For the abalone, overharvest of the populations and increasing harvest of reproductively immature females are current concerns. The large and small pelagic fisheries are being harvested below their potential yields.

Under the present research mix, then, at the MSFC the three fisheries requiring early and increased research effort and timely management advice (lobster, abalone and demersals) are the responsibility of a single researcher, while the two fisheries not under pressure (large and small pelagics) are the responsibility of one researcher each.

The OSU research program on seafood technology is not capable of being fully pursued at the MSFC because of lack of processing capabilities, equipment and trained technical personnel, all of which are available at SQU.

The ichthyoplankton (Marine Ecology) research program is producing a long-term data base on fish eggs, larvae and developmental stages in Omani waters. The oceanography program is analyzing previously-collected oceanographic data for Omani waters to provide a base of oceanographic analyses. Processing is being done by hand rather than with computer, and no new data are being collected.

a. Conclusions

Research emphasis and divisions of researchers at the MSFC Center are imbalanced and should be adjusted to put emphasis on the high priority fisheries (lobster, abalone, demersals) with a view to providing timely short-term resource status information for management decisions, with continuing resource assessment studies and fisheries management advice to DGF.

Lower priority fisheries (large and small pelagics) should continue to be monitored under the supervision of the fishery biologists working on the demersal fisheries to provide an adequate information data base for subsequent resource analyses. If increased funding is made available to the MSFC to employ more U.S. researchers, full biological research can be resumed on the large and small pelagics.

Seafood technology research at the MSFC under the present conditions is not cost-effective, given the availability of food technology research facilities at SQU.

The ichthyoplankton work is appropriate, both in direction and level of ability. The oceanographic work is appropriate, but should be automated as possible and should move toward obtaining current oceanographic information on a continuing basis.

b. Recommendations

1. Restate the objectives of the OSU team as follows:

° establish ongoing research programs in the lobster, abalone and demersal fisheries for fisheries resource assessments

° provide timely information and advice on the status of Oman's fisheries resources to the GovOman for fisheries management decisions

° establish and oversee long-term monitoring and data collection programs for the large pelagic and small pelagic fisheries, and

° develop and maintain a public aquarium and a marine resource library.

ii. Relieve Dr. Johnson of his responsibilities for research on demersal fisheries and place him full time on lobster and abalone research. Refine the research program presented in the Implementation Plan; provide adequate technical and logistic support to carry out the research; hire a senior OSU technician to support Dr. Johnson; and move the entire program to Salalah.

iii. Reduce research in the large pelagic and small pelagics fisheries programs to continuing market and port sampling, data entry, summarization and presentation, for establishing long-term data bases. Put the new program under the supervision of Mrs. Prabhakar with Omani research and technical staff, with oversight by Drs. Dudley and Dorr.

iv. Place Drs. Dudley and Dorr both on the demersal fisheries to develop a research plan leading to a quickly developed statement on the status of the demersal stocks and a long-term resource assessment program with the aim of providing management advice to the DGF. Approaches should include an analysis of the existing trawl fleet data (1982-87), establishment of a biological catch-sampling and catch-effort program aboard the trawl fleet, to replace the current on-board observer program and establishment of a system of regular resource surveys aboard foreign trawlers or other platforms. Recruit a senior OSU technician competent in at-sea sampling programs to implement the at-sea sampling programs.

v. Coordinate the seafood technology program with SQU, with the objective of developing new fisheries products, particularly of trawl discard species, quality control criteria, and processing procedures. Mr. Hilderbrand should also work with SQU as an extension resource between the fishing industry and SQU. His staff at the MSFC should be free to work at SQU with other fisheries staffs there.

vi. Support the library and aquarium programs at the levels indicated in the Implementation Plan.

vii. The OSU implementation plan should be revised according to the recommendations made above. These plans should be succinctly worded and also be presented in a flow chart with clearly specified objectives, a time frame and benchmarks, along with projected staff, financial and other resources needed to attain the benchmarks. These flow charts and benchmarks should be reviewed and presented annually to the JC and the DGF for review and agreement on the work to be undertaken during the coming year.

viii. Support the DGF ichthyoplankton work at the MSFC at its present level, and

ix. Computerize the analyses within the oceanographic program at the MSFC, obtain satellite-generated oceanographic data and move toward routine collection of new oceanographic data.

#### 4. Staffing

OSU staff at the MSFC includes four researchers, an aquarist and a librarian. Senior Omani research staff include the Director and Deputy Director (the latter now at OSU for graduate training). Two non-U.S. expatriate researchers are also on staff. Of the nine research assistants (M.S. and B.S. level) on staff, four support OSU-led research, three support other research, one is in the library and one in the aquarium. Eight technical assistants to the OSU team complete the technical staff. No Omani counterparts at the senior research level are on the MSFC staff.

Long-term staffing requirements for research are given in the October 1987 Implementation Plan as the Director, Deputy Director, 6 to 8 Ph.D. senior researchers, 16 research assistants, and 16 technical assistants at the MSFC. The Plan leaves unspecified requirements for data collectors, administrative staff, and laborers. Also needed is a night watchman to guard the MSFC after hours and weekends and to respond to any aquarium alarm.

The aquarium is adequately staffed with competent and trained Omani staff. Specific further training is required for one of the technical assistants who has significant potential as a counterpart to the curator. The librarian's counterpart staff is on maternity leave and has expressed a lack of long-term career interest as a librarian.

The numbers of research assistants (RA), technical assistants (TA), and field staff fall below the numbers required by the OSU staff to carry out adequate fisheries research programs. Considerable time and effort are being expended to train the RAs and TAs now on staff, with varying degrees of success. TAs are selected by OSU and Center staff. RAs are selected by the DGF.

The Administrative section is inadequately and inappropriately staffed. The MSFC Director has no secretary. There is no Executive Officer, and the Deputy Executive Officer lacks full competence to contribute to the functioning of the Center. Neither of the two general secretaries is trained in the use of word processing equipment. There is no translator on the staff. The storekeeper, with a self-generated short working day and sole possession of the storehouse key, impedes the Center's functions. Several of the staff present in the Administrative area appear to have no known duties.

Women are well represented at both the RA (5/9) and TA (3/8) levels. They appear positively motivated and amenable to training. Women routinely participate in local and day market sampling activities with few problems. Overnight or extended



field sampling trips for women staff are more difficult and require special arrangements. Yet such trips have been made and successfully so. Omani women cannot, under present cultural norms, act as technicians on fishing vessels.

The OSU team encourages the use of women as field samplers outside of the laboratory environment. The OSU team is providing training to all RAs and TAs without regard to the sex of the trainee. The MSFC Director believes that women should be limited to laboratory work because of the special arrangements required for them to work in the field.

a. Conclusions:

The research staff is inadequate, in both numbers and qualifications. It would not be capable of operating independently as a staff on the departure of the OSU team at the termination of the contract. This dependence on U.S. researchers will continue for a long period of time while senior Omani researchers are being trained at the graduate level out of country and while they are obtaining hands-on experience in fisheries research after their return.

The present administrative support staff (level, quality, and organization) impede the efficient functioning of the MSFC.

Omani women at the MSFC are being given the opportunity to work and develop their capabilities, fully in the laboratory environment and to a more limited extent in the field.

b. Recommendations:

i. Make a realistic review of MSFC staffing needs at all levels, identify training needs and move immediately to provide immediate and long-term training at appropriate levels to carefully selected staff.

ii. Retain expatriate expert staff at the Center until senior Omani researchers are trained at the graduate level and have attained sufficient experience to assume research and management responsibilities.

iii. Provide appropriate training for an Omani aquarium curator. Renew the OSU aquarium curator's contract until the Omani counterpart has full capabilities.

iv. Appoint a counterpart librarian (possibly from the University Library School) for hands-on experience and specialized training. Renew the OSU librarian's contract until the Omani counterpart has full capabilities.

v. Hire a night watchman immediately.

vi. Completely reorganize and re-staff the administrative support area (see specific recommendation in "Administration" section).

vii. To further the use of Omani women in the scientific work place and to place them in a position of responsibility, place the recommended new field sampling program for the large and small pelagics program at the MSFC under Mrs. Arundati Probhakar. Use Omani women to the greatest extent feasible in the field collections and sampling activities, even if, in some cases, there are some personnel inefficiencies resulting from the cultural constraints.

#### 5. MSFC Administration

Competent research administration and administrative support are two basic elements necessary for the efficient operation of a fisheries research center. Research administration involves leadership in establishing the goals and strategic plan of the Center; in agreeing on research priorities and specific objectives within these priorities; in formal program planning to meet these objectives followed by specification of time and resources required to accomplish the program; in setting benchmarks and holding routine program reviews to monitor progress; and in establishing continuing mechanisms for enhancing communications between and among the research and technical staffs to build an esprit de corps and understanding of the Center's goals. The goals, strategic plan, past year's accomplishments and future annual plans must be regularly reviewed by senior MSFC, DGF, and MAF management for advice, agreement, support and allocation of needed resources to the MSFC. The MSFC must be then delegated authority and processes to carry out and manage the agreed-upon program within GovOman fiscal and administrative procedures.

None of these attributes of program research administration presently exists at the MSFC, save for the implementation plans developed by the OSU team.

Administrative support involves designing and using systems, processes, and activities that facilitate the attainment of the MSFC's goals and objectives. These processes and activities include the following:

- ° financial control, accounting procedures, and regular fiscal reports;
- ° effective purchasing mechanisms for various levels of expenditures;
  - ° personnel functions;
  - ° building maintenance, equipment repair, stores, security, vehicle control and maintenance;
  - ° secretarial support;
  - ° technical support such as typing, printing, technical illustrations, computer facilities; and
  - ° travel procedures, including per diem and other reimbursements.

These processes should be the responsibility of an Executive Officer with the necessary supporting staff, who is directly responsible to the MSFC Director and who is also a member of the MSFC's management team.

None of these capabilities or processes is now available at any effective level at the MSFC.

a. Conclusion:

The MSFC will not develop as an effective marine fisheries research center capable of providing fisheries management advice to the GovOman unless appropriate research administration procedures and administrative support services are installed at the Center and supported within the DGF.

b. Recommendations:

i. That the MSFC Director be exposed to and trained in fisheries research administration procedures at a USG fisheries research center for three months, to be undertaken as soon as possible.

ii. That the MSFC Deputy Director, now at OSU, also be given training in fisheries research administration for three months at a USG fisheries research center, prior to his return to Oman.

iii. That the DGF change its planning, budgetary allocation and staffing procedures for the MSFC with the objective of installing new processes to facilitate the administration and effectiveness of the MSFC. That the MSFC be placed organizationally in a staff/advisory role within the Department to distinguish it from the operational Directorates to emphasize its primary advisory function and that it be delegated authorities necessary to attaining its goals.

iv. That a professional executive officer/administrator be contracted as part of the OSU team for the MSFC to establish an administrative support organization and to recruit and train staff and an Omani Deputy Executive Officer for eventual assumption of the Executive Officer position.

6. Relationship with Sultan Qaboos University

SQU has established a fisheries school that will produce B.S. graduates trained in marine science and marine technology. The first students will graduate in 1990. The University will also graduate students in biology, whose background will be amenable to advanced training in fisheries. A fifty foot research vessel is being acquired both as a fisheries training platform and for as yet unspecified fisheries research.

An agreement is in place promoting cooperation between SQU and DGF, and an inter-agency committee has been established; the committee has met once. A seminar series, alternating in location between the University and the MSFC was in place for seven months before lapsing because of waning interest; plans are underway to revive the series under new circumstances. Informal contacts between researchers and SQU staff in both the fisheries and food science programs are maintained, although these have been hampered recently by restrictions on telephone use at the Center. SQU - MSFC relationships are good at the

professional level. Enhancement of these relationships on a more formal and consistent basis will contribute to the well-being of both organizations.

The food science department has a fully equipped operational food technology laboratory, with a teaching, research and technical staff capable of undertaking seafood technology research with appropriate support.

a. Recommendations:

i. Complete a formal agreement for cooperation between SQU, MSFC and the DGF and develop a fixed meeting schedule. Construct meeting agendas to include such items as cooperative research, student training, establishment of a long-term oceanographic and ichthyoplankton cooperative research program, seminar series, student employment, and graduate training.

ii. Place the research staff at the MSFC on the adjunct staff at SQU, for teaching, seminars, and student guidance and training;

iii. Screen SQU graduates of both the fisheries and biology programs as candidates for graduate training in fisheries and for employment in DGF, MSFC and industry;

iv. Locate the seafood technology program in the food science program at SQU and add a University extension outreach function for essential links to the fisheries industry (see "Research Priorities" above).

7. Physical Facilities and Equipment at the MSFC

The MSFC is a modern, reasonably designed and functional building. It has 14 offices for scientists and technicians, good laboratory facilities, excellent space for the library and a functioning marine aquarium. As the MSFC develops and staff increases, it will likely be necessary to provide more office space for the research staff.

Design and construction flaws in the aquarium are being corrected. With the increasing attendance at the aquarium, expansion of the aquarium displays both indoors and outdoors will undoubtedly be required, as will construction of an aquarium gift shop.

Procurement of equipment and supplies is extremely slow; specification changes are made by the MAF purchasing department without consultation, and unsuitable purchases often result. Purchase of major items has taken 15 months and longer. Of particular concern is the need for additional computers. These are essential to the work of the Center but their purchase, although requested in January 1987, has not yet been approved.

a. Recommendations:

i. That administrative changes be made that will facilitate the timely purchase of specified equipment and supplies (see "Administration" above).

ii. That, specifically, immediate action be undertaken to order the computer hardware necessary for the support of research and training at the Center.

iii. That provisional planning be undertaken now for additional office space for the future, as the MSFC staff increases.

iv. That planning for an enlarged aquarium and related equipment be initiated.

More recently, a 25' outboard powered skiff was acquired to test improved fishing methods, and a 43' diesel powered boat was purchased to introduce modern fishing techniques. An expatriate master fisherman and a marine engineer have been recently added to the RDA staff to operate this boat.

