AID = 52763

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: C (A = Add, C = Change, D = Delete) — Amendment Number: One — DOCUMENT CODE: 3

2. COUNTRY/ENTITY: Bureau for Science and Technology

3. PROJECT NUMBER: 936-4024

4. BUREAU/OFFICE: Office of Agriculture — 10

5. PROJECT TITLE (maximum 40 characters): Fisheries Development Support Services

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 92

7. ESTIMATED DATE OF OBLIGATION (Under "B." below, enter 1, 2, 3, or 4): A. Initial FY 82 — B. Quarter — C. Final FY 92

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. Total	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. Total
AID Appropriated Total	285		285	6,400		6,400
(Grant)	(285)	( )	(285)	(4,000)	( )	(4,000)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1. Missions, Regional				2,400 *		2,400 *
Other U.S. 2. Bureaus & AID/W						
Host Country						
Other Donor(s)						
TOTALS	285		285	6,400		6,400

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	C. PRIMARY TECH. CODE 2. Loan	D. OBLIGATIONS TO DATE 1. Grant	D. OBLIGATIONS TO DATE 2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	E. AMOUNT APPROVED THIS ACTION 2. Loan	F. LIFE OF PROJECT 1. Grant	F. LIFE OF PROJECT 2. Loan
(1) FN	1291	097		1,313		-0-		4,000	
(2)									
(3)									
(4)									
TOTALS				1,313		-0-		4,000	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 876 | 079 | 740 | 963 | 874 | 877

11. SECONDARY PURPOSE COD: 269

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	BRW	RDEW	TNG	TECH	NUTR	XII	
B. Amount	1,500	1,800	1,600	3,250	4,500	6,400	

13. PROJECT PURPOSE (maximum 480 characters)

To: assist LDCs improve their capabilities to develop programs designed to: 1) increase employment and income in the fisheries sector; 2) decrease post harvest losses and increase utilization of high quality animal protein by the poor, majority; 3) use rational management strategies to conserve national resources and optimize sustained yields; and 4) increase foreign exchange earnings from fisheries products.

14. SCHEDULED EVALUATIONS: Interim MM 12 YY 88 — MM 06 YY 91 — Final MM 09 YY 92

15. SOURCE/ORIGIN OF GOODS AND SERVICES: ☒ 000 ☐ 941 ☐ Local ☐ Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of 1 page PP Amendment)

The purpose of this amendment is to: extend the project assistance completion date to September 30, 1992 and the final year of obligation to FY 1992; 2) add a new scope of work and budget for the last five years of the project; and 3) include up to $2,400,000 of additional mission, regional bureau and other AID/W funds to be obligated by delivery orders issued against a companion basic ordering agreement.

*Funds to be contributed by missions, regional bureaus, and other AID/W offices under seperate project authorizations.

17. APPROVED BY — Signature: Dr. Duane Acker — Title: Agency Director for S&T/FA — Date Signed: MM DD YY 5 30 87

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1350-4 (8-79)

PROJECT AUTHORIZATION

ENTITY : Bureau for Science and Technology

PROJECT TITLE : Fisheries Development Support Services

PROJECT NUMBER : 936-4024

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, the Fisheries Development Support Services project which is centrally funded was authorized on May 27, 1982. The authorization is hereby amended as follows:

   - The authorized project assistance completion date is extended to September 30, 1992;

   - The authorized final year of obligation is extended to FY 1992; and

   - Up to $2,400,000 of additional mission, regional bureau and other AID/W funds may be provided through contractual instruments during the next five years.

2. The authorization cited above remains in force except as hereby amended.

Duane Acker
Agency Director for Food and Agriculture
Bureau for Science and Technology

Date 5/28/87

Clearances:

S&T/AGR, D. Bathrick		Date 5-16-87
S&T/AGR, R. Neal		Date 5-11-87
S&T/AGR, T. Gill		Date 5-11-87
S&T/AGR, E. Roche		Date 5/20/87
S&T/PO, G. Gower		Date 5/27/87
GC, S. Tisa		Date 5-15-87

WANG 1470C:S&T/AGR/RNR:MMozynski:1/16/87:Revised 5/08/87

a

ACTION MEMORANDUM FOR THE AGENCY DIRECTOR FOR FOOD AND AGRICULTURE, BUREAU FOR SCIENCE AND TECHNOLOGY

FROM : S&T/AGR, David D. Bathrick MAY 20 1987

SUBJECT : Authorization amendment of the Fisheries Development Support Services project (936-4024) (Doc #000200)

Problem: Your approval is required to amend the Fisheries Development Support Services project to: 1) extend the authorized project assistance completion date (PACD) to September 30, 1992, and the final fiscal year of obligation to FY 1992; and 2) include up to $2,400,000 of additional mission, regional bureau, and other AID/W funds to be obligated by delivery orders issued against a companion basic ordering agreement (BOA).

Discussion: The project was originally authorized in FY 1982 for ten years to terminate June 30, 1992 with a life-of-project cost of $4,000,000. The project currently is being implemented through a cooperative agreement (CA) with the International Center for Marine Resource Development, University of Rhode Island (URI/ICMRD) which is scheduled to terminate on June 30, 1987. We plan to continue the project through a new five-year CA and companion BOA with URI/ICMRD, but we need to amend the original authorization and update project documentation in order to do so.

In the original project data sheet, the PACD is June 30, 1987, and the authorized final fiscal year of obligation date is FY 1991. In addition, the project design summary (logical framework), budget and scope of work covered only the first five years of the project and no provisions were made for mission, regional bureau, and other AID/W funds to be obligated through contractual delivery orders under a companion BOA. Since we obligated only $1.3 million for the first CA and have planned a five year budget of $1.3 million for the new CA, it is not necessary to increase the authorized life of project funding level.

Further, the Agriculture Sector Council discussed and verbally approved extension of this project at its meeting held on May 6, 1987.

This amendment will: 1) extend the PACD to September 30, 1992 and the final year of obligation to FY 1992; and 2) update the project paper by adding the scope of work, the logical framework, and budget for the last five years of the project to allow for a new five-year CA and a five-year BOA with URI/ICMRD.

b

Agency Policy: This project is highly consistent with the current Agency policy to: increase income among poor fishermen; foster food security objectives and stimulate economic growth in LDCs; increase food production without harming the natural resource base; increase the consumption of high quality animal protein - thus improving nutrition and decreasing hunger; make effective use of available natural resources; and strengthen national institutional capabilities through education, policy dialogue, and human resources development.