The extension program has made considerable progress through on-site training sessions and demonstrations for fishermen in the major fishing areas. The use of outrigger trolling poles on skiffs has been shown to increase productivity; demonstrations on the use of small winches to haul traps and pots have resulted in a number of fishermen acquiring this equipment which are now available in the country; and the training sessions on safety at sea have been attended by several hundred fishermen from over 50 fishing communities. The introduction of lobster pots has been successful to some extent, but in light of the recent Government ban on the use of nets for lobster fishing, further work on this activity should be continued. The program has also prepared material for the media that has been shown on television and has appeared in articles in local newspapers.

### 3. Impact to Date

Though it is too early to quantify the impact of the extension program, the timely creation of an extension service sets the stage for the next phase of development of the artisanal fishing, i.e., increased productivity of existing fishing craft, the introduction of improved boats and equipment, better fish handling methods and the gradual formation of qualified extension agents. Though transfer of technology to fishermen is a slow process, many fishermen have adapted to new innovations introduced by the program, and it is likely that others will follow. The training sessions on safety have made several hundred fishermen aware of the need for safety precautions at sea.

### 4. Problems of Implementation

Most activities of the extension program indicated for completion by September 1987 in the Implementation Plan have been or are being carried out. Notable exceptions are the extension centers which were to be established in Seeb, Dhofar and Sharkia, and the support centers in Sur, Sohar, Muttrah, al-Ashkarah and Masirah; and the extension staff to be assigned to these centers. The plans to establish these centers were dropped by the DGF due to budgetary constraints although some consideration is being given to using agriculture extension centers as an alternative.

The lack of trained and motivated extension agents has reduced the effectiveness of the extension program. Of the six staff members currently assigned to the program, only two are sufficiently qualified to carry out the work. The situation is expected to improve upon the return of three staff members currently under training in the United States.

## C. Extension Program

### 1. Overview of the Program

To improve the welfare of traditional fishermen and to minimize a tendency of coastal fishermen to leave fishing communities in search of other employment, the Government initiated a number of programs to develop the artisanal fisheries sector. These included the Fishermen's Encouragement Fund (FEF) established in 1977 that provides soft loans for inshore fishermen to purchase aluminum or fiberglass skiffs and motors at subsidized prices; the Agriculture and Fisheries Bank which provides soft loans to fishermen for purchasing engines and/or fishing equipment for dhows; the construction and staffing of workshops to repair outboard motors; and the construction of cold storage complexes, most of which have recently been leased to private firms. It has been reported that from 1980 through 1986 a total of 5,479 skiffs and 10,542 outboard motors were purchased by fishermen through the FEF at a total expenditure of R.O. 4 million. This program not only revitalized the inshore fishing fleet but also provided the incentive for establishing local manufacture of fiberglass boats. The success of these programs is difficult to quantify on a national basis because of limited data. However, a recent project study indicates that annual profits of artisanal fishermen in al-Khabura increased from R.O. 762 in 1978 to R.O. 5,217 in 1986. Though this substantial increase may not be indicative on a national basis, it is safe to assume that the virtual transformation of the inshore fishing fleet from primitive craft to considerably more efficient and productive fishing platforms resulted in higher incomes.

Though the FEF program appears to have achieved its primary objective, it has also created a manpower problem for dhow owners as many crew members opted to purchase and operate their own skiffs. Since foreign crew may not be hired because of GovOman prohibitions, many dhows have been forced to stop fishing.

### 2. Description of Program and Achievements to Date

The Technical Services and Extension Department of DGF was formed in November 1984 and includes the FEF, workshops located in fishing communities throughout the country, and the Extension and Training Units. The main purpose of this Division is to provide direct assistance to fishermen to improve their economic and social well being. Staffing of the Extension Unit includes 9 extension agents, 3 of whom are currently studying at URI. The workplan implemented to date includes the introduction and demonstration of lobster pot fishing, the use of outrigger trolling poles, demonstrating the use of small winches for hauling traps and pots, training of extension agents, extensive training of fishermen on safe boat operations and safety equipment, preparation of training aids and material, improved fish handling at sea, and various studies concerning the economics of the artisanal fisheries sector.

Transportation difficulties and the cumbersome GovOman procedures for local purchases of equipment and materials have also had an adverse effect on program activities.

5. Probability of Achieving Objectives by June 30, 1990

It is doubtful that all objectives of the program can be achieved by mid-1990, particularly the goal of having a fully operational extension service manned only by qualified Omanis. Currently, qualified staff of the extension program include the Director, appointed in August 1987 and two extension agents. Three staff members currently studying in the U.S. will return in June 1988, and an additional three are expected to complete training by June 1990. The evaluation team feels that the minimum requirements for a fully functional extension program include two qualified management staff and 15 agents, including 5 in a core group and 10 field agents.

6. Recommended Strategy for Use of Remaining Funds

a. Continue efforts to acquire facilities for regional training centers. Though budget constraints may prohibit the construction of new facilities, there are many strategically located cold storage complexes and workshops that could be used for periodic training of fishermen. DGF should therefore consider that leasing agreements to private firms who operate these facilities include a provision that a part of the complexes be made available for periodic training of fishermen. The evaluation team believes that there would be little disagreement on the part of lessees as much of the training would include subjects beneficial to both fishermen and fishing companies, i.e., methods to increase production and improve fish handling methods.

b. Develop a core group of trained extension agents to be assigned to the Capital Region who will plan and direct field training and demonstration activities. The DGF should begin to seek out and recruit suitable field agents to be stationed in strategic fishing communities and trained in specific subjects most relevant to fisheries in their area. To measure the impact and effectiveness of the extension program, field agents should be instructed on how to monitor progress of fishermen, i.e., incomes, productivity, fish handling practices, use of improved fishing methods, and the like.

c. The introduction and testing of improved fishing methods and equipment should include innovations adaptable to skiffs and dhows, i.e., net and pot hauling devices, pelagic and bottom longlines, snapper reels, improved methods of constructing gillnets, and other techniques. Demonstrations on the use of lobster pots should be continued. (All pots should include escape hatches for immature lobster.)

d. Extend the assignments of the RDA extension specialist, master fisherman, and engineer to June 30, 1990. Add an Arabic-speaking Extension Specialist should to the RDA



staff to assist in the implementation of field training for fishermen and field agents, and in the preparation of training material.

e. The program should continue the preparation of training material including video tapes, slides and pamphlets.

7. Recommended Strategy for New Funds

a. Overseas training of counterpart staff should be continued beyond mid-1990 in order to reach the objective of establishing a fully operational extension program manned by Omanis.

b. The introduction of improved fishing methods for the existing fishing fleet gives rise to the need for improvements in the design and construction of improved fishing vessels and the construction of fishing ports and support facilities, i.e., repair facilities, fuel and water supplies, ice deliveries, and supply stores. Consideration should therefore be given to providing technical assistance to the Government in the fields of fishing vessel design and construction; and fish harbor planning and design.

## D. Marketing Program

### 1. Overview of the Program

The Government of Oman has been actively involved in the marketing of fish and has taken a number of initiatives to increase the availability of quality fish to consumers. The overall development of roads, loading facilities, electricity, cold storage, ice plants, and related infrastructure has been an integral part of the development of fish marketing. Government efforts have focused on marketing of fresh fish, the preferred product form in Oman, and on facilities for increasing availability, acceptance and use of frozen fish, which obviously can be stored for longer periods of time, to help provide a more uniform supply to consumers and to avoid market gluts.

Fresh fish distribution and availability have been facilitated through increased availability of ice for use in transportation and storage of fish. Ice plants were built by the Government at 16 locations, and most are being leased to the private sector. Private buyers with pick-up trucks (estimated at between 500 and 1,000) buy fish directly from the fishermen at all landing sites, including remote beaches. The trucks are loaded with ice so that freshness of the fish can be maintained while in transit to markets. Fish marketing facilities in local suqs (markets) have been upgraded through Government programs. The net result of changes in infrastructure and ice availability is that fresh fish are distributed to major markets throughout the country, even though distribution to interior markets may be irregular and insufficient to satisfy total demand. An estimated 17,000 tons of the 101,000 ton annual catch (based on mid-1985 to mid-1986 data) is exported to neighboring countries, and 7,000 tons is transported fresh on ice.

The universal problem of fish marketing is large fluctuations in landings and the consequent disruptive variations in prices. Cold storage of frozen fish is now a commonly used mechanism for evening out the supply to domestic markets. Since frozen fish can be shipped long distances for export without loss of quality, the Government has constructed 12 freezing and cold store facilities at major fish landing sites and, after initial periods of operation by the Government, is progressively leasing these facilities to the private sector. An additional 17 smaller cold store units have been constructed to facilitate distribution and marketing of frozen products at the local level.

The Government participates in the sale of frozen fish from Korean trawlers (38% of their catch is delivered to the Government) through the parastatal Oman National Fishing Company. Frozen fish are exported as well as sold domestically, 10,000 tons from mid-1985 to mid-1986. Omani consumers show a strong preference for fresh fish over frozen fish products.

## 2. Project Progress and Achievements to Date

RDA advisors have established baseline data on fish prices, quantities marketed by species, and product form country-wide based on a sampling of markets. A detailed Strategy and Work Plan for the DGF was prepared by RDA advisors and was submitted to DGF in November 1985. This Plan describes goals of marketing work, a strategy for achieving program goals and a detailed workplan for implementation of the strategy. The Plan is a useful discussion of needs for marketing information and of the types of information that can be utilized. However, it is a rather unwieldy combination of plans, questions, and suggestions that is very likely difficult for DGF to understand and follow.

Work completed on marketing includes implementation of a regular marketing services program, a survey of household fish consumption, a survey of fish suqs, a study of how to transfer the Omani share of the Korean catch to the private sector, and the preparation of pamphlets for extension purposes (though the latter have not been published or distributed). Additionally, a three-day fish quality seminar was held and attended by 50 people; a preliminary sector analysis was completed and presented to the Director General, and analyses were prepared of Korean fish catches between 1983 to 1986. The RDA advisors have gained a thorough understanding of the Omani fish marketing sector and have served as capable advisors for the Government and the private sector. One has provided specific advice to private sector firms on a number of occasions through the private sector advisory services activity of the marketing program. No data on numbers of firms assisted nor on impact are available.

RDA staff have offered technical assistance for the improvement of the quality of fish being marketed and increased use of presently underutilized products in association with the extension program. Some specific activities included in this assistance have been suggestions for improving fish boxes for transport of iced fish, improving fish freezing and glazing procedures, upgrading fish handling procedures, demonstrating and testing a retail display box, documenting underutilized species present in trawl catches, and exploring potential for air freighting specialty products to foreign markets.

The RDA advisors have played an active and productive role, in spite of management and administrative limitations, and their overall level of achievement has been highly satisfactory. Of the assigned activities listed in the Implementation Plan for completion by October 1986, RDA advisors completed all ten. Of those scheduled for completion by August 1987, seven have been completed; the remainder are unlikely to be completed. The major limitation has been numbers of Omani staff assigned to the Department of Fisheries Development. (The exception is four data collectors now at work where three had been promised.) None of five construction staff members were assigned. One data entry clerk scheduled to arrive by September 1986, actually arrived in June 1987; the RDA advisor had to enter his own data

from his arrival in April 1986 to June 1987. The translator, typist, and driver arrived on schedule. Professional staff for education, educational materials, and production and marketing development specialist have not been assigned. The evaluation team notes that even the level of Omani counterpart staff proposed in the Implementation Plan seems inadequate to take over the full responsibilities of the marketing program. The program's total DGF staffing needs must be rethought.

### 3. Impact to Date

Prior to the initiation of the marketing program, most officials in the DGF had little knowledge of the potential role of a government marketing program. The most significant outcome of the program has been the demonstration for Government officials of the role and importance of the public sector in marketing. Other outcomes have been the following: organizational elements of the GovOman program have been established, and a small field sampling program involving three Omani staff members is in operation. Data are being routinely computerized in DGF. Avenues have been opened for the flow of technical information through the marketing section to the fishing industry.

Because most of the marketing activities to date have been carried by RDA staff, DGF is still not ready to undertake these activities, even in conjunction with RDA advisors. There has, consequently, been little impact of the program on DGF. Little can be determined of the actual impact of these activities on the recipients because of the lack of benchmarks and a reporting system on these benchmarks to DGF and the JC. See Section VII.

### 4. Policy and Management Problems of Implementation

DGF has discouraged RDA advisors from interacting directly with private sector fish marketing firms, ostensibly for fear of being accused of showing favoritism toward some commercial firms over others. In the opinion of the evaluation team this is an undesirable restriction that unnecessarily limits the flow of technical information to industry.

The lack of sufficient operational funding is a serious problem, limiting the ability of RDA advisors to test new procedures and demonstrate proven procedures to the industry. For example, pilot sardine drying innovations were designed but no pilot demonstration done because R.O. 2,000 was not provided by DGF though a counterpart budget for pilot tests had been agreed to. (Such a pilot test is highly desirable since present sardine drying is done on the beach, and the sand that clings to the dried sardines is ingested by the cattle to which the sardines are fed, causing a variety of illnesses and health problems.) The effectiveness of an expensive expatriate team is being greatly diminished for lack of a small operational budget.

The level of cooperation and interaction among the DGF, the MSFC and SQU in food technology is minimal at present. The overall impact of the three institutions is likely to be increased through improved interaction and cooperation.

For reasons the team could not determine new business licenses for private sector firms wishing to enter the fish marketing business are not easily obtained from DGF. A relaxation of this policy would be beneficial to the competitive development of the private sector in this field.

#### 5. Probability of Achieving Objectives by June 30, 1990

Organizational objectives are not likely to be achieved by June 30, 1990.

Limited staffing objectives may be achieved if additional resources are allocated by the Government for this purpose. However, it is unlikely that the level of staff training will be adequate in the areas of quality control, economics, or consumer education to ensure adequate Omani staff by June, 1990. Furthermore, private sector advisory services require a professional with applied experience in private industry, and no Omani is expected to have such background for some years to come.