This project has the potential to increase foreign exchange earnings from the sale of fisheries products.

Justification to Congress: This action will not require a congressional notification as the project level shown in the FY 1987 CP is $300,000 and the current S&T/AGR OYB level is only $245,000; of which $128,000 has been added to the existing CA and $117,000 will be obligated under the new CA.

Project Evaluation: This project was evaluated on November 5 - 7, 1986 by a team of scientists, including AID regional bureau and LDC representatives who supported the project and strongly recommended that it be continued with URI/ICMRD as the implementing agent. Many success stories can be cited. For example in the Philippines, URI/ICMRD trained scientists are leading in-country programs for extension workers who are instrumental in reducing post harvest losses and improving the quality of fishery products. In Palawan and northern Luzon, fishermen using improved fishing techniques have decreased post harvest losses of fish substantially. This has increased the availability of fish, resulted in more disposable income, and increased the nutritional level of the fishermen's families.

In Ecuador, capture technology promoted by URI scientists has resulted in the previously unutilized "blue crab" species being harvested and exported. This new activity will bring additional earnings, including foreign exchange, and employment to the small-scale fishermen when fully developed. Although just beginning, the crab project is a good example of S&T/AGR, mission and host country cooperation in utilizing natural resources to develop a lucrative fish industry.

In Thailand, the Philippines, and Ecuador, URI/ICMRD scientists have trained faculty members on methods for analyzing fatty acid profiles in brine shrimp. This analysis has resulted in the use of new methods which have greatly reduced mortality and increased growth rates of these fish food organisms which are essential for successful mariculture programs.

The evaluation team reported that improved marine resource management and development techniques will increase: 1) food production and security; 2) the incomes of LDC fishermen; and 3) the foreign exchange earnings of the LDC governments involved in the program. The team further stated that URI/ICMRD is the appropriate U.S. institution to implement programs in this area, as it has a unique combination of highly trained marine scientists and the facilities to respond to the needs of the LDCs. The university is sensitive to: 1) human factors by virtue of its on-going research in socio-economics, and 2) the developmental methods needed for successful LDC programs by virtue of its background and years of experience working in the developing world. The facilities at the university are designed to support a program of basic and applied research, training, technology transfer, and networking. These activities are interdisciplinary and tied to strong academic courses at the URI. In addition, URI is expected to provide another $1,019,000 from its own resources to assure the success of the program during the next five years.

Method of Implementation: The CA and companion BOA will build on the foundation established between the Agency and URI since 1969 when the first 211(d) grant was made to advance the understanding and control of fishery management and development in LDCs. S&T/AGR has programmed $2,292,000 for core costs under a new CA, of which $1,273,000 or 56 percent will be contributed by S&T/AGR, and $1,019,000 or 44 percent by URI/ICMRD. Missions, regional bureaus, and other AID/W offices are expected to contribute up to $2,400,000 through delivery orders under the BOA.

The CA will assist the URI/ICMRD to: 1) strengthen its research capacity in marine science applicable to LDCs which was developed over the past two decades of cooperation with the Agency and other donors; 2) expand the level and range of its collaboration with U.S., LDC, regional and international institutions; 3) provide assistance for establishing and implementing salt water marine fisheries activities in the LDCs; and 4) provide marine science graduate and under graduate training at URI/ICMRD, and technical training at URI/ICMRD and in LDCs.

The delivery orders issued under the companion BOA will provide missions, regional bureaus and other AID/W offices with short, medium, and long-term technical advisory services for: 1) planning, designing and evaluating programs and projects concerned with marine fisheries; 2) identifying problems in the LDC fisheries sector and providing assistance to resolve them; 3) implementing in-country and regional training programs; and 4) testing research results in LDC environments. The practical

experiences and on-site information and insights gained from these activities will be fed directly back into URI/ICMRD's research, training programs, academic curricula, informational development activities and the applied research agenda developed and implemented under the CA. In addition, it is intended that the needs and opportunities for delivery orders will be identified by the cooperator in its work under the CA and proposed to S&T/AGR, regional bureaus and missions for approval and funding.

S&T/AGR has considered several other institutions to provide these services such as the Universities of Washington and Delaware, Texas A&M University, and Oregon State University. However, the programs at each of these institutions, while addressing certain specific aspects of small-scale marine fisheries, lack a comprehensive, multidisciplinary approach, specifically tailored to the broad range of conditions existing in LDCs. In addition, none of these universities has an appropriate combination of the following: 1) a broad marine fisheries program of basic and applied research applicable to LDC environments; 2) an operational computer data base covering artisanal fishing techniques, mariculture, basic seafood processing, fisheries economics, post harvest losses, socio-economics of small-scale fisheries, marketing of fishery products, and fisheries management techniques; and 3) an educational program specifically designed for training LDC students at under graduate, and post-graduate levels at URI, and at technical levels at URI and in LDCs.

In consideration of the above, and in accordance with the S&T Delegation of Authority dated December 18, 1981 to the Agency Directors regarding award of grants/CAs without consideration of other sources, I recommend that you determine that URI/ICMRD is the most appropriate entity to carry out a program in marine fisheries by signing the memorandum to M/SER/OP requesting that the CA be awarded to URI/ICMRD without competition (Attached as Tab 4). In addition, attached as Tab 5, is a memorandum to M/SER/OP requesting that the companion BOA, which must "feed back" data and related research and development information directly to the CA activities, be awarded to URI/ICMRD without competition and that the resultant delivery orders under the BOA need not be individually competed. We have consulted with M/SER/OP and expect this request will be approved.

Recommendation: That you indicate your approval to proceed with the new CA and companion BOA with URI/ICMRD by signing: 1) the revised Project Authorization Form (Tab 1) and Project Data Sheet (Tab 2); 2) memorandum to M/SER/OP requesting that the CA be negotiated with URI (Tab 6); and 3) the memorandum to M/SER/OP requesting that the BOA be awarded to URI/ICMRD without competition and that the individual delivery orders under the BOA need not be individually competed (Tab 7).

Attachments:

Tab 1	Project Authorization Form
Tab 2	Project Data Sheet
Tab 3	University of Rhode Island Proposal
Tab 4	External Evaluation Team Report
Tab 5	Updated Project Paper, including Logframe and Budget
Tab 6	Memorandum to M/SER/OP for Cooperative Agreement
Tab 7	Memorandum to M/SER/OP for Companion Basic Ordering Agreement

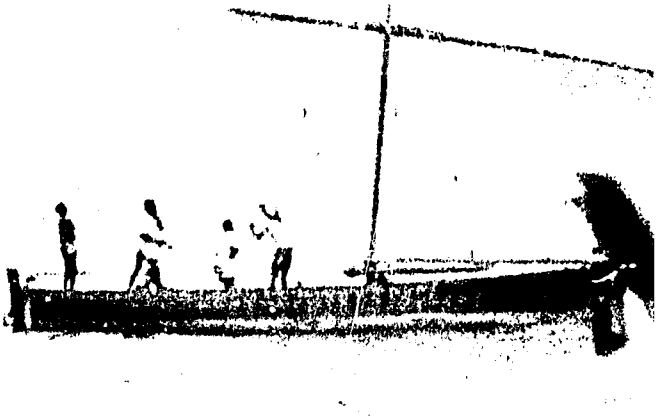
Clearances:

S&T/AGR, R. Neal	RAN	Date	5/17/87
S&T/AGR, T. Gill		Date	5/19/87
S&T/AGR, E. Roche		Date	5/20/87
S&T/PO, G. Gower		Date	5/27/87
GC, S. Tisa		Date	5/15/87

WANG 1470C:S&T/AGR:MMozynski:1/16/87:Revised 5/08/87

PROPOSAL FOR YEARS SIX - TEN
July 1, 1987 through June 30, 1992

U.S. AID COOPERATIVE AGREEMENT DAN 4024 A-00-2072
FISHERY DEVELOPMENT SUPPORT SERVICES
Project Office S&T/AGR/RNR
PROJECT NO.: 936-4024



ICMRD

INTERNATIONAL CENTER FOR MARINE RESOURCE DEVELOPMENT
126 WOODWARD HALL UNIVERSITY OF RHODE ISLAND
KINGSTON, RI 02881 USA

January 26, 1987

TABLE OF CONTENTS

		Page #
JUSTIFICATION AND CAPABILITY		1
SUMMARY OF IMPACTS: PHASE I		5
PURPOSE AND OBJECTIVES		6
INTRODUCTION		8
1. PLANNING AND PROGRAMMING OF FISHERIES DEVELOPMENT SUPPORT SERVICES		9
Output 1.1:	Administration of Cooperative Agreement Activities	9
Output 1.2:	International Training Component of Fisheries Development Support Services	12
	1.2a. Degree and Non-Degree Training	12
	1.2b. International Visitors	14
	1.2c. Seminar Series	15
	1.2d. Training Manuals	16
Output 1.3:	International Information Services Component of Fisheries Development Support Services	18
2. SOCIO-CULTURAL FACTORS: WORKPLANS AND MILESTONES		22
Output 2.1:	Analysis of the Role of Women in Fishing Societies	22
Output 2.2:	Factors Influencing Success of Fishermen's Organizations	23
Output 2.3:	Analysis of Traditional Behavior Patterns in Fishing Communities	24
Output 2.4:	Model of Interrelationships Between Socio-cultural Characteristics of Fishing Communities, Fishing Technologies and Techniques, and Aspects of the Marine Environment and Coastal Zone	25
Output 2.5:	Response Capability in Sociocultural Aspects of Fishery Development	27
3. FISHERIES MANAGEMENT: WORKPLANS AND MILESTONES		29
Output 3.1:	Management Policy Analysis	29
Output 3.2:	Market Analysis: Research on Domestic and International Markets for Mariculture	30

TABLE OF CONTENTS (CONT'D)

Output 3.3: Market Analysis for the Capture Sector 31
Output 3.4: Mathematical Programming Algorithms 32
Output 3.5: Utilization of Fish Bycatch of the Shrimp Fishery 33
Output 3.6: A Bioeconomic Management Model for Tropical Multispecies Fisheries 34

4. USE OF MARICULTURE IN DEVELOPING COUNTRIES 36

Output 4.1: Development of Artemia Production and Quality Control in Ecuador 36

4.1a. Work with Pond Systems 38

Output 4.2: Development of Artemia Production and Quality Control in Thailand 38
Output 4.3: Fundamental Studies on Artemia Quality 40
Output 4.4: International Study of Artemia Workshop . . . 41

5. POST-HARVEST FISHERY LOSSES: WORKPLANS AND MILESTONES . . 43

Output 5.1: Reduction of Postharvest Fishery Losses (PHFL) due to Spoilage and Contamination 43

Output 5.2: Processing Methods for Fishery Products . . . 44

Output 5.3: Products from Underutilized Species 46

Output 5.4: Development of Human Resources Training in Postharvest Fishery Losses 47

6. RESOURCE DEVELOPMENT AND UTILIZATION 50

Output 6.1: Investigation into the Feasibility of Developing of Swimming Crab Fishery in Ecuador 51

Output 6.2: Investigation into the Feasibility of Developing an Cultivation Fishery for the Mangrove Oyster crassostrea columfiensis in the Guayas Estuary, Ecuador 52

Output 6.3: Transferring of Appropriate Technology to Fishermen of Lesser Developed Countries to Increase the Productivity of their Fisheries . 54

Output 6.4: Preparation of Technical Fisheries Training Manuals 54

TABLE OF CONTENTS (CONT'D)

Fishery Development Support Services Proposed Budget Summary 56

Fishery Development Support Services Proposed Budget Years 6 - 10 57

Annual Projections by Person-Months 58

JUSTIFICATION AND CAPABILITY

Fishery development support services is a cooperative agreement between USAID and The University of Rhode Island's International Center for Marine Resource Development. This agreement provides a unique capability in fishery development in developing countries through applied and development research, technology transfer, training, networking and linkages.