Program outputs in the Marketing and Fishing Industries sections may be on schedule except that personnel will not be fully trained. Construction is likely to be behind schedule unless Government funding is accelerated. Progress of the economics section will probably be behind schedule.

#### 6. Recommended Strategy for Use of Additional Resources

The combination of the availability of abundant resources and the strong and increasing demand for fish on the world market is expected to generate rapid changes in the fishing industry of Oman during the next few years. The role of this program could be particularly important to the successful and economically sound development of the fisheries sector, if limitations on staff levels and qualifications can be overcome.

Because DGF staffing for the marketing program remains so thin (lacking both a full-time Department Director and Deputy) and because implementation depends almost entirely on the RDA advisor, the evaluation team was reluctant to recommend any extension of this advisor's contract until counterpart staffing becomes available. (The second advisors resigned several months ago.) The team observed, however, that the present RDA advisor, who has an excellent work record with the project and very appropriate experience, could work very productively on the marketing of underutilized species. Secondary areas of emphasis could be advisory services to industry in product handling and marketing to maximize value added by the industry and undertaking a survey of international market needs for abundant Omani species (both Gulf regional

markets and world markets). Finally, he could also work on monitoring and distribution of marketing statistics (prices and quantities by species and location).

The team believes that this This continued work (and contract extension) should be contingent on the OSU food technology advisor's being assigned to SQU's food technology laboratory, or a cooperative agreement's being arranged between SQU and the MSFC. The RDA marketing advisor could then make use of the food technology work in his marketing work. The team believes that without this MSFC-SQU arrangement and adequate DGF staffing, the RDA advisor's effectiveness will be too low to justify his presence.

NOTE: Attempts to market inferior products internationally can reflect negatively on all products of Omani origin. The recent shipment of poor quality lobsters to the U.S. has seriously reduced marketing opportunities for Omani lobsters throughout the U.S. market. Once product quality from a country has a poor reputation, it may take years to restore market confidence in the products.

## E. Observer Program

### 1. Overview of the Program

The GovOman has been collecting data from Korean trawlers fishing in Omani waters under a joint venture agreement since 1976. At the present time observers are placed aboard Korean vessels to record data on catches. An attempt is made to place an observer on every trawler for each trip; however, sufficient manpower is not always available to provide complete coverage.

In addition to their responsibilities for data collection, observers have an implicit law enforcement role, that is, to report violations of regulations applying to these trawlers. The observers do not have authority to make arrests nor to confront the captain when violations are observed.

Data collected from the trawlers are compiled and stored but not computerized by staff of the Statistical Program.

### 2. Project Progress and Achievements to Date

An RDA advisor assisted with the implementation of the Observer Program, particularly in terms of improving the coverage and quality of data collected, defining the data needs for stock assessment, and training observers. None of these efforts have been successful for reasons noted under item 4. below. The Implementation Plan calls for two observers per vessel by September 1987. This level has not been achieved. The number of observers in fact fluctuates with the number of licensed vessels, there now being eight vessels and eight observers. These observers have not had classroom training as called for in the Implementation Plan.

At the present time the Observer Program is providing little if any data that could not be obtained directly from the vessel records and consequently does not provide an independent check on the vessel's data. Data from the observers are not being computerized nor shared with the MSFC.

### 3. Impact to Date

The primary utility of the program is that it permits the DGF to assure Omani fishermen that government observers are on board the Korean vessels to ensure compliance with applicable regulations. As fishermen can see Korean vessels fishing in coastal waters where they are forbidden to fish, this assurance is valueless, and the impact of the program minimal.

### 4. Management and Policy Problems of Implementation

The combination of statistical and enforcement roles makes the observers unwelcome guests aboard foreign vessels and subjects them to coercion or bribery. The observers have no enforcement authority and in fact serve no useful enforcement role. The dual role is an obstacle to innovations needed in the observer program.

Observers have not been properly trained to identify fish, to ascertain the exact location of a vessel, nor to estimate the weights of fish caught, processed or discarded. Lack of training is partly due to the fact that until very recently observers were not regular employees of DGF, but were paid only while they are on board a vessel. They were unwilling to undergo training on shore, which would have been on their own time and without compensation. Although the observers are now civil servants, the other problems with the program remain.

At sea the observers are not allowed on the fishing deck to observe or sample the catch. They are not allowed to observe the processing and freezing of fish, nor are they allowed access to the bridge to determine the location of the vessel. In fact, the present function of observers is purely perfunctory, as they are given data by the Korean crew which they pass on to the DGF.

5. Probability of Achieving Objectives by June 30, 1990

The program being conducted at present is virtually useless. No worthwhile contribution to DGF or JC goals will be achieved unless the program is completely revised.

6. Recommended Strategy for Using Existing and Additional Funds

The Observer Program should be completely revised as an at-sea biological sampling program designed to provide data for the stock assessment of demersal species. All enforcement elements of the present program should be eliminated, and implementation should be assigned to the Demersal Division of the MSFC which will be the primary user of results of the program.

Observers should be well-trained technicians permanently paid as full-time Government employees with supplemental pay for sea duty. They should be trained for the specific needs of their assignments, i.e., the collection of biological, catch and effort data aboard trawlers. It is recommended that a U.S. technical advisor be assigned the task of revising the at-sea sampling program. The evaluation team recommends that the JC not fund a U.S. advisor for the present program.

The DGF will need to design and implement a separate enforcement program with the appropriate Omani law enforcement agency. The enforcement activity may well include unscheduled boarding of Korean vessels and inspection of catches, gear and logs; however, it should be an entirely separate activity not connected to the at-sea sampling program. The JC should not participate in the law enforcement activity.



## F. Economics Program

### 1. Overview of the program

Although the DGF had not addressed fisheries economics in the past, an Economics Section was established in the Fishery Resources Development Department at the time of the November 1984 reorganization of DGF. Tasks envisioned for this section included addressing policy questions, such as the value of subsidies, control of prices, and the economic evaluation of particular fisheries development activities. The purpose of this program was to demonstrate the potential contributions of economic research and analysis to the development of the fishing industry and to lay the foundation for fisheries management and regulations. The program was also to show the role of economic considerations in fisheries management, prevention of overcapitalization, improving economic efficiency of the industry and comparing alternative investment strategies for the private sector. At the time this program was established (and even now), DGF had had little understanding of the role of economic analysis in fisheries development.

RDA brought on board an economist for the period March 1985 through May 1987 to work in the Fishery Resource Development Department. His workplan included several broad assignments (contribute to the Third Five Year Plan, assess economic impact of projects and assist in developing programs, assist in budget preparation and analysis, and design fishery economics programs) as well as several more specific assignments (determine gross expense patterns for major fisheries in each region, address problems associated with fishing rents and government revenues, analyze the market capacity for Oman's fisheries products, and determine the contribution of the fisheries sector to GDP and GNP. This was an ambitious scope of work, and DGF and RDA decided in mid-1985 to reduce this consultant's terms of reference to individual tasks to be addressed one at a time in close consultation with the Director General.

### 2. Project Progress and Achievements to Date

The economist provided assistance in developing the fisheries portion of the Third Five Year Plan and completed studies of production costs of the artisanal and industrial fisheries. Other major studies completed under this activity include a Fisheries Income Study, a study on the Economics of Artisanal Fishing in Oman, a study of the Fishermen's Encouragement Fund Subsidy Program, and a report, Fishery Contribution to the Gross Value of the Oman National Economy.

Many additional smaller activities were undertaken by the economics advisor. These include review of the economic feasibility of industrial uses of mesopelagic fishes, training of sampling staff with regard to economic data, development of interview forms incorporating economic data, developing a format for DGF review of fishing industry applications, economic assistance and advice to the industry (e.g., on the

feasibility of exporting shark fins), assistance with marketing and price analyses, assistance with computer programming and operation, assistance with the design of a socio-economic census of fishermen and economic analysis of the DGF cold store and fish distribution network. This is not an exhaustive list, but serves to illustrate that the consultant was active and productive and interacted effectively with DGF's programs. The quality of his work based on the evaluation team's reading of the reports completed is highly professional.

### 3. Impact to Date

The major product of this program was the documentation of fishing costs, earnings and related economic data that will serve as baseline data for future work. This information is critical to the understanding of the industry and to planning for fisheries development. The team recommends that it become part of the MSFC's library. DGF seems to have taken little action as a result of these studies, so the impact of the program appears to be minimal.

In the area of human resource development/institution building the program's impact has been negligible due to the lack of trained counterparts able to understand and assimilate basic principles of fisheries economics. While the team hopes that the consultant's work may have given rise to some appreciation in DGF of the necessary role of economics in fisheries management, there are few indications that this has happened. Discontinuing the economist's contract in May 1987 was in the team's view a logical if regrettable step, because of a lack of counterpart staff and follow-up to his reports.

### 4. Policy and Management Problems of Implementation

Lack of counterpart personnel sufficiently educated in economics to interact with the expatriate economist was the primary shortcoming of this program. No Omani staff (trained or untrained) were assigned to the program, and not surprisingly transfer of any technical expertise in the methods of economics was minimal.

DGF is not yet ready to participate in economic research and analyses of the type undertaken in this program. The evaluation team finds it odd that the lack of absorptive capacity in the technical area was apparently not fully appreciated by those designing the program. The Implementation Plan even acknowledges that no Omani staff were assigned to the program. The team does not anticipate that DGF capacity to develop a meaningful economics program will be in place in the near future. A minimum requirement for this development would be several Omanis educated at the B.S. level in economics or fisheries economics in the DGF.

Failure of the DGF to supply economic data from ONFC was a special problem which further illustrates the lack of understanding of the tasks undertaken by an economist.

5. Probability of Achieving Objective by June 30, 1990

The requirements of Amendment No. 3 of the DGF - RDA contract may have been met in the loosest sense. The terms of the contract are general, and some services have been provided in each of the areas specified.

The specific objectives of the program have been difficult for the evaluation team to determine. The Terms of Reference for the economist presented in the RDA January - March 1985 Quarterly Report (summarized in section F.1. above) are the best statements of the objectives seen by the team. However, the succeeding Quarterly Report states that these Terms of Reference have been modified, without an explanation of the modifications.

The objectives of the program are unlikely to be met by June 1990.

6. Recommended Strategy for Use of Existing and Additional Resources

It is recommended that no further funding be provided for an economics program until DGF has staff educated sufficiently in economics. It should be noted, however, that economic considerations are an important component of fishery management and regulation. Economic analyses completed earlier will be useful but not sufficient for the purposes of fishery management. They can be used as important reference work in the future as DGF adds Omanis trained in economics to its staff. The evaluation team recommends that no further expatriate assistance be provided to this program until Omani counterpart staff are in place.

### III. Institutional development: progress toward project purpose

#### A. Organizational Structure of DGF

Proposals by RDA for restructuring the Fisheries Department were approved by the DGF and implemented in late 1984. The five Directorates under the Office of the Director General include Fisheries Affairs, Fishery Resources Development, Statistics and Data Processing, Marine Science and Fisheries Center, and Technical Services and Extension. The Director's and Deputy and Director's posts for Fishery Resources Development are currently vacant and are temporarily being filled by the Director of Statistics and Data Processing.

The present structure of the DGF appears to be basically sound and is an appropriate foundation for the effective administration of fisheries development in Oman. The only missing element is a policy decision supporting active fisheries management. Research by the MSFC will ultimately lead to an assessment of marine resources important to Oman, at which time, DGF will have to begin activity managing these resources for the long-term survival of these resources.

The responsibility for managing both domestic and foreign fishing apparently rests in the Fisheries Affairs Department of DGF. This Department will have an extremely important role to play, one that has not generally been exercised by DGF in the past. The Department will have the responsibility for interpreting stock assessment data, economic and statistical data, social-cultural studies, and relevant governmental policies with regard to fisheries, and for using these inputs in formulating regulations for management of the fishery. The formulation of regulations to control fishing and thereby maximize harvests on a species-by-species and area-by-area basis is a difficult task, normally assigned to more senior, experienced staff only. DGF staff assigned responsibility for formulating regulations must have the capacity to understand and interpret all sources of information noted above.

Management regulations and controls eventually developed by Fisheries Affairs staff, such as gear restrictions, closed seasons, size limits and closed areas, must be enforced if they are to be effective. DGF and the JC need to determine which government agency will have the responsibility for enforcement of fishing regulations and to define how that agency will enforce the laws and regulations. (This responsibility may have already been determined but it was not apparent to the evaluation team.) The Fisheries Affairs Department will have to interact closely with the government agency finally given enforcement authority; however, only trained law enforcement officers should exercise enforcement procedures.

One other issue that needs to be addressed is redefining the functions of the MSFC to reflect its research advisory role rather than allowing it to remain an operational unit of the DGF (see Section B).

## B. Manpower Development and Participant Training

### 1. Description of the Current Training Program

The project made a rather slow start to implement the participant training program. The first group of participants in the non-degree course started in late 1985 at the Florida Institute of Technology (FIT). After six months of English language training, participants were unexpectedly transferred to the University of Rhode Island (URI). Currently, 11 participants are studying at URI, eight who started in April 1986 and three who joined the program in September 1986. Of these, four are in applied fisheries, one in applied technology, two in fisheries science and research, and four in data processing and statistics. All are staff members of the DGF and expect to complete training by May 1988.

Sponsored by the JC-assisted Scholarship and Training Project, 10 participants are in degree courses enrolled at various U.S. universities studying marine sciences, and one is a graduate student at the Pacific Lutheran University. The first group of six participants is expected to graduate in 1990/91 and the others a year later. The graduate participant will complete his studies in 1988/89. None of the degree level participants are affiliated with any government agency, but under the terms of their scholarship, must return to Oman for two to four years to work for the government. Up to twenty percent of them may be released to work in Oman's private sector if no suitable public sector job is available. DGF and the JC need to investigate recruiting qualified candidates among these participants for positions in DGF.