LDC Needs:

Fisheries can play an important role as a low cost form of protein, a productive means of employment, and a potential source of foreign exchange for many developing countries throughout the world. While world catch is slowly approaching its peak due to present levels and methods of exploitation and ecological constraints, it is estimated that substantial increases are still possible under controlled conditions. Aquaculture has a tremendous potential, but significant shorter term increases are more practical through proper management of inland and coastal fisheries resources and improved post harvest utilization. It has been estimated that developing countries could increase their catches by approximately 25 million metric tons per year by harvesting resources near their shores at an optimal rate under proper management. Currently, over 10 million metric tons of fish (4 to 6, billion $ estimated value) are lost annually through spoilage or pest attack and this figure could be substantially reduced through the introduction of improved methods of post harvest storage, distribution, and processing.

The importance of fish protein in the diets of AID target groups is significant, but the role varies from region to region. FAO estimates that on the average about 60 percent of the population in the developing countries of much of the world derive more than 30 percent of its animal protein (excluding eggs and milk) from fish. This underestimates the importance of fish in Asia, parts of West Africa and many island countries where it is often an indispensable part of the diet. The importance of fish protein in the diets of rural poor is increased by the fact that fish products are generally available at a lower cost than other animal products. Fish may be one of the few protein sources affordable by the poorest population strata in developing countries.

Fisheries have an important employment impact on AID target groups. Much of the harvest taken by developing countries is caught by millions of small-scale fishermen and production increases would also benefit them. FAO estimates that the world fishery provides employment, both full- and part-time, for about 10 million fishermen with as many as 40 million more people engaged in associated activities such as processing and marketing. The greater part of this work force is associated with small-scale fisheries located in developing countries. These fishermen often represent the poorest groups in developing countries and, if dependents are taken into account, several hundred million people

in developing countries rely in a major way on fisheries for their livelihood.

Changes in the Law of the Sea related to extension of national jurisdiction to 200 miles has brought increased attention to the importance of fisheries and marine resources, particularly the role they can play in development. This emphasis is especially critical to small-scale fishermen who make up the bulk of the fisheries sector in many developing countries. If all coastal states extend jurisdiction to 200 miles, almost 99 per cent of all living marine resources harvested will come under national control. Small-scale fishermen can benefit from the introduction of fishery management measures designed to optimize production while protecting the resource. Before the onset of extended jurisdiction, foreign fishing fleets often exploited the fishery resources off the coasts of developing countries to the detriment of the small-scale fisheries, which depended on the same resources. Under extended jurisdiction, governments of developing countries can grant fishing rights in their waters in return for joint ventures, licensing fees, and technical assistance designed to improve national fishing capabilities. Regulations can be introduced by LDC government agencies limiting the catches of foreign fleets and creating special areas where only small-scale fishermen can fish, and these management regulations can promote sustained levels of harvest at optimal yields.

Greater attention to the role of fisheries resources in the development process can lead to greater efficiency in methods of post-harvest utilization. This can directly benefit small-scale fisherman by improving income through sale of higher quality catch and reducing loss due to spoilage.

Developing countries require assistance in all facets of fisheries development and management. Applied research and technology transfer in improved methods for fishery resource management, methods for using underutilized species, and methods for determining the social and cultural soundness of projects including impacts on women in fishing communities will assist in improving the quality of life in LDC fishing communities. Improved gear and boat designs can upgrade the fishing capabilities of the small-scale fishermen and improve his income through increased catches. Better methods of post-harvest utilization can help to reduce currently estimated losses of 10 million metric tons of fish and improve the final product. Improved mariculture methods can supplement capture fisheries. Finally greater attention to social and economic aspects of fisheries development can enhance the likelihood of project success.

URI Capability:

The University of Rhode Island has put together with AID's help an ability to respond to the needs of less developed countries in the area of marine fisheries. Interdisciplinary programs

incorporating resource economics, fishery biology, anthropolcgy and food technology and marine science in general provide the base for this capability. The project can also draw on the extensive basic and applied fisheries research that is carried out at URI. Numerous research projects in all areas of ocean related sciences including stock assessment, water quality, ocean engineering, coastal zone management, mariculture, fishery resource economics, food science applied to fisheries, and marine technology are carried out by URI scientists under funding from many different sources including industry as well as funding organizations such as Sea Grant and the National Science Foundation. The work of these scientists in both basic and applied research can be drawn upon and adapted to the LDC context. Equally important, is the structure of the Center, the Library Services, and the experience in both academic and technical training available at the Kingston and Bay campuses.

The history of USAID and URI cooperation since 1969 has led to a growing ability to meet the needs for assistance in fishery management and development in less developed countries. The building blocks of the present program: applied and development research, technolcgy transfer, training, and networking and linkages are interacting components including faculty, staff and facilities of the University. ICMRD has 26 Center Associates involved in working committees that cover the priority areas of applied and development research: Sociocultural factors, fisheries management, use of mariculture in developing countries, post-harvest fishery losses, and resource development and utilization. Resumes of these personnel can be found in ICMRD Center Associates: "Resumes of Working Groups which accompanies this proposal. In addition another fifty Center Associates participate in other ICMRD activities and are available if required.

The training component includes both formal degree programs at the undergraduate and graduate levels and an ability to provide specialized training programs for groups such as Peace Corps volunteers, fishermen, and fishery development specialists both at The University of Rhode Island and within country sites. The technical assistance portion draws on the interdisciplinary team from across the campus with a sensitivity to local conditions and situations. Assistance is provided in a range of levels from analysis of fisheries to design or repair of fishing gear. Technology transfer also includes an excellent library facility for providing information from a wide range of library sources through a microcomputer database, the products of which are made available at the request of less developed countries. The applied research capabilities are extremely broad and include fishery science, mariculture, anthropology, fishery resource economics, food technology, fishery gear design and testing.

A recent review of the URI Fisheries Development Support Services Cooperative Agreement by USAID and a Team of outside evaluators concluded:

> "The International Center for Marine Resource Development at The University of Rhode Island conducts an important program of training, assistance and applied research in marine resource development in less developed countries. The University has a unique combination of capabilities to advance this mission and is responsive to the needs and opportunities in fishery development. The components of training, technical assistance are organized into inter-disciplinary programs tied to strong academic programs. The program is sensitive to human factors and the context for development within developing countries. The facilities for information services, training, and applied research at URI are good ... Clearly this valuable capability should be maintained by the United States at The University of Rhode Island. We know of no group who could do it better; these unique capabilities are an important national resource for assistance in less developed countries. The need and potential benefits for marine resource management and development in less developed countries are great and The University of Rhode Island's program is the right place to do it."

FEEDBACK TO THE STATE OF RHODE ISLAND AND THE UNIVERSITY

The applied and development research conducted under the various components of this agreement will feed back to the University and State of Rhode Island in several ways. First, the applied research will have positive impact on course content in the areas of fishery development. Second, since Rhode Island has an important fishing industry, some of the findings can be adapted and applied to problems in development and change within fishing communities in the State.

SUMMARY OF IMPACTS: PHASE I

ICMRD, for the most part, has not been directly involved in the implementation of development projects. The involvement has been indirect and in the form of preparing fishery sector studies, conducting applied research which is subsequently transferred to LDC scientists and fishery personnel, providing expert consultations for LDC fishery personnel and projects, and operating formal training programs with the objective of improving the fishery to increase production, income of fishermen, foreign exchange, and the overall quality of life in LDC fishing communities.

Impacts can be identified in many areas. For example, trainings and consultations were provided for personnel at the Southeast Asian Fisheries Development Center (Philippines) concerning detailed biochemical analyses of feeds and water quality, all factors important in the culture of marine organisms. ICMRD mariculture specialists have helped develop and transfer appropriate techniques for identifying chlorinated hydrocarbons in water which adversely impact mariculture production. Additionally, they have trained and consulted with faculty from Thailand, the Philippines, and Ecuador concerning analysis of fatty acid profiles in brine shrimp. Fatty acid profiles of this important mariculture feed can greatly influence mortality and growth rates, hence directly influencing mariculture production.

Postharvest loss applied research has been input to training programs run for Bureau of Fisheries and Aquatic Research (BFAR) Training Division personnel from the Philippines. These personnel are now leading the in-country training of middle level and lower level personnel who are conducting extension work that is having positive impacts in fishing communities by reducing post-harvest losses and improving the quality of fishery products. Related to this is a fishery training project monitoring and evaluation program which was implemented by the Bureau of Fisheries and Aquatic Research in the Philippines. This program has resulted in a plan which not only uses adequate socioeconomic and fishing technology baseline data to select training projects, but monitors and evaluates the results of the training. The ICMRD social scientist who helped set up the program has participated in several follow-up evaluations to determine impacts of specific trainings. In both Palawan and northern Luzon, the post-evaluation of training of marine fishermen indicate that those involved in the training and/or adopting the technology have increased production, incomes, and household elaboration as indicated by a comparison of baseline and evaluation surveys.

Finally, concerning resource utilization, non-utilized species of a "blue crab" (Callinectes toxotes and C. arcuatus) and its distribution was identified in Ecuador. Capture technology was suggested by ICMRD personnel, and the crab is now being harvested, in part for limited export, bringing new earnings and employment to the small-scale fishermen.

PURPOSE AND OBJECTIVES

The overall purpose of the proposed project is to assist in improving the capabilities of LDCs to design development programs for the fishery Sector which will result in: 1) increasing employment; 2) increasing fish production and utilization through the use of rational management strategies which will conserve national fishery resources; 3) increasing income and efficiencies in the fishery sector; and 4) foreign exchange from fishery products. The capabilities of LDCs will be improved through selective use of applied and development research, technology transfer, training programs, and networking.

The objectives of proposed applied and development research programs are to: 1) improve methods for managing fish resources, including underutilized species in LDCs; 2) improve methods for reducing post harvest spoilage and contamination; 3) improve methods for processing, distributing, and marketing fish and fish products in LDCs; 4) improve methods for assisting LDC fishermen, processors, and wholesalers to use innovative methods in the industry; 5) determine factors that influence the success or failure of fishermen's cooperatives; 6) determine the role of women in fishing societies as related to changes in the fishery; 7) determine interrelationships between sociocultural characteristics of fishing communities, technologies and techniques and aspects of the marine environment and coastal zone; 8) develop models for mariculture systems in LDCs, including Artemia. The results of the applied and development research associated with each objective will be applied in at least one LDC.

Technology transfer will involve two major areas: Problem solving and transfer of information. Problem solving will consist of responding to requests for long, short and medium-term assistance for project design, assessment, feasibility studies, and evaluations in the areas of 1) factors influencing project success, 2) fisheries marketing and policies, 3) planning in fisheries development, 4) fishery sector studies, 5) developing fishermen's organizations, 6) utilization of fish by-catch, 7) mariculture of Artemia and other marine species, 8) development of quality control methods for Artemia, 9) improved fish handling and processing techniques. As a means for transferring information URI/ICMRD maintains a library/information services covering all topics related to fishery development in LDCs. This information service will provide assistance to LDCs concerning maintenance of marine information services and will disseminate ICMRD publications and research findings to LDCs and national and international institutions involved in fisheries development.

Another major objective of the proposal is to provide training activities which will have an impact on developing LDC fisheries. The specific objectives of the training component are to provide: 1) long-term training at undergraduate and graduate level for LDC scientists, 2) non-degree and short-term training both at URI and in LDCs in the areas of cooperative development, small scale

fisheries technology, project monitoring and evaluation, project development and management, instrumentation repair and maintenance, applications of microcomputers, post harvest losses, and marine information centers, 3) comprehensive training manuals where needed, 4) seminars and workshops, 5) a capability to assist Peace Corps staff in fisheries training, and 6) activities related to visitors involved in international fisheries development.

The final objective involves establishing and maintaining networks and linkages which will facilitate achievement of the other major objectives. ICMRD will continue existing networks and linkages, and new contacts will be made with international, national, and regional research centers and institutions. Specifically, at least one conference or international study group concerning Artemia will be held annually. In addition one annual workshop will be conducted on fresh fish preservation and reduction of post harvest losses. Publications and scientific journal articles will be produced, selectively collected and disseminated to LDCs and international organizations. Finally, URI will continue to establish formal memoranda of understanding with LDC institutions and governments.