### 2. Status of Training Program Starting in 1988

DGF and the Ministry of Education and Youth (MOEY) formed a Training Committee in 1987 to prepare a training plan to respond to fisheries training needs among DGF staff now on board. The committee is composed of the DGF directors and representatives of the MOEY, JC, RDA and Checchi. The evaluation team supports this systematic approach to planning. This training plan covers non-degree training in 1988/89, is currently under review, and includes courses for 47 individuals ranging from one-month specialized courses to 21-month courses in fisheries science, technology, development and administration. The longer term courses of 18 to 21 months are for participants from DGF (13), the Southern Region (4), Sultan Qaboos University (4), and the Oman Bank for Agriculture and Fisheries (1). The 22 participants proposed for these longer term courses would include nine in fishery science, ten in fishery technology and three in administration/finance. This training will be financed jointly by DGF, MOEY and the JC.

At a recent meeting of the Training Committee it was generally agreed that certain components of the training program should be implemented in Arab countries, specifically fisheries technology and administration/finance, to avoid the high costs of extensive English language training and U.S.-based training. Fishery science courses, however, would continue at URI. The

one facility mentioned was the National Institute of Agricultural Sciences in Tunisia which offers a fisheries technology training program. However, very little is known about the standards of training at this institute, nor about the physical facilities available for the fisheries technology course.

The evaluation team notes that the proposed internal training program for 1987 - 1987 suggests an investment of \$924,000 from the JC and \$620,000 from the DGF to train workshop staff in various technical discipline as part of the extension program. The plan calls for training 60 staff members through ten three-week sessions and providing five mobile workshops and two four-wheel drive vehicles fitted for training in safety and first aid. The evaluation team does not support this program and feels that the funds could be better utilized for training of fishermen. Field extension agents could be trained in specialized skills through arrangements with the private firms and project staff, i.e., dealers of diesel and outboard motors for training in preventive maintenance, boat manufacturers for fiberglass repairs, and project staff for fishing gear and methods. The concept of individual community training and demonstration sessions supplemented by regional programs are a more effective way to transfer technical skills to fishermen.

### 3. Impact to Date

It is too early to measure any impact the URI training will have on strengthening the capabilities of DGF. The impact of this training will depend on how and where the participants are assigned their return to Oman. The training is, however, having a considerable impact on participants, virtually all of whom are doing well. Earlier difficulties with language and adjustments to a different environment are in the past, and they now have a very positive attitude toward the training program. Two took additional evening classes in order to pass the high school equivalency exam, and others have purchased their own personal computers to learn various software packages. Upon their return to Oman, they will undoubtedly contribute significantly to the work of DGF.

### 4. Successes/Problems of Implementation

Despite the initial difficulties experienced by participants, only three of the original 15 participants dropped out of the program. This is commendable considering that none had much, if any, previous formal education. The successful performance of the participants is due largely to their determination and to the patience and abilities of the URI instructors.

The evaluation team feels that the URI course is well suited for short-term training in fisheries technology and basic marine science. The trainees have flexibility in determining their coursework, and they are given the opportunity to pursue specialized subjects relevant to their specific jobs. URI has excellent facilities with well equipped labs and workshops for hands-on training in computer science, fishing gear and

equipment, engines, and boats. Coursework includes a three-month period of training at the University of Puerto Rico where experiential training is emphasized in a tropical environment.

The degree training program now faces a particular problem. Since the Sultan Qaboos University opened, overseas GovOman scholarships for undergraduates have been stopped. Forty overseas scholarships for graduate students are awarded annually, 20 of which are for the university and 20 for the civil service. Currently there is only one student majoring in marine science at the university, and it is not known whether others will be attracted to this specialization.

The evaluation team feels that coordination between the Scholarship and Training Project and the Fisheries Development Project has been lacking, particularly with regards to degree-level and post graduate training. There have been unreasonable delays in ensuring an adequate number of fisheries scholarships, considering the urgent need for fishery graduates. In addition many of those Omanis currently enrolled in the U.S. are attending universities that do not rank high in marine or fishery science. It appears that degree-level training has been implemented in an ad hoc manner rather than following a comprehensive plan covering the full range of DGF's training requirements. The team, therefore, felt that the fisheries training program might be better served through direct inputs by the JC or the Fisheries Development Project.

#### 5. Probability of Achieving Objectives by June 30, 1990

The Project Paper projected a total of 33 trained staff in the life-of-project training plan. These included 17 with at least two years of training, 7 with bachelor degrees, 6 with master degrees and 3 Ph.D.s. A study in 1984 on training to meet manpower requirements indicated that considerably more degree level staff would be needed, particularly for the MSFC. There will, therefore, be a serious shortfall of trained staff for the DGF by the end of the project in 1990. There is no assurance of how many of the 10 participants currently studying for a B.S. degree will opt for employment in DGF since SQU and other government agencies will also be bidding for their services.

#### 6. Recommended Strategy for Use of Remaining Funds

a. That the current plans for the second group of participants for short-term training at URI proceed without delay, including the requisite English language training.

b. That the decision to send the fisheries technology participants to Tunisia for training await a thorough assessment of the training standards available in Tunisia by appropriate members of the Training Committee including RDA and Checchi. The standards of training and available facilities should at least equal URI's.

c. Should a decision be made to send participants in fisheries technology to Tunisia, the JC and DGF should consider increasing the number of participants studying fisheries technology in Tunisia and marine science at URI to at least 14 each.

d. That the JC and the DGF explore methods of attracting high school graduates, particularly from coastal areas to marine science education at Sultan Qaboos University.

e. That the JC and DGF, through the Training Committee, request MOEY to instruct the Omani Embassy in Washington, D.C. to transfer Omani students in their sophomore years into U.S. universities with first rank fisheries faculties.

f. That the proposed training of extension workshop staff be redesigned, recosted and rebudgeted as a training component of the extension program.

#### 7. Recommended Strategy for New Funds

a. That training and education in fishery fields be given top priority as a means of strengthening the capabilities of the DGF, particularly the MSFC.

b. That the JC and DGF explore the possibilities of establishing a joint scholarship program for post graduate studies as a means of attracting students for employment in the Fisheries Department, i.e., those currently studying in the U.S., current degree level staff at the MSFC, and future graduates of Sultan Qaboos University.

c. That the JC consider the following options to improve the fisheries training program:

i. continue the present arrangement with the Checchi consulting team for managing this project's training, but take steps to strengthen coordination between DGF and MOEY in planning and implementing the degree training program, or

ii. discontinue arrangements with Checchi and establish an Education/Training Specialist in the JC to plan and administer all training sponsored by the Commission,

iii. include a Fishery Education/Training Specialist in the RDA staff who would be responsible for planning and implementing all fishery training, or

iv. assign responsibility for fisheries training to the newly appointed Executive Officer at the MSFC.

d. That the DGF with the assistance of the project establish a Fisheries Management Unit and clearly define its role in managing fishery resources.



#### IV. Progress toward project goals

The team's difficulty in evaluating progress towards progress goals was, first, the lack of indicators, and, second, that the breadth of the goal statements made progress towards those goals unlikely at so relatively early a stage in the project's life. (These goals are to diversify the Omani economy and to increase the welfare of traditional fishermen.)

Diversifying the economy would presumably mean measuring the fisheries' increased share of GDP and GNP, increased foreign exchange earnings, and the like. The project has not had time to make any progress towards this goal.

The project's contribution to increasing the welfare of traditional fishermen has been the result of the work of the extension program. The introduction and at least partial acceptance of lobster traps is the first step in protecting the lobster resource from depletion and hence protecting fishermen's incomes. Courses in sea safety have the potential of saving lives and protecting fishermen from accidents. (The programs are described in greater detail elsewhere in this document.) No attempt has been made by this team or any other to quantify these benefits, nor should they have so early in a project that has had so many implementation problems.

It is time, however, for the JC and DGF to think seriously about how such progress might be measured. Two upcoming events will be helpful to this process: a Bureau of the Census (BUCEN) assisted census of fishermen and the recently begun collection by the Statistical Program of effort data. Effort is a technical fisheries term that tries to quantify the fisherman's expenditure of time, physical energy, and money in fishing. The fisheries discipline has developed a series of indicators of effort, such as hours of net soaked (meaning nets set in the water to catch fish), and the Statistics Program has recently begun collecting effort data. The JC and DGF should examine these indicators to determine which would be most useful to measure project progress. (The Statistics Program meanwhile will continue collecting data against all these indicators as part of the process of data collection and analysis for fisheries management.)

No census of Oman's population has been made to date. URI did a statistical survey at the beginning of the project of the distribution of kinds of fishing boats along the coast, and a helicopter was used to do a boat count in 1985. These studies might prove useful along with data from the Fishermen's Encouragement Fund to measure the Fund's contribution. The BUCEN study gives the first opportunity to establish baseline data on the socio-economic status of traditional fishermen.

## V. Problems in project implementation

A number of generic problems are slowing the pace of implementation.

1. DGF has complex administrative procedures for routine needs: vehicles, petty cash, procurement, and hiring. Obtaining a vehicle for a routine field visit by, say, the RDA extension consultant and a DGF staff member involves preparing three memos of request, the first prepared by RDA to the Director of the individual program. This process can take two to four days for a routine field visit. Petty cash expenditures are reimbursed upon submission of receipts for all purchases, each signed, in the RDA case, by the RDA Chief of Party, the Director, and the Director of Administration.

These procedures apply to DGF staff and expatriate consultants alike. The drag on the entire system is substantial, and project implementation in all programs is delayed while everyone works through these processes. The evaluation team acknowledges the need for proper monitoring of vehicles and expenditures, but believes that DGF would be better served by streamlined procedures that strike a balance between the need for oversight and the need for rapid response to requests for vehicles, petty cash, and the like.

The team noted as well that the shortage of trained support staff in DGF caused the burden of these procedures, e.g., preparing memos requesting vehicles, to fall on the RDA consultants themselves. Having an M.S. fisheries biologist preparing such memos is an inefficient use of his time and expertise.

The Ministry of Agriculture and Fisheries, like other ministries, is subject to several government-wide restrictions based in part on past abuses and in part on austerity measures imposed after the 1985 fall in oil prices:

The number of telephones, especially those capable of long distance calls, has been drastically reduced throughout the Ministry; vehicle procurements and repairs have been delayed; use of GovMan vehicles by civil servants for personal use or after normal business hours has been prohibited. The project has suffered under some of these prohibitions, in part because they have been applied indiscriminately across the board. In some cases exceptions are being granted, though after a long exchange of letters of request, e.g., on behalf of the field samplers in the Southern Region who need to remain in the field after business hours and sometimes overnight but could not keep vehicles out beyond business hours. Other equally justifiable cases merit exceptions: The MSFC needs to be able to phone the university, now a long-distance call. The Statistics Program's modum was authorized for an additional year at R.O. 300 (\$750) while the telephone by which it is accessed was disconnected as part of the economy drive (annual cost: \$15).

All these circumstances have slowed project implementation. They also suggest the need for a review of

DGF's and the Ministry's administrative procedures to see where they could be streamlined and where exceptions to Ministry- or government-wide prohibitions might be sought. How the JC might sponsor such a review is discussed in Section VII C.

2. The directors of DGF's several departments seem to have little information on the annual budget levels for their respective programs and have no information on disbursements from these budgets as the budget year proceeds. These directors submit requests for disbursements for project implementation to the DG, the Office of Administration, or other parts of the Ministry. Many directors, DGF staff and consultants complained to the team that these requests were often turned down because of lack of funding. The team had no way of measuring composite requests against actual expenditures or refused requests, but notes only that implementation progress has been hampered by lack of funding for vehicle replacement and repair (Statistics and Extension), small equipment and commodity purchases (Research and Extension), pilot tests (Extension and Marketing), field travel costs for DGF staff (Statistics and Extension), and operations costs for vessels (Extension and Research). In addition these directors seem to have little authority to approve expenditures or to make decisions on procurement, hiring, or implementation. A happy exception seems to be the hiring of six research technicians by MSFC after the MSFC's careful and systematic review of 40 CVs to choose the best qualified applicants.

3. Availability of appropriate vehicles. The GovOman provided each RDA consultant with a Toyota Tercel for professional and personal use. DGF had apparently offered field vehicles, but the consultants asked for sedans. Since these vehicles are inappropriate for field trips, consultants must request field vehicles through the laborious process described earlier. These sedans are now almost four years old and ready for replacement.

DGF's pool of field vehicles is in poor repair. Only one of 21 project vehicles is operational. The remainder are awaiting repairs, a process that can take up to four months on the grounds of insufficient funds.

4. Staff shortages. As the earlier program narratives made clear, anticipated additions of DGF staff have fallen short of expectations, with Statistics the least affected and Marketing the most affected. This problem has dogged the project since its inception. It remains unclear precisely what the problem is. Some staff have been added to most programs but the qualifications of some and sometimes many of the people hired have been open to question. DGF and RDA have sponsored several hiring campaigns during the project's life, including writing job descriptions and interviewing candidates, only to have the process aborted by an unseen hand. The process and policy of hiring merits detailed study to determine how the process might be streamlined.

5. The language barrier. The limited number of English speakers among DGF staff and of Arabic speakers among U.S. staff poses a communications problem, as does the consultant teams' advanced level of formal education in fisheries but relative inexperience in working in the public sector of any government. The evaluation team, not being Arabic speakers either, had difficulty assessing the extent to which the DGF staff found the language barrier a problem, apart from noting the following:

a. The Director General asked the team to be aware of the problem and to recommend that Arabic speakers be sought in the future.

b. relations between consultants and English-speaking DGF staff, especially the three current Directors, appear to be cordial and friendly. No director complained to the team of consultants being culturally unaware or insensitive to Omani social standards.

c. one of the two RDA statisticians is a native Arab speaker and has apparently been able to work very effectively after a relatively short period of time and has been helpful in and outside the Statistics Program at working out substantive problems because of his language ability.

d. while undoubtedly valuable, Arabic skills, in the evaluation team's view, should take second place to technical skills, especially while the consultants' work is primarily providing direct services to DGF rather than institution building.

e. English, though difficult to master, will give Omani professionals in fisheries access to scientific literature and professional conferences, private sector markets in Europe, the U.K. and the U.S., and American educational and training opportunities.