Details concerning procedures to be used to achieve these objectives can be found in the following workplans.

INTRODUCTION

Under the terms of USAID Cooperative Agreement DAN 4024 A-00-2072, "Fishery Development Support Services," the International Center for Marine Resource Development provides a range of services including Applied and Developmental Research, Technology Transfer, Training, Networking and Linkages. These services address five principle fishery management and development problem areas identified as the following:

Socio-Cultural Factors
Fisheries Management
Use of Mariculture in Developing Countries
Post-Harvest Fishery Losses
Resource Development and Utilization

Descriptions of these problems, problem specifications and targeting, current status and prospects, desirable linkages and expected/intended results are detailed in an ICMRD publication.

The purpose of the following document is to detail a program of work to take place within each of the earlier defined five problem areas. It also describes the administrative, training, information and other program support activities which will take place under the new Cooperative Agreement. This workplan will be revised on an annual basis. The contact person at URI is

Donald E. McCreight, Associate Director
International Center for Marine Resource Development
The University of Rhode Island, Kingston, RI 02881-0804
Program Director for Cooperative Agreement DAN 4024 A-00-2072
Telephone: 401-792-2479
Telex: 6974611RI ICMRD

The services provided by this Cooperative Agreement are available to USAID Missions, Regional Bureaus and Science and Technology/Central Bureau under various cost sharing arrangements. Requests for services under the Cooperative Agreement are to be directed to Dr. Richard Neal, S&T/AGR/RNR, USAID Washington.

1. PLANNING AND PROGRAMMING OF FISHERIES DEVELOPMENT SUPPORT SERVICES

Output 1.1: Administration of Cooperative Agreement Activities

The Planning and Programming Committee will serve as the coordinating linkage for the new Fisheries Development Support Services Cooperative Agreement. The major purpose of the Committee is to ensure an interdisciplinary approach to the solving of priority fisheries development problems. Review of all materials produced for the Agreement is also a Committee responsibility. In-house evaluations or reviews are conducted by the Committee. The following work areas have representation on the Committee:

Administration
Training Services
Information Services
Socio-Cultural Factors
Fisheries Management
Use of Mariculture in Developing Countries
Post-Harvest Fisheries Losses
Resource Development and Utilization

Results to Date:

The Committee was reappointed in January 1986. Clerical, editing and word processing services, fiscal services, training support services, and information services are provided and administered by the International Center for Marine Resource Development (ICMRD) Office.

Task Analysis:

Activities/Tasks	*Funding Source	Selected Milestones	Target Dates Start	End
1. Identify five priority fisheries development problem areas	1,3	X	11/86	1/87
2. Establish and implement working committees	1,3		1/87	6/92
3. Prepare a composite of committees resumes and update on an annual basis	1,3	X	7/87 to 6/92	Annual
4. Prepare a report of the five priority area problem descriptions	1,3	XX	7/87	Annual to 6/92
a) Revise and distribute	1,3	XX	7/87	

Activities/Tasks	*Funding Source	Selected Milestones	Target Dates Start	End
5. Organize and implement a planning and programming committee; meet at least 6 times during each year.	1,3		7/87	6/92
6. Prepare Quarterly Fiscal Reports for project management purposes	1,3	X	4/87	1/87-92 4/87-92 7/87-92 to 10/87-91
7. Develop and maintain linkages with other USAID projects: Strengthening Grant Program (URI) Coastal Resources Management Cooperative Agreement, etc. (URI) Aquaculture Technology Development (Auburn University) CRSP Stock Assessment (Univ. of Maryland, Univ. of Washington and URI) Reproductive Studies of Milkfish (Oceanic Institute) CRSP Pond Dynamics (Oregon State Univ.) Other Mission projects	1,3		7/87	7/92
8. Prepare Annual Report of Cooperative Agreement Activities	1,3	X	7/87	2/88 2/89 2/90 2/91 2/92 8/92
9. Respond to and implement technical assistance requests from USAID Missions, Regional, and Central Bureau offices	1,3		7/87	7/92
10. Finalize and distribute trip reports of persons involved in international travel	1,3	X	7/87	Continuous to 7/92
11. Supervise all support services services providing input to to Cooperative Agreement activities	1,3		7/87	7/92
12. Conduct in-house review of ongoing Cooperative Agreement activities	1,3		7/87	7/92

	Activities/Tasks	*Funding Source	Selected Milestones	Target Dates Start	End
13.	Meet with S&T project on a quarterly basis	1,3		7/87	7/92
14.	Meet with Regional Bureau representatives and AID Mission personnel to discuss the Fisheries Development Support Services	1,3		7/87	7/92
15.	Prepare a composite report of 5-year work plans and revise on an annual basis	1,3	XX	1/87	11/87 11/88 11/89 11/90 11/91
16.	Develop Gantt chart to depict all activities, milestones and target dates	1,3	XX	7/87	Revise on Annual basis
17.	Develop 3-4 minute slide sets and scripts to depict each of the identified problem areas	1,3	XX	7/87	7/88
18.	Prepare audio/visual cassettes for each of the priority areas	1,3	XX	11/87	9/92

* Funding Source
1. Core Support from S&T/AGR
2. USAID Mission Support
3. URI/ICMRD Support
4. Other Support

Output 1.2: International Training Component of Fisheries Development Support Services

1.2a. Degree and Non-Degree Training

A princi component of ICMRD's comprehensive approach to providing tec ical marine fisheries assistance to developing countries is through an active degree and non-degree training center.

ICMRD develops and manages non-degree training programs for fisheries officials from throughout the developing world. The training is offered on an individualized request basis and is country as well as skill specific.

Students arriving for graduate-degree training are assisted with the admissions process and are closely monitored by ICMRD training staff.

ICMRD provides cross-cultural preparation and logistical support to all trainees. Training materials are developed in-house to meet the specific needs of each group, and training staff evaluate and monitor the program on an ongoing basis. After completion of the final evaluation recommendations are made to improve on future trainings.

ICMRD is a major player in the area of international marine fisheries training because of its ability to touch on virtually every marine discipline. Training programs have varied from the scientific (stock assessment) to the technical (instrumentation maintenance and repair).

Over the five year period ICMRD will oversee the training activities of thirty graduate students and will design and implement five short course training programs.

Short Course Offerings:

1. Information From The Harvest Sector
2. Microcomputer Application In Fisheries
3. Minimizing Post-Harvest Losses
4. Mariculture Utilization
5. Fisheries Technology

In-Country Training:

ICMRD is working on two fronts in the area of in-country training. The first is based on the philosophy that training conducted in the U.S. to be comprehensive should include an in-country component. The follow-up to the initial training is done by the original trainer after a lag period of two months, thus allowing the trainees to process their new skills. The trainer is able to gauge the effectiveness of the training and complete a thorough evaluation. Follow-up, in-country training has proven to be a highly effective method of reinforcing skills learned during the original training period.

In the second instance, especially with large groups, training conducted in-country is more cost effective. The cost of travel and per diem for each trainee is eliminated as well as the adjustment period required to acclimate oneself to a new environment. ICMRD feels that the same high standard of non-degree training performed at The University of Rhode Island can be maintained in any in-country component.

Task Analysis:

WORKSHOP AND TRAINING PROGRAMS

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Peace Corps Marine Fisheries in-country training Philipines (Peace Corps Funding)	4	X	2/87	5/87
2. Oman Technical Fisheries Training (AID Funding)	2		1/86	7/88
3. Information from The Harvest Sector Workshop (URI)	1,3		5/87 9/90	6/87 10/90
4. Microcomputer Applications in Marine Fisheries Section (AID Funding) Workshop (URI)	1,3		6/87 6/91	6/87 7/91
5. Minimizing Post Harvest Losses Workshop (USAID - URI Joint Sponsors)	1,3		6/87 6/90	7/87 7/90
6. Mariculture Utilization Workshop URI)	1,3		5/88	6/88
7. Fisheries Technology Workshop (URI)	1,3		5/89	6/89

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
8. Non-Degree Training Program Maniculture - 1 Participant - ESPOL			1/88	12/88
9. Degree Training Program Ocean Engineering Ph.D. 1 Participant - ESPOL	4		5/87	12/90
10. Post Harvest Fishery Losses (PHFL) In-Country Workshop (Latin America)	1,2	XX	2/88	2/88
11. (PHFL) In-Country Workshop (West Africa)	1,2		2/89	2/89
12. (PHFL) In-Country Workshop (Asian)	1,2		2/90	2/90
13. (PHFL) International Symposium	1,4		5/90	5/90
14. (PHFL) in-country workshop (new LDC)	1,2		2/91	2/91

1.2b. International Visitors

The University of Rhode Island's breadth of programs in the marine fisheries field attracts scholars and government officials from throughout the world. The University has a worldwide reputation for its comprehensive approach to problems in international fisheries and sits in the forefront of new developments in this field.

As host to marine fisheries experts sponsored directly by their governments or by other international agencies, the Center offers orientation sessions and organizes seminars on marine fisheries issues relevant to each visitor. Training staff serve as translators, technical assistants, and guides throughout the course of a visit. ICMRD administrative staff assist with coordination of logistics from airline scheduling to airport pickup.

University-to-university linkages begin with informal visits by international professors and administrators and on the basis of mutual interests are formalized by means of a Memorandum of Understanding. ICMRD has current Memorandums of Understanding with ESPOL in Ecuador, the University of the Philippines Visayas, The Institut Agronomique et Veterinaire Hassan II, Morocco, Kasetsart University, Thailand, The University of Sierra Leone/IMBO The

University of Puerto Rico, The University of Azores and the Shanghai Fisheries College. ICMRD will forge closer links and build upon present MOUs, as well as develop an increased network of sister universities and organizations.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Support service activities for 50 visitors per year	1,3		1987	1992
2. Signing of five Memorandums of Understanding	1,2,3		1987	1992

1.2c. Seminar Series

In order to keep the academic community abreast of current trends in international marine fisheries, ICMRD sponsors a series of seminars. The lecture series has also enabled ICMRD associates to report on an informal basis on projects undertaken with Cooperative Agreement funds.

In addition to the eight seminars presented by the Center, the International Fisheries Association, a college organization composed of undergraduate and graduate students interested in international marine fisheries, holds ten seminars a year. The organization is hosted and assisted by ICMRD.

Output:

The seminar series plays an important role in the dissemination of germane information in the marine fisheries sector. ICMRD will continue to sponsor the series and will enhance this effort by including the participation of well-known speakers from outside the Rhode Island Area.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. 8 seminars per year organized by ICMRD	1,3	XX	6/87 6/88 6/89	6/88 6/89 6/90
2. 10 seminars per year organized by International Fisheries Association supported by ICMRD	1,3	XX	6/90 6/91	6/91 6/92

1.2d: Training Manuals

To compliment the actual training programs, ICMRD has recognized the need to compile information into usable training manuals available for distribution to LDC's. To date, 5 training manuals are being prepared and 6 have been completed.

ICMRD will continue with the preparation of applicable training manuals. A minimum of 3 manuals will be completed during the 5 year period.

Task Analysis:

TRAINING MANUALS

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Completion of guide for socio-cultural information needs for developing cooperatives among small-scale fishermen (Socio-Cultural Factors Work Group)	1,3	XX	9/87	3/88
2. Seafood Preservation and Processing (PHFL)	1	XX		
English Version				9/87
Spanish Version				9/88
3. Methodology of Measuring Post Harvest Fishery Losses (PHFL)	1	XX	-	6/91
4. Innovative Seafood Processing (PHFL)	1	XX	-	4/92
5. Manual for the design, construction & Outfitting of a 14M fiberglass fishing vessel	1,3		-	12/89
6. Development of audiovisual cassette in a selected priority area, annually, for a total of five	1,3		7/87	12/89

CAPABILITIES OF TRAINING STAFF RELATED TO PEACE CORPS TRAINING

ICMRD has maintained a close working relationship with Peace Corps; many of the ICMRD core staff are ex-Peace Corps Volunteers with extensive experience in South America, Africa and Asia. This year marks the end of the 3 year contract signed between URI and Peace Corps for the Marine Fishery Training Program. ICMRD will submit a bid for the next contract based on past experience and success of the previous contract. The experience of the trainers and favorable past evaluations of the program should be recognized as indicators of ICMRD capabilities in performing this type of fisheries training.