The team also suggests the following:

a. that RDA and OSU seek out Arabic-speaking professionals as consultants to the extent possible. The proposed training officer is one possibility.

b. that both teams be careful in written communications and reports to use good, concise standard English, especially for material that is to be translated and that the format for reports include a summary that makes the major conclusions and recommendations for action readily accessible to senior government managers. This summary is in addition to an executive summary, probably not more than one page, or two at most, with a minimum of terse prose laid out in highly readable form on the page. The Marketing Workplan is probably the worst offender with neither clear English nor coherent organization. The economist's reports, which are well written and contain very interesting and useful material, have executive summaries that are not well presented for even the casual reader, much less a senior manager who needs the major findings at a glance.

Other factors may have caused unidentified problems between consultants and DGF that tend to be thought of as a language problem because the language barrier prevents a discussion that would clarify the problems. These factors include the following:

a. The consultants assume that much of their work will take place in the field, while DGF staff seem to feel that so much field travel is unnecessary.

b. The consultants assume that they are responsible largely if not exclusively for the duties listed in their job description, while DGF staff seem to feel that they are available for a wide variety of special assignments as special needs arise.

c. The consultants believe they should have a broad range of counterpart professional and support staff, field travel for the staff and themselves, while DGF staff seem to feel that the consultants should be able to manage on their own.

d. The consultants come entirely from the U.S. private sector and universities and are unfamiliar with the workings of a public sector bureaucracy. This puts them at a disadvantage when having to deal with the Omani public sector. They would be similarly disadvantaged in working with the AID bureaucracy.

## VI. Proposals for project redesign

### A. Existing resources:

Few person-months remain unprogrammed in the RDA contract, now scheduled to terminate in June, 1988. The contract's manpower distribution reflects the project's priorities appropriately (statistics, extension, marketing, the Southern Region) with the observer and economist's positions vacant. The team sees few options and little need to reconfigure remaining person-months.

As to the OSU contract, the team sees the present mix of skills on the team appropriate for their assigned work, but notes the following problems:

1. the assigned work for the three scientists seems to us unrealistic. One scientist (Johnson) is charged with the three most important fisheries (demersals, lobster and abalone) and is stationed in Muscat while the lobster and abalone are in the Southern Region. One scientist (Dudley) is Chief of Party, management advisor to the MSFC Director, and in charge of large and small pelagic research. A third scientist (Dorr) has greatest expertise in designing fisheries surveys, but has no responsibility of survey design for demersals, lobster and abalone. (These recommendations are summarized on the chart following page PD-4.)

The team therefore recommends that Dudley be relieved of management advisory responsibilities and large and small pelagic research, take on demersal research with Dorr, and oversee monitoring (by an Indian researcher) of ongoing data collection and analysis for large and small pelagics. He would remain responsible for Chief of Party duties. The team further recommends that Johnson be assigned to Salalah and made responsible for demersal, lobster, and abalone research. (Surveys for these fisheries would be designed by Johnson with major assistance from Dorr.)

2. The team notes that the food technologist (Hilderbrand) at MSFC has two untrained Omani staff, no equipment, and a mandate to do pure research. SQU has a fully equipped food technology laboratory and no staff. The Marketing Program is responsible for private sector advisory services but has no access to food technology for new product design.

The team therefore recommends that Hilderbrand be transferred to SQU (the JC continuing to pay his contract costs), that his mandate become new product development using underutilized species in conjunction with the private sector advisory services program. The team also recommends that, if these changes do not take place, Hilderbrand's contract be allowed to expire on schedule in June, 1988.

No changes are called for in the scope of the librarian's and aquarium curator's work.

Note: The team is recommending adding to the staffs of both contracts to facilitate the team's work and to ensure that the project can meet its objectives. This additional staff cannot be funded without new funding being added to the project.

**B. Additional resources**

If additional U.S. funding were available for activities now ongoing, the team recommends the following:

1. provide one long-term RDA advisor for the Southern Region through June 1990, with primary responsibility for the extension program and supervisory responsibility for samplers for the statistics and marketing programs. This advisor is warranted by the GovOman's priority given to the Southern Region. The fact that large fisheries resources are in the South, that fishermen are using less advanced techniques than in the North, and that less aggressive work in extension and data collection are taking place in the South without a resident advisor argue strongly in our view for this position.

2. extend the senior RDA statistician through June 1990, and the second statistician through June 1989, both to provide continuing supervision and improve the quality of the data collected. Technical assistance to this program would need to be continued at least five years (until 1992) before DGF could run it without U.S. advisors. This recommendation assumes that the present vehicle problem preventing samplers from collecting data is resolved expeditiously. Without quick resolution, the JC and DGF need to rethink the entire program.

3. extend one RDA extension advisor through June, 1990, to continue running the program and to supervise the Omanis now at URI who will return to Oman in June, 1988. The master fisherman and engineer would be extended through June, 1990, and an Arabic-speaking extension agent added to the contract. At least one extension advisor would be necessary through 1992.

4. extend the Chief of Party through June, 1990.

5. add a training advisor to serve through June, 1990 to ensure a systematic approach to the project's training needs. This advisor would identify and process candidates for URI and Arab-world training, U.S. training for Ph.D.s and M.S., SQU training for undergraduates, and arrange the in-country training programs laid out in the current training plan. Hiring such an advisor is only one option of assuring this comprehensive approach to training. Other options include appointing a JC training officer, continuing to use the Checchi contract or using OSU executive officer at the MSFC (see recommendation below).

If additional funding were available to the OSU contract, the team would recommend the following:

1. extending the three scientists to June 1990.

2. if the food technology's advisor is transferred to SQU, extending his contract to June 1990.

3. extending the librarian and aquarium curator until June, 1990.

4. adding two senior technicians, one to work with the Dudley-Dorr team on demersals and one to work with Johnson in Salalah, through June 1990.

These technicians would assist with supervising data collection to ensure reasonable quality standards and with data entry and analysis. These technicians would hasten production of relatively rapid and accurate stock assessments.

5. adding an experienced U.S. or other expatriate (possibly Indian or Pakistani) executive officer to bear the burden of supervising the day-to-day operations of the MSFC. At present the burden of running the MSFC is falling on Dudley and the Director and distracting them from their professional duties without creating any institutional capacity to run the MSFC in the long term. An Omani assistant executive officer should be added as well if a U.S. Executive Officer is hired. Having this Omani assistant to begin the process of institution building for management of the MSFC.

If the JC and DGF wish to accelerate the process of developing stock assessments for key species, the team recommends adding one or more of the following to the OSU team, listed beginning with the highest priority:

1. one U.S. Ph.D. fisheries research scientist for kingfish, longtail tuna and yellowfin tuna.

2. one U.S. Ph.D. fisheries research scientist for snapper/grouper.

3. one U.S. Ph.D. fisheries research scientist for sardines.

#### C. New Areas

The team suggests the following as possible new areas the JC might investigate for future JC investment in the fisheries sector:

1. Technical assistance for site studies and construction design for harbors, breakwaters, and support facilities. These studies would include reviews of similar facilities in the region, in particular UAE which has developed extensive, well-designed and constructed facilities, to take advantage of regional experience. Adequate shore facilities are essential to encourage the modernization of the fisheries sector. Boats larger than skiffs, which are now dragged onto the beach, require dock facilities to allow expeditious loading and unloading of supplies, equipment and catch. The Director General of



Fisheries, when asked by the team about his priorities for fisheries development, cited the need for U.S. \$100 million for harbors, breakwaters and support facilities.

2. A management study of the MAF, perhaps limited to Ministry offices that relate to DGF and affect its operations, in particular financial management, personnel, and procurement. Many of the management problems delaying project implementation lie in systems outside DGF's control. Reviewing these systems and recommending changes to streamline operations would require the Minister's approval and would need to examine a number of MAF offices. An experienced U.S. management consulting firm, such as Booz Allen Hamilton or one of the Big Eight, would be appropriate.

3. a fisheries management specialist for the Department of Fisheries Affairs, DGF. This advisor, probably not needed until 1990, would begin to analyze the data collected by the program in the framework of managing the fisheries resources and to create policies and regulations that would allow biologically responsible exploitation of the resources. Data gathering now being undertaken is building the data base from which fisheries management proceeds.

4. a study of the Omani private sector. The number of private firms in the fisheries sector appears to be growing, and the operations of ONFC and subsidies of small boats and motors does not seem to inhibit the growth of these firms. Apart from some indication of DGF's restricting licensing of new firms, the team found no evidence of inhibitions to private sector activity. Nonetheless, little seems to be known about the climate for private investment in fisheries, the adequacy of the banking system, banking policy on lending, availability of credit, terms, interest rates, correspondent banks in the West and Japan, and so on. The JC may wish to undertake one or more studies to determine the adequacy and efficiency of these systems.

5. a study on the sardine fishery to determine its adequacy to support a fish meal plant. The team found some interest in such a plant in a number of quarters. It appears, though, that the fishery may be inadequate to support a plant. A study would put the matter to rest.

Summary of Recommended Changes in Technical Assistance Positions

The following shows positions only and does not endorse specific advisors. Blanks indicate no change in present circumstance.

<u>Team</u>	<u>Position (Present work)</u>	<u>Incumbent</u>	<u>Location</u>	<u>Recommended job description</u>	<u>Present position expir date</u>	<u>Recommended position expir date</u>
RDA	COP	Swerdloff			6/88	6/90
RDA	Sr. Statistician	McClure				6/90
RDA	Statistician	Moussalli				6/89
RDA	Extension	Jurick				6/90
RDA	Marketing	Jenkinson			4/88	6/90*
RDA	Master Fisherman	McFadden			6/88	6/90
RDA	Engineer	Tombari			6/88	6/90
RDA	Observer	(vacant)	-	-	-	-
RDA	Southern Advisor	Cox			6/88	(retiring)
		(to be named)	Salalah	extension, local supervision for samplers for marketing, stats	-	6/90
RDA	Arabic-speaking Extension	(to be named)		extension		6/90
RDA	Training Specialist	(to be named)	Muscat	all training (U.S., SQU, in-country)	-	6/90**
OSU	COP	Dudley		demersals		6/90
OSU	Fisheries Biologist	Johnson	Salalah	lobster, abalone		6/90
OSU	Fisheries Biologist	Dorr		demersals		6/90
OSU	Seafood Technologist	Hilderbrand	SQU	food technology	6/88	6/90*
OSU	Sr. Technician	(to be named)	Muscat/MSFC	demersals (through on-board observer)		6/90
OSU	Sr. Technician	(to be named)	Salalah	lobster, abalone		6/90
OSU	Executive Officer	(to be named)	MSFC	management/administration	-	6/90***
OSU	Aquarium Curator	Mee				6/90
OSU	Librarian	Hoover				6/90

\*This position should not be extended without significant change in location and/or level of logistics support.

\*\*This training position is one option for coordinating training. Other options include using the Checchi contract, establishing a Training Officer in the JC, or assigning training responsibility to the MSFC Executive Officer.

\*\*\*Either American or expatriate.

VII. Monitoring and evaluating the progress of the project towards its goals

The team used the Program Paper, approved in March 1982, as the primary background document for the project. The team based the evaluation on Annex I of Amendment 2 to the Subgrant Agreement as the formal agreement between the JC and GovOman on the project's goals, purposes, outputs, and inputs. The team used the Implementation Plan, dated October 13, 1986, as the statement of formal agreement between RDA, the JC and GovOman on project components and benchmarks of implementation progress. Finally, the team used the RDA-GovOman and OSU-GovOman contracts as statements of agreements of work between those agencies. The team's comments on these documents are as follows:

A. Annex I is a useful description of the goals and objectives of the project, although it is inconsistent in parts. It begins by stating that the broad goal of the project is to develop the fisheries sector, then breaks that broad goal into four subgoals and describes the means by which these subgoals are to be met. The next section, outputs, however, lists outputs for only two of the four subgoals, suggesting that the project is in fact not working sector-wide. At the same time certain GovOman activities, e.g., cold stores, are listed though they are not receiving U.S. funding nor included in this project. This ambivalence and ambiguity in an official document parallels, and fails to correct, the ambiguity in the minds of many project participants, described in Part I (Introduction and Overview) of this evaluation, as a fundamental issue the project needs to address and resolve.

This Annex I, however, is a much clearer statement than its predecessor and will undoubtedly be a very useful means of gaining agreement from all participants on what this project is attempting to achieve.

B. The team found the Implementation Plan very helpful as a reference against which to measure progress and applauds the JC's preparation of it. The team notes that in at least the case of the marketing program the accomplishments expected from the project by the time of this evaluation were drawn in no recognizable order from the RDA workplan for marketing. Trying to evaluate the progress of the program laid out in the workplan using the indicators in the Implementation Plan was difficult. The JC might want to make these two more consistent for easier project monitoring.

Similarly, more detailed benchmarks need to be developed to measure progress and achievements, and responsibilities need to be assigned for collecting these data, perhaps through making consultants aware that they should keep records against which progress can be measured. The RDA marketing consultant, for example, has provided advice to private firms, as part of the private sector advisory services activity, but no record has been kept of how many firms received this assistance and what effect, if any, this advice had on their operations.

The team senses that in preparing this Plan, the JC struggled with the need to provide detailed benchmarks without creating so detailed and bulky a document as the Beginning and End of Project Status Statement that was prepared as an outcome of the last project evaluation. We found the detail in the Plan adequate for this broad evaluation, but would have needed the next level of detail, perhaps in a separate document, to do a more detailed evaluation. We believe that the JC should have this greater detail, especially for areas like marketing that are directly responsive to Agency policy.

The team strongly recommends that this plan be updated and an amendment or separate plan be prepared for the OSU activities.

C. The OSU and RDA contracts give very little indication of what is expected from the two teams, making the Implementation Plan especially necessary.

The team's ideas on monitoring progress toward project goals are discussed in Section IV.