In addition, ICMRD intends to expand on the current Peace Corps program and offer country - specific, in-country training as well as mid-term, in-country training.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. In-country Peace Corps Fishery Training Philipines	4	X	2/87	5/87

Output 1.3: International Information Services Component of Fisheries Development Support Services

Information Support Services

The ICMRD Information Service provides information support services to AID on issues of small-scale fisheries development in developing countries including brackishwater aquaculture. Over a decade old, it is the only library/information service in the United States devoted to the problems of artisanal fisheries development.

Primary users of the Information Service include ICMRD professors at work on AID development projects and AID offices in all countries. Other users of the collection include ICMRD trainees, both degree and non-degree, University of Rhode Island students preparing for internationally-oriented careers, subcontractors working on AID development projects in allied fields, artisanal fisheries researchers at other institutions, libraries and information services in developed and developing countries with research collections on artisanal fisheries, and non-governmental or United Nations agencies focusing on issues which impinge upon small-scale fisheries.

When possible, researchers are encouraged to visit the facilities which are open from 8:30 to 4:30, Monday through Friday. Other requests are filled by mail or other means of communication as appropriate. ICMRD Library materials are loaned to all users at home and abroad.

Due to the broad range of interests and countries included in ICMRD development programs, the Information Service's subject interests cover artisanal fishing techniques, mariculture, basic seafood processing, fisheries economics, post-harvest loss, socioeconomics of small-scale fishing, marketing of fishery products, and fisheries management issues.

Emphasis is placed upon acquiring "grey" literature not available through traditional book services with special consideration for AID's most disadvantaged target countries. At present, the collection consists of over 14,000 documents and reports with an average of 1,000 items being added each year.

Through arrangement with the University of Rhode Island Library, online searching facilities, interlibrary loan and extended research facilities are made available to AID through the ICMRD Information Service.

Policy for the operations of the ICMRD Information Service is set by the ICMRD Publications/Information Services Committee.

Activities:

A. Collection Development

For the years 1987 - 1992, the ICMRD Information Service will maintain a core collection of 14,000 items on small-scale fisheries issues and will add to it at the rate of 1,000 documents per year. Basic services to project and AID personnel will remain constant. 1000 ICMRD publications/research findings will be disseminated annually. (Output 2 Transfer Information)

B. Database Development

A database of materials available in the ICMRD library will be continued. Products of the database, printouts or data disks, will be disseminated to AID projects, AID missions and others working for the benefit of artisanal fishermen. Priorities for database development are on topics derived from the Working Groups subject interests. This is a departure from the previous workplan which should result in more specific outputs as noted below.

C. Recommended Readings

The Information Service Staff will work with priority area researchers to produce summaries of "recommended readings" on target topics. These summaries will highlight first priority literature for purchase by LDC scientists, managers or information center coordinators on topics of small-scale fishery development. They will be published through the ICMRD publications program. This is a new activity of the Information Service which will be produced in close coordination with the ICMRD Working Groups.

D. Networks and Linkages

The Information Service will continue to strengthen networks and linkages between its own and LDC fishery information services. Such activities will include: participation in international conferences emphasizing methods of efficient information transfer between fisheries information services in developing and developed countries; publication of articles, ICMRD documents or brochures detailing methods for the exchange of information; further consulting with AID DIU and FAO's Aquatic Science and Fisheries Information Service to facilitate machine-readable transfer of ICMRD's grey literature record to the AID and ASFIS databases. (Networking and Linkages)

E. LDC Marine Information Services

Development of incountry marine information services will continue as a priority area for the ICMRD Information Service. Advisory/consulting activities, regional training seminars, workshops or other educational activities for LDC information personnel charged with the development of marine information services will be included in project proposals and will be carried out subject to funding levels. The Information Service will also aid in the design and presentation of training activities either in Rhode Island or elsewhere which will help LDC scientists in ICMRD training programs learn to effectively access fisheries information.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
A. Collection Development	1			
Review needs with working group coordinators			2/87	2/87
Begin ordering of materials			ongoing task	
Report growth quarterly		X	3/87	1992
B. Database Development				
Postharvest losses (current holdings)	1	X	10/86	2/87
Review with coordinator			2/87	2/87
Additional acquisitions			4/87	6/87
Prioritize, review items			5/87	5/87
Add review comments to Post-harvest database			6/87	6/87
Refer to Publications Committee/Publish "Recommended Readings"		X	7/87	8/87
Socio-cultural aspects (current holdings)	1	X	2/87	9/87
Review with coordinator			3/87	3/87
Additional Acquisitions			4/87	8/87
Prioritize, review items			9/87	10/87
Refer to Publications Committee/Publish "Recommended Readings"		X	10/87	12/87
Fishery Technology (current holdings)	1	X	9/87	1/88
Review with coordinator			3/87	3/87
Additional Acquisitions			7/87	9/87
Prioritize, review items			1/88	2/88
Refer to Publications Committee/Publish "Recommended Readings"		X	2/88	4/88
Mariculture (current holdings)	1	X	2/88	6/88
Review with coordinator			3/87	3/87
Additional Acquisitions			4/87	1/88
Prioritize, review items			4/88	5/88
Refer to Publications Committee/Publish "Recommended Readings"		X	6/88	8/88

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
	Resource Management (current holdings)	1	X X	5/88	10/88
	Review with coordinat			3/87	3/87
	Additional Acquisitic.s			4/87	4/88
	Prioritize, review items			5/88	8/88
	Refer to Publications Committee/Publish "Recommended Readings"		X	9/88	12/88
	Printouts/Data Disks on selected topics/regions/ countries as required		X	ongoing	
	Guide to Building a Fisheries Data Base by P. Watkins-draft completed, to publications committee for review/publishing		X	6/86	6/87
C.	Recommended Readings	1			
	Postharvest Losses		X		8/87
	Socio-Cultural Aspects		X		12/87
	Fishery Technology		X		4/87
	Mariculture		X		8/88
	Resource Management		X		12/88
D.	Networking & Linkages	1			
	Review AID MICROIDIS program, write conclusions			2/87	3/87
	Acquire UNESCO CD/ISIS program evaluate