## Annexes

1. Private Sector (See Part VI C New Areas)
2. Women's involvement in the project

Women have had little involvement in the project to date for largely cultural reasons. Only men are involved in fishing, all phases of marketing, including sorting, local marketing, transport, operation of cold stores, and export. Only men are involved, and would be accepted, in extension, and on-board monitoring. There are selected exceptions to this pattern. DGF includes women as data entry and processing staff (but not as secretaries), and the MSFC has a number of women as technical assistants to the researchers. The OSU team has been urging DGF to send these women, in pairs, into the field to monitor data collection as part of their technical training. DGF has been reluctant to do so to date.

Educational opportunities for women in Oman are rapidly increasing: there are 244 primary and secondary girls schools in Oman in academic year 1987/1988, 263 boys schools, and 171 co-educational schools. In the Capital Region there are just over 25,000 girls in primary and secondary schools and just over 28,000 boys. The 1,150 students at Sultan Qaboos University are in their freshman and sophomore years. (There are no upperclassmen because SQU opened in 1986/1987.) Women students outnumber men students 6 to 4, possibly on the model found elsewhere in the Middle East where women may attend local universities but not foreign ones. The opening of SQU and the substantial enrollment of women hold promise for more qualified women in the labor market.

### Annex 3: Use of U.S.-funded advisors

Section V of this evaluation describes the generic program management problems in the project. This annex speculates on the causes of these problems. There is no question that these problems are causing the consultants great frustration, that their effectiveness is reduced, and that the JC is getting less than full U.S. dollar value for its investment in these consultants. These problems represent policy dialogue opportunities for the JC as a means of increasing the consultants' effectiveness.

DGF has a number of problems that adversely affect the project:

a. a capricious and willful management style: DGF has a social hierarchy that is influenced by whether one is Omani or Zanzibari, by traditional rank (e.g., a sheikh), age, education and probably a number of other factors. Management style seems to be by fiat based on a traditional sense of exercise of authority and subservience to authority, depending on one's position in the hierarchy.

b. a management style that is unaware and uninformed of modern management concepts of delegation of authority, accountability, staff development, hence the large number of staff who sit and drink tea and never seem to have work to do.

c. a sense of distrust among senior managers of people at lower levels of authority. This sense encourages continuing centralization of authorization and is reinforced by abuses of telephone and vehicles by lower level and staff people. This distrust, of course, breeds more distrust and is self-perpetrating.

d. a lack of an understanding of what fisheries development and management mean and consequently a lack of commitment, and dedication to fisheries development and management, and

e. a lack of understanding of what leadership is and why it is needed, and how it is exercised.

On the consultants' side the problems seem to arise from the following:

a. the consultants' lack of prior experience with public sector bureaucracies. The DGF's mode of operation and mindset is much more comprehensible to this team's USG employees than to the two teams of advisors. DGF operates like any bureaucracy, and the problems the advisors face are problems U.S. foreign service officers face in the USG, though the latter exist in not so virulent a form.

Extension agents in Salalah who have not been paid their field allowances for six months bring to mind problems of U.S. direct hires stationed in the Middle East with problems in payment of Sunday differential that go on for months despite repeated cable requests for assistance. DGF staff abuses of the telephone recall the results of a recent GAO study of phone use in USG agencies, the only difference being that the GovOman has taken steps to curb the abuses. The Joint

Commission needs to be sensitive to the advisors' plight and act as a lightning rod to their frustration, while making clear to them that problems are inherent in bureaucracies, that all the staff in bureaucracies suffer similarly, and that these problems are not a special punishment devised by the Omanis solely for them.

b. the consultants need to learn the art of being or appearing to be responsive to requests from the client agency, which usually means understanding or divining the political context, especially political pressures, in which requests come to them from DGF or the Minister and then respond or appear to respond to these requests in a timely manner. This will usually involve the consultants' having to provide one or more interim responses. It will certainly involve having to compromise quality and thoroughness for timeliness and purely American technique for a blend of Omani and U.S. technique, or rather for U.S. technique modified to suit the Omani environment. This art also involves skill in preparing brief, concise, clearly written memos, probably not more than a page and preferably translated, that alert senior Omani managers to particular problems or provide pieces of information or respond to questions or requests from senior managers. The timeliness and clarity of these communications are as important as their content. Such memos should also transmit longer reports and technical pieces from the consultants.

Finally, the JC must play an active role in facilitating the interaction between consultants and the Ministry. The team sensed that this JC assistance has been missing from the project, though we could not pinpoint specific problems; this assistance seemed notable by its absence on all levels, on day-to-day matters as well as on policy dialogue matters. What seems missing is the feeling that the JC is an active participant in the project as the advisors are, that the JC was working as actively at its level to deal with these problems as the advisors.

## Annex 4: Findings, Conclusions, and Recommendations

### I. Training and institution building

#### 1. Findings: Training needs

Omani staffing needs for the MSFC are not identified in the training plan. The MSFC needs at least 6 Omani Ph.D.s, 14 Omani masters degree holders, and 14 B.S.s to staff it fully. Only one Omani is now in training for these positions, the assistant director enrolled at OSU. There are 9 Omani staff with undergraduate degrees (1 M.S., 2 B.Sc. and 6 B.S.) now at the MSFC. Each requires training in fisheries research procedures.

Under current GovOman regulations no undergraduate scholarships may be given to foreign universities now that SQU is open, and only 40 masters degree scholarships are given annually.

SQU will not begin graduating fisheries B.A.s until 1990.

#### Conclusions:

The project's training needs are substantial. The project needs a more systematic approach to training and manpower development. The training plan developed by the Checchi consultant through the Training Committee is an excellent move toward a more systematic approach.

#### Recommendations:

- that the project expand the training plan to cover all DGF and MSFC training needs.

- that the JC and DGF make a major commitment to training over the next five to ten years.

#### 2. Findings: Need for program management/administration training

Training to date has not covered program management (personnel, office management, procurement, accounting). The training plan provides some short-term, in-country program management training at the Institute for Public Administration.

The training plan provides funding for three-month U.S. fisheries management/development training.

#### Conclusions:

The team supports the training plan's provision for program management training. The project should also fund training in research administration.

#### Recommendations:

- that program management training be provided to DGF



- that, in the framework of fisheries management/development training listed in the training plan, the Director of the MSFC be sent for three months on-the-job training (OJT) with the Director of a U.S.G. fisheries research facility.

- that the training program for the Assistant Director of the MSFC, now at URI, be extended by three months to permit him the same OJT opportunity.

3. Findings: Calibre of training for Omanis in the U.S.

Twelve Omani students are now enrolled in their freshman and sophomore years in programs funded through the GovOman's scholarship program at OSU, University of Miami, Pacific Lutheran College, Florida Institute of Technology, Jacksonville University, and Univeraity of Toledo. OSU has a first rate program in fisheries, and the University of Miami has a first rate program in marine biology, but the fisheries programs of the remaining institutions are not in the first rank of U.S. institutions.

Conclusion:

Omani students should graduate from first rank U.S. institutions, though they may begin their course work in other institutions.

Recommendation:

That the JC and DGF, through the Training Committee, ask MOEY to instruct the Omani Embassy in Washington, D.C. to transfer Omani students into first rank U.S. fisheries programs.

4. Findings: Arab world training

The team notes the desire to take advantage of Arab world training opportunities in fisheries and the proposal to discontinue URI training. The team finds URI training, especially in fisheries science, is high quality and appropriate, and finds that the cost is appropriate to the quality. That the cost of URI training will be minimized if the program follows the standard academic year.

Conclusions:

Arab world training in fisheries technology might be appropriate if a suitable institution can be found.

The need for Omanis trained in fisheries is so great as to require the greatest feasible number of them in training.

Recommendations:

- that the JC look closely at Arab world training before committing funds to it. Such a review should include the views of an education/training specialist and a fisheries specialist.

- that the JC and DGF continue fisheries science training at URI.

- that the whole group of trainees slated to go to URI in academic year 1988-1989 be sent to begin studies in September 1988 without waiting for an inquiry into Arab world training.

5. Findings and conclusions: cooperation between MSFC and Sultan Qaboos University (SQU)

No formal link exists between the MSFC and SQU, beyond a single letter of agreement on coordination. Such cooperation is desirable.

Recommendations:

- that the JC and DGF pursue signing a tripartite agreement among DGF, the MSFC and SQU for cooperation on resource surveys and use of research vessels (an Omani Cooperative Oceanic Fisheries Investigations Agreement) to include cooperative research among MSFC and SQU faculty, work study opportunities for SQU students at the MSFC, and informal seminars.

- that OSU staff be named adjunct faculty at university.

6. Findings: food technology program

The MSFC has inadequate staff and no equipment to carry out this program. SQU has a fully equipped food technology laboratory but only one trained staff member. The MSFC's food technology program as currently designed is research-oriented, not problem-oriented. The present OSU advisor for food technology is by background a food technology extension agent for private industry, not a researcher. DGF does not want to be involved overtly in assistance to individual Omani private sector firms in the fisheries sector.

Conclusions:

The MSFC and SQU are on the point of establishing duplicate food technology programs, and the opportunity exists for combining resources in a single program. Seafood technology research should be linked to needs of private industry through an outreach program.

Recommendation:

- that a single food technology program be established at SQU using present MSFC advisor, with adequate operational budget.

7. Findings: Extension training

Some extension workshops, e.g., those on Masiran, have been turned over to the private sector, and the remainder will

be. The training plan proposes an investment of \$924,000 from the JC and \$620,000 from DGF. URI returnees will form the beginning of a core staff of trained agents who will in turn train field agents as a foundation for training programs for fishermen. The extension program has already done training sessions for about 60 trainees/session in sea safety at moderate cost.

Conclusions:

This program would be more appropriate as a component of the extension program. The costs, especially from the U.S. side, seem excessive, amounting to \$4,000/trainee/each of seven three-week courses.

Recommendation:

- that this training be redesigned, recosted, and rebudgeted as a training component of the extension program.

## II. DGF management and project implementation

### 1. Findings: budget planning and expenditures

The project's expatriate accountant left his position in early 1987 and has not been replaced.

GovOman funds for the project are kept in a special account, but actual disbursements are made both from regular DGF funds and from the special account.

DGF has no mechanism to tell Directors routinely how much has been disbursed from project funds (special account and regular funds) nor the balance remaining undisbursed.

Directors must request disbursement of funds from the Director General's Office of Administration for all project activities and for logistical support for the advisors and national staff.

Conclusion: To allow for orderly planning and implementation of program activities, directors need at a minimum to know how much funding has been disbursed from the annual budget for their programs and how much remains.

Recommendation: - that the project accountant be replaced, that he prepare quarterly budgets and expenditure tables for each program for the directors, and that directors prepare quarterly disbursements in line with these planned disbursements.

### 2. Findings: project vehicles

The process of requesting vehicles for routine RDA use involves writing and submitting three memos of which the first is written by one of the RDA advisors. The process can take two to four days.

Of the 21 GovOman vehicles assigned to the project, both at DGF and in the field, only one is operational as of 11/87. These vehicles are four years old on average. Advisors have been restricted in their travel for the last six months due to vehicle shortages.

DGF carries inadequate insurance coverage for vehicles driven by U.S. and Omani staff, no insurance coverage at all for Omani staff and no collision coverage for expatriate staff. Insurance costs are high because risks are high.

In many cases use of GovOman vehicles is restricted to regular working hours although data collection requires GovOman staff stay in the field longer than regular hours.

#### Conclusions:

The process of requesting vehicles is cumbersome and is affecting both DGF staff and advisors' work adversely.

Insurance is a cost of doing business in Oman and is particularly important because risks are high.

Recommendations:

- that the system for requesting vehicles be streamlined to allow more efficient access by DGF and consultant staff while ensuring appropriate monitoring of vehicle use.

- that full insurance coverage be provided.

- that restrictions on DGF vehicles being in the field be loosened selectively for data collection staff, among others.

- that the advisors' Tercels be replaced by field vehicles and insurance coverage and operations and maintenance funds be provided by DGF or JC.

3. Finding: Overly broad budget cuts

Economy measures have cut all phone communications between the MSFC and Sultan Qaboos University, have removed the phone connecting the Statistics Program to regional data banks via a modum, and prevented other long-distance telephoning. Other economy measures have cut insurance coverage and restricted vehicle use to official office hours.

Conclusion: Economy measures appear to have been too broadly imposed since at least two desirable connections have been severed.

Recommendation: - that DGF rethink these cuts and approve limited restoration of phone service, insurance, and vehicle use to permit project implementation to proceed smoothly.

4. Findings: Petty cash

Receipts for petty cash expenses must be signed by at least three individuals: the chief of party, DGF director concerned, and head of Office of Administration. Turnaround time for replenishing petty cash is two to three months.

Conclusion: The management system for providing petty cash is slowing implementation.

Recommendation:

- that this system be streamlined to allow more rapid turnaround and that the JC consider establishing a petty cash and operational fund within the RDA and OSU contracts to facilitate the advisors' work.

- that the JC provide funding in the RDA and OSU contracts for limited quantities of a wide range of supplies, equipment and services (such as translation) to be managed by the respective Chiefs of Party.

5. Finding: Equipment procurement

Equipment procurement in excess of minimal amounts is approved and handled by central MAF offices rather than by the directorate concerned. The former makes changes in equipment specifications without consulting the receiving directorate. These changes have resulted in purchased equipment being unusable, unsuitable, or incompatible, especially in the MSFC.

Conclusion: Authority for approving expenditures and specifications needs to be rationalized.

Recommendation: - that the directorates, in particular technical staff and technical advisors, be granted final authority on technical specifications, subject only to policy level review. Senior DG and Ministry staff should determine overall budget figures for equipment purchases within which directorates can make technical decisions.'

6. Finding: Circulating RDA Reports

Once approved for submission by the Director of Statistics, RDA reports take from two to six months to be cleared by the other directors for transmission to the Director General.

Conclusion: Such time delays seriously inhibit understanding and uses of these reports.

Recommendations:

- that DGF review its procedures for reviewing these reports and adopt measures to ensure more rapid approval and circulation.

- that RDA and the JC review the format of these reports to ensure that their major findings and recommendations are presented in a readily readable format.

7. Findings: fisheries management

The GovOman has limited abalone fishing, has forbidden lobster fishing by nets, and made other restrictions on keeping juvenile and female lobsters.

The GovOman has closed entry of additional foreign fishing vessels to Omani waters.

Restrictions on lobster fishing are being only partially enforced: one wali has informally allowed net fishing, and buyers continue to purchase berried females and juveniles.

Conclusions:

The team supports GovOman restrictions on abalone, lobster, and commercial fishing. The team notes the need for uniform enforcement of lobster fishing and for a ban on the purchase of illegal lobsters by fishing companies.

Recommendations:

- that the DGF develop and expand its fisheries management role, including ensuring adequate enforcement through coordination with appropriate GovOman agencies.

- that the DGF develop a plan for creating the mechanisms needed for fisheries management: creating and enforcing regulations on seasons and total catch, and levying fines and penalties. The plan should show how Departments of DGF share data, information, and resources to develop fisheries regulations and policies; the role of the Department of Fisheries Affairs as prime agent in developing these regulations and policies; and the interaction of the Department with other GovOman agencies to ensure enforcement.

- that the DGF and JC consider a short term consultant to develop such a plan as the basis for further DGF-JC policy discussions.

- that the JC and DGF consider a long term advisor in fisheries management after this plan is developed and fully discussed and approved by the JC and MAF, probably by 1990 or later.

### III. The research program

#### 1. Findings: OSU workload and staffing

The research program advisors (OSU) are working to the best of their abilities given the administrative constraints, but their contribution is much less than it could be.

Dudley is Chief of Party (COP), chief scientist and in charge of large pelagic research, and advisor for MSFC management/administration to the Director of the MSFC.

Johnson is responsible for demersal and shellfish research programs, Oman's most important fisheries.

Hilderbrand is in charge of the food technology research program; DGF wants him to do product development from discards from commercial vessels.

DGF wants the OSU team to undertake a stock assessment in addition to the above work.

Conclusion: Each OSU advisor's work assignment is excessive and made more difficult by lack of staff and logistics support.

#### Recommendations:

- that DGF and the JC redefine the OSU team's responsibilities as follows:

- Dudley would be COP, chief scientist, and, with Dorr, would be responsible for the demersal fish research program.

- Johnson would be responsible only for the lobster and abalone research programs in the Southern Region and would be reassigned to Salalah.

- local MSFC staff would continue to monitor large and small pelagics through the data collection system now in place.

- the JC and DGF should add two new OSU team members: one technician for Johnson on the lobster/abalone program and one for Dudley and Dorr on the trawl fisheries program.

- the OSU team should provide an immediate resource assessment for lobster, abalone, and demersal species.

- the OSU team should develop a long-term resource assessment for these fisheries and provide recommendations for fisheries management.

- that responsibility for seafood technology program be transferred to or coordinated with SQU and be redesigned to include an extension/outreach component and be closely coordinated with the marketing program.



- that Hilderbrand's contract should not be renewed beyond its present termination (June, 1988) unless the food technology program is moved to SQU.

- that the JC fund Hilderbrand's position at SQU if the program is moved there.

## 2. Findings: MSFC management

Dudley does not have time to be management advisor to the Director of the MSFC and also complete his research and COP work.

Dudley and the Director do not know what the MSFC's annual budget is and have serious problems with obtaining adequate petty cash, vehicles, purchasing procedures for equipment, travel advances, car insurance, and access to telephones.

Selection of staff at the research assistant level is made outside of MSFC. For example, the last two research assistants placed in the MSFC were sent without notice to the MSFC for interviews. Although told they were "not needed," both were hired for the MSFC from outside the MSFC.

### Conclusions:

The director of the MSFC needs assistance in research administration other than Dudley. The MSFC needs an established and known annual budget and reporting of expenditures throughout the fiscal year. The MSFC needs a system for selecting and hiring staff that ensures their obtaining qualified staff.

Recommendation: - that the JC and DGF hire a U.S. or expatriate executive officer and implement recommendations under II. 1 of this section on DGF Management and project implementation.

## 3. Finding: Role of the MSFC

DGF and OSU seem unclear on the basic role of the MSFC, whether it is pure research or problem-oriented in support of specific needs for either public policy (fisheries management) or private sector support.

Conclusion: The team believes the MSFC's proper role should be problem-oriented.

Recommendation: - that the JC and DGF should make this role explicit and change the research assignments of the OSU team as recommended elsewhere in this report.

## 4. Findings and Conclusions: Other research

Mrs. Prabhakar is working for Dudley on large pelagic market sampling and is capable of monitoring a sampling program. Thangaraja's work on ichthyoplankton is well focused and

appropriate. The oceanographic work is appropriate, but the methodology uses older methods.

Recommendations:

- that Mrs. Prabhakar manage the monitoring of large and small pelagics sampling program (see Section I of these recommendations) for the biological data base.

- that the oceanographic work begin to use more modern methods, e.g., computer-based graphics and satellite generated oceanographic data; that a continuing basic oceanographic data collection and analysis system be established in collaboration with SQU.

5. Findings: The aquarium

The OSU advisor is making full use of existing resources, but is constrained by administrative problems and lack of logistical support. The advisor is beginning to bring school groups and other groups (e.g., the military) through the aquarium.

Conclusion: The aquarium is well managed and the advisor's plans for a public education program are sound.

Recommendation: - that the JC and MSFC approach MOEY to establish an ongoing program of visits by Omani school children to the aquarium as part of their general education and to encourage Omani children to choose fisheries as a career.

6. Findings and Conclusions: MSFC library

The OSU librarian is working well; his problems are administrative, in particular access to petty cash. He has only one Omani staff member who is now on leave. The advisor does not know and cannot find out how much the library's annual budget is. The role of the library has not been made clear, whether it is intended solely for in-house researchers or whether it should be open to a wider audience.

Recommendations:

- that the JC and DGF strive to overcome petty cash and other administrative problems.

- that the JC and DGF clarify the role of the library and establish a link between it and the SQU library.

7. Finding: Vessels

The DGF is interested in adding large vessel capability through leasing or purchase of a multipurpose vessel. DGF has not worked out the costs of vessel operation, leasing, nor detailed, specific vessel requirements. A small research vessel

is now available for joint use with the MSFC, and SQU is purchasing another medium-sized research and training vessel.

Recommendations:

- that the MSFC, SQU and the DGF collaborate on a detailed five-year plan of vessel needs and usage that will match research needs and staff capabilities to analyze and interpret data.

- that vessel needs be established based on this plan.

- that DGF and the JC investigate the use of Korean vessels or Oman National Fishing Company vessels for research purposes on a short-term, limited, and task-oriented basis to supplement capabilities of existing DGF vessels.

8. Findings and Conclusions: Long-term status of the MSFC

The MSFC needs to retain its problem-oriented character permanently as a staff office for marine resource advice for DGF.

Recommendation: - that the MSFC become a staff, rather than line, office in DGF and be delegated authority for budget planning and expenditures, staffing and logistics. The MSFC would submit a research plan and operational budget once a year to DGF for approval. The plan and budget would be reviewed along with a report on the prior year's operation and then be approved with modifications as appropriate. The MSFC should also prepare a long-term research plan for period review.

fisherman and engineer have been added to the RDA staff to operate this vessel. No onshore facilities are currently available to support the operation of the vessel.

Conclusion: The introduction of improved fishing methods and equipment will greatly expand the activities of the program and has the potential of making a significant contribution to modernizing traditional fisheries.

Recommendation: that DGF identify or provide onshore facilities including dock space, workshop and storage areas to facilitate operations and minimize operational delays.

4. Findings: Extension of RDA staff

The Extension Specialist is now scheduled to complete his assignment in March 1988, and contracts for the master fisherman and engineer will expire in June 1988.

Conclusions:

The early withdrawal of the Extension Specialist would seriously cripple the activities of the program. These services must be continued if the objectives of the program are to be attained. The short assignments of the master fisherman and engineer are insufficient to carry out the work planned for the vessel.

Recommendation: - that the contract of an Extension Specialist be extended to June 30, 1990, and the current assignments of the master fisherman and engineer be extended for at least one year.

#### IV. The Extension Program

##### 1. Findings: Regional Training Centers

Plans for constructing regional training centers have been dropped because of budget constraints. The use of agriculture extension training facilities is being considered as an alternative.

Conclusion: The need for strategically located facilities to train fishermen in the field is essential for an effective extension program. A better alternative would be the cold storage complexes and/or workshops located in fishing communities.

Recommendation: - that though most cold storage complexes and workshops are or will be leased to the private sector, GovOman consider a provision in the lease to allow a part of these facilities to be used periodically for fishermen training. Since much of the training would benefit both fishermen and fishing companies, lessees would probably be agreeable to such an arrangement.

##### 2. Findings: Extension organization

Only two agents in the extension program are qualified and contribute significantly to the activities of the program. Present staffing does not include field agents. Three trained staff members will return from the U.S. in June, 1988. Program activities are adversely affected by lack of DGF vehicles and difficulties in making local purchases for supplies and equipment.

Conclusion: The extension unit is currently understaffed, but the situation should be somewhat alleviated upon the return of the staff from the U.S. An effective extension program should include field agents as well as a core group in the Capital Region.

##### Recommendations:

- that staffing include at least five qualified agents located in the Capital Region who will plan and implement field training and demonstration, and six field agents stationed at strategically located regional centers to carry out the day-to-day work assigned by DGF.

- that the JC and DGF alleviate the transport problem and simplify the procedure for purchasing equipment and supplies.

##### 3. Findings: Introduction of improved fishing gear and methods

The project has recently obtained a 43' diesel-powered multipurpose fishing vessel. A well qualified U.S. master

## V. The Statistics Program

### 1. Findings: Program design and implementation

The program is correctly designed and is making an important contribution to the development of fisheries in Oman. Data collection plans and checking/verification plans are adequate. Field sampling has been reduced greatly because only one of the eight vehicles assigned to statistical agents is functional. The work performance of field agents varies from good to poor.

#### Conclusions:

Samplers are not collecting data because they cannot travel, and the program's progress to date is in jeopardy.

Statistical agents need continual training and motivation to upgrade the quality of data being collected. Agents need closer supervision and spot checks as well as ongoing feedback regarding the quality of data they provide.

#### Recommendations:

- that adequate vehicles be made available to samplers immediately so that full-scale data collection can be recommenced.
- that the Statistical Program be continued at its present level with progressive increases in the role and responsibilities of the Omani staff.
- that the senior RDA statistician position be extended for the life of the project and the second statistician position be extended for one year.
- that samplers be given further training to increase their level of motivation and to improve the usefulness of data collected. Field supervision of sampling and verification of data quality should be increased.

### 2. Findings: Use of data

Statistical data are not being provided to the MSFC and to the public and private sectors of the fishing industry in a timely fashion. The MSFC is not utilizing data collected through the Statistical Program nor interacting with statistical staff to ensure that required data are being collected for purposes of stock assessment of various species.

#### Conclusions:

Statistical data can be one of several important sources of information for stock assessment of commercially harvested species. Statistical data provided to the fishing industry can be an important source of information influencing planning, operating and investment decisions.

Recommendations:

- that statistics program staff work closely with the MSFC to ensure that statistical data collected are of maximum usefulness for long-term stock assessment.

- that statistical data be compiled quarterly and annually and distributed freely to all public and private sectors of the fishing industry.

3. Finding: Boat counts

A survey of all fishing vessels on the coast of Oman was made in early 1985 using helicopter flights and video recorders. These data are an integral component of basic statistical information on the fishing industry.

Conclusion: On the basis of the rapid development and evaluation of the fishing industry, a frequent re-survey of the coast is required and should be considered an essential part of the statistical data.

Recommendation: that surveys of the total coast by air to estimate total numbers of fishing vessels be conducted at three-year intervals. The next survey should be conducted in early 1988.

## VI. The Observer Program

### Findings:

Observers in the present program are not allowed by the commercial ship's captain on deck to sample the catch nor onto the ship's bridge to read the instruments. Observers gather their data solely by copying the ship's log. Observers have minimal education and no on-shore training. Until recently observers were not civil servants, were paid only when on board ship, and receive no benefits for sea duty. DGF policy sees the observers as part of an enforcement program.

### Conclusions:

Unless observers collect data first hand on deck and on the bridge, the data are so suspect as to be useless. Observers must have a basic minimum of education, adequate on-shore training and reasonable working conditions and benefits.

### Recommendations:

- that the JC and DGF redesign the observer program as a biological data collection program, ensure that samplers can take samples of the catch on deck as the catch comes on board, and ensure that samplers have access to the bridge.
- that the newly designed program be assigned to the demersals program at the MSFC as the most likely user of data from the program and to ensure the program's complete divorce from any enforcement program.
- that the samplers receive on-shore training and routine monitoring under an OSU technician (recommended in the Research Section).
- that the GovOman determine how it wishes to handle enforcement separate from this program.
- that the JC fund the OSU technician for the newly designed program, but provide no U.S. technical assistance to the present observer program.



## VII. The Marketing Program

### 1. Findings and conclusions: Marketing and extension

There is no link nor institutional relationship between the marketing and extension programs. The RDA workplan for the marketing program is confusingly written and presented. There is no full time Director or Assistant Director, and the members of DGF staff for the program have fallen very short of expectations.

The climate is very conducive to drying fish; present techniques for drying sardines on the beach as cattle fodder result in cattle ingesting harmful quantities of sand; DGF has taken no action on RDA's proposal for a pilot test of sardine drying.

#### Recommendations:

- that DGF, RDA and the JC rethink the marketing workplan to re-establish priorities in light of the shortage of DGF staff and dim prospects for increasing this staff size and competence in the near future.

- that DGF ensure a close working relationship between the extension and marketing programs, in particular for fish handling and preservation, especially in remote areas; e.g., the use of ice on board boats and use of simple techniques of smoking, salting and drying fish.

- that DGF and the JC ensure a close link between the SQU food technology program and the marketing program to maximize new product development (see separate recommendations on this subject).

- that the DGF give high priority to pilot testing for new product development for both currently utilized and underutilized species with value added potential.

### 2. Findings and Conclusions: Survey of remote areas

Remote landing sites are still not covered by the statistics program. The project does not know whether fishermen in these areas can market their fish or whether they are landing high value fish with good market potential. The near-term prospects for expanding the statistics program into these areas are dim.

#### Recommendation:

- that the project undertake a field survey of these areas to determine whether fishermen have sufficient market for their catch and determine the main types of fish being caught, in particular to determine if higher value fish are being caught.

### 3. Findings: Market study

Data on exports to the Gulf and the region are questionable. Markets in the Gulf can probably absorb more of Oman's fish, and international markets beyond the Gulf certainly can. Quantities, species, products, and quality standards for these markets are unknown.

#### Recommendation:

- that the DGF and JC undertake a study or studies to determine market demand for fish and fish products. First priority is the Gulf (including Kuwait and Jordan) for both land and air transport. Second priority is world markets (U.S., Europe, Japan, Singapore). Studies should be species-specific and should focus on abundant, underutilized species. Studies should also look for species and fish products that maximize value added potential. The results of these studies would be disseminated to the Omani private sector.

### 4. Findings: Market outreach

The present KDA marketing consultant is well qualified to help the Omani fish marketing industry with quality control, etc. The skills needed for assisting industry come from experience in industry, not through formal education or training programs.

#### Conclusions:

The short-term prospects for developing a cadre of Omanis in DGF to assist Omani industry are dim since Omani industry is relatively young. Providing public sector services to industry, complemented by research assistance from universities, is a reasonable goal for the GovOman; the U.S. among other countries follows the same pattern.

Recommendation: - that DGF as a long-term objective develop an outreach program for industry as part of DGF's marketing program to improve quality, stimulate product development and distribution, and help identify and meet market needs.

## VIII. The Southern Region

### 1. Findings: Workplan

The Southern Region lacks its own workplan for fisheries. Its programs are treated as adjuncts to the programs in the north. The circumstances of fish, fishing, and fisheries differ between the north and south.

Recommendation: - that the JC and the Directorate of Fisheries for the Southern Region, in collaboration with DGF, prepare a plan for fisheries development in the Southern Region. The plan should show how DGF programs will be modified and implemented to meet the particular needs of the Southern Region.

### 2. Findings: Management study

The administrative relationships and the responsibilities for budget control between DGF and the Southern Region are unclear. A number of the problems of the Southern Region's fisheries program are traceable to this lack of clarity, e.g., data collectors in the South have not been paid per diem for field travel for six months because of problems over which budget these costs should be paid from.

Recommendation: - that DGF and the JC sponsor a management study of the roles, responsibilities, and relationships between the Director General of Agriculture and Fisheries (DG/AF) for the Southern Region (and the Director of Fisheries) and the DGF.

## Annex 5: Recommendations

### I. Training and institution building

#### 1. Training needs

- that the project expand the training plan to cover all DGF and MSFC training needs.

- that the JC and DGF make a major commitment to training over the next five to ten years.

#### 2. Need for program management/administrative training

- that, in the framework of fisheries management/development training listed in the training plan, the Director of the MSFC be sent for three months on-the-job training (OJT) with the Director of a U.S.G. fisheries research facility.

- that the training program for the Assistant Director of the MSFC, now at URI, be extended by three months to permit him the same OJT opportunity.

#### 3. Calibre of training for Omanis in the U.S.

- that the JC and DGF, through the Training Committee, ask MOEY to instruct the Omani Embassy in Washington, D.C. to transfer Omani students into first rank U.S. fisheries programs.

#### 4. Arab world training

- that the JC look closely at Arab world training before committing funds to it. Such a review should include the views of an education/training specialist and a fisheries specialist.

- that JC and DGF continue fisheries science training at URI.

- that the whole group of trainees slated to go to URI in academic year 1988-1989, be sent to begin studies in September 1988 without waiting for an inquiry into Arab world training.

#### 5. Cooperation between MSFC and Sultan Qaboos University (SQU)

- that the JC and DGF pursue signing a tripartite agreement among DGF, the MSFC and SQU for cooperation on resource surveys and use of research vessels, an Omani Cooperative Oceanic Fisheries Investigations Agreement, to include cooperative research among MSFC and SQU faculty, work study opportunities for SQU students at the MSFC, informal seminars.

- that OSU staff be named adjunct faculty at the university.

6. Food technology program: - that a single food technology program be established at SQU using the present MSFC advisor, with adequate operational budget.

7. Extension training: - that this training be redesigned, recosted, and rebudgeted as a training component of the extension program.

## II. DGF management and project implementation

### 1. Budget planning and expenditures

- that the project accountant be replaced, that he prepare quarterly budgets and expenditure tables for each program for the directors, and that directors prepare quarterly disbursements in line with these planned disbursements.

### 2. Project vehicles

- that this system for requesting vehicles be streamlined to allow more efficient access by DGF and consultant staff while ensuring appropriate monitoring.

- that full insurance coverage be provided.

- that restrictions on DGF vehicles being in the field be loosened selectively for data collection staff, among others.

- that the advisors' Tercels be replaced by field vehicles and insurance coverage and operations and maintenance funds be provided by DGF or JC.

3. Overly broad budget cuts: - that DGF rethink these cuts and approve limited restoration of phone service, insurance, and vehicle use to permit project implementation to proceed smoothly.

### 4. Petty cash

- that this system be streamlined to allow more rapid turnaround and that the JC consider establishing a petty cash and operational fund within the RDA and OSU contracts to facilitate advisors' work.

- that the JC provide funding in the RDA and OSU contracts for limited quantities of a wide range of supplies, equipment and services (such as translation) to be managed by the respective Chiefs of Party.

### 5. Equipment procurement

- that the directorates, in particular technical staff and technical advisors, be granted final authority on technical specifications, subject only to policy level review. Senior DG and Ministry staff should determine overall budget figures for equipment purchases within which directorates can make technical decisions.

### 6. Circulation RDA reports

- that DGF review its procedures for reviewing these reports and adopt measures to ensure more rapid approval and circulation.

- that RDA and the JC review the format of these reports to ensure that their major findings and recommendations are presented in a readily readable format.

### 7. Fisheries Management

- that the DGF develop and expand its fisheries management role, including ensuring adequate enforcement through coordination with appropriate GovOman agencies.

- that the DGF develop a plan for creating the mechanisms needed for fisheries management: creating and enforcing regulations on seasons and total catch, and levying fines and penalties. The plan should show how Departments of DGF share data, information, and resources to develop fisheries regulations and policies; the role of the Department of Fisheries Affairs as prime agent in developing these regulations and policies; and the interaction of the Department with other GovOman agencies to ensure enforcement.

- that the DGF and JC consider a short term consultant to develop such a plan as the basis for further DGF-JC policy discussions.

- that the JC and DGF consider a long term advisor in fisheries management after this plan is developed and fully discussed and approved by the JC and MAF, probably by 1990 or later.

### III. The research program

#### 1. OSU workload and staffing

- that DGF and the JC redefine the OSU team's responsibilities as follows:

- Dudley would be COP, chief scientist, and, with Dorr, would be responsible for the demersal fish research program.

- Johnson would be responsible only for the lobster and abalone research programs in the Southern Region and would probably be reassigned to Salalah.

- local MSFC staff would continue to monitor large and small pelagics through the data collection system now in place.

- the JC and DGF should add two new OSU team members: one technician for Johnson on the lobster/abalone program and one for Dudley and Dorr on the trawl fisheries program.

- the OSU team should provide an immediate resource assessment for lobster, abalone, and demersal species.

- the OSU team should develop a long-term resource assessment for these fisheries and provide recommendations for fisheries management.

- that responsibility for seafood technology program be transferred or coordinated with SQU and be redesigned to include an extension/outreach component and be closely coordinated with the marketing program.

- that Hilderbrand's contract should not be renewed beyond its present termination (June 1988) unless the food technology program is moved to SQU.

- that the JC fund Hilderbrand's position at SQU if the program is moved there.

## 2. MSFC management

- that the JC and DGF hire a U.S. or expatriate executive officer and implement recommendations under II. 1 of this section on DGF Management and project implementation.

## 3. Finding: Role of the MSFC

- that the JC and DGF make the MSFC's role in undertaking problem-oriented rather than pure research explicit and change the research assignments of the OSU team as recommended elsewhere in this report.

## 4. Other research

- that Mrs. Prabhakar manage the monitoring of large and small pelagics sampling program (see Section I of these recommendations) for the biological data base.

- that the oceanographic work begin to use more modern methods, e.g., satellite generated oceanographic data, and establish a continuing basic oceanographic data collection and analysis system in collaboration with SQU.

5. The aquarium: - that the JC and MSFC approach MOEY to establish an ongoing program of Omani school children to the aquarium as general education and to encourage Omanis to choose fisheries as a career.

6. MSFC library: - that the JC and DGF strive to overcome petty cash and other administrative problems.

- that the JC and DGF clarify the role of the library and establish link between it and the SQU library.

## 7. Vessels

- that a specific, detailed plan of vessel needs for all national research, demonstration and training needs be prepared, with the cooperation of the MSFC, SQU and the DGF.

- that vessel needs be established based on this plan.

- that use of commercial vessels be considered as a primary source of specific data and observations to meet the requirements of the plan.

## 8. Long-term status of the MSFC

- that the MSFC become a staff, rather than line, office in DGF and be delegated authority for budget planning and expenditures, staffing and logistics. The MSFC would submit a research plan and operational budget once a year to DGF for approval. The plan and budget would be reviewed along with a report on the prior year's operation and then be approved with modifications as appropriate. The MSFC should also prepare a long-term plan for period review.

## IV. The Extension Program

### 1. Regional training centers

- that though most cold storage complexes and workshops are or will be leased to the private sector, GovOMAN consider a provision in the lease to allow a part of these facilities to be used periodically for fishermen training. Since much of the training would benefit both fishermen and fishing companies, lessees would be agreeable to such an arrangement.

### 2. Extension organization

- that staffing include at least five qualified agents located in the Capital who will plan and implement field training and demonstrations and six field agents stationed at strategic fishing centers to carry out the day-to-day work assigned by DGF.

- that the JC alleviate the transport problem and simplify the procedure for purchasing equipment and supplies.

3. Introduction of improved fishing gear and methods: - that DGF identify or provide on-shore facilities including dock space, workshop and storage areas to facilitate operations and minimize operational delays.

### 4. Extension of RDA staff:

- that the contract of the Extension Specialist be extended to June 30, 1990, and that the current assignments of the master fisherman and engineer be extended for at least one year.

## V. The Statistical Program

### 1. Program design and implementation

- that the Statistical Program be continued at its present level with progressive increases in the role and responsibilities of the Omani staff.

- that the senior RDA statistician position be extended for the life of the project and the second statistician be extended for one year.



- that adequate vehicles be made available to samplers immediately so that full-scale data collection can be recommended.

- that samplers be given further training to increase their level of motivation and to improve the usefulness of data collected should be continued. Field supervision of sampling and verification of data quality should be increased.

## 2. Use of data

- that statistics program staff work closely with the MSFC to ensure that statistical data collected are of maximum usefulness for long-term stock assessment.

- that statistical data be compiled quarterly and annually and distributed freely to all interested persons in the public and private sectors of the fishing industry.

## 3. Boat counts

- that surveys of the total coast by air to estimate total numbers of fishing vessels be conducted at three-year intervals. The next survey should be conducted in early 1988.

## VI. The Observer Program

- that the JC and DGF redesign the observer program as a biological data collection program, ensure that samplers can take samples of the catch on deck as the catch comes on board, and ensure that samplers have access to the bridge.

- that the newly designed program be assigned to the demersals program at the MSFC as the most likely user of data from the observer program and to ensure the program's complete divorce from any enforcement program.

- that the samplers receive on-shore training and routine monitoring under an OSU technician (recommended in the Research Section).

- that the GovOman determine how it wishes to handle enforcement separate from this program.

- that the JC fund the OSU technician for the newly designed program, but provide no U.S. technical assistance to the present observer program.

## VII. The Marketing Program

### 1. Marketing and extension

- that DGF, RDA and the JC rethink the marketing workplan to re-establish priorities in light of the shortage of DGF staff and dim prospects for increasing this staff size and competence in the near future.

- that DGF ensure a close working relationship between the extension and marketing programs, in particular for fish handling and preservation, especially in remote areas; e.g., the use of ice on board boats and use of simple techniques of smoking, salting and drying fish.

- that DGF and the JC ensure a close link between the SQU food technology program (see separate recommendations on this subject) and the marketing program to maximize new product development.

- that the DGF give high priority to pilot testing for new product development for both currently utilized and underutilized species with value added potential.

2. Survey of remote areas: - that the project undertake a field survey of these areas to determine whether fishermen have sufficient market for their catch and determine the main types of fish being caught, in particular to determine if higher value fish are being caught.

3. Market study: - that the DGF and JC undertake a study or studies to determine market demand for fish and fish products. First priority is the Gulf (including Kuwait and Jordan) for both land and air transport. Second priority is world markets (U.S., Europe, Japan, Singapore). Studies should be species-specific and should focus on abundant, underutilized species. Studies should also look for species and fish products that maximize value added potential. The results of these studies would be disseminated to the Omani private sector.

4. Market outreach: - that DGF as a long-term objective develop an outreach program for industry as part of DGF's marketing program to improve quality, stimulate product development and distribution, and help identify and meet market needs.

#### VIII. The Southern Region

1. Work plan: - that the JC and the Directorate of Fisheries for the Southern Region, in collaboration with DGF, prepare a plan for fisheries development in the Southern Region. The plan should show how DGF programs will be modified and implemented to meet the particular needs of the Southern Region.

2. Management study: - that DGF and the JC sponsor a management study of the roles, responsibilities, and relationships between the Director General of Agriculture and Fisheries (DG/AF) for the Southern Region (and the Director of Fisheries) and the DGF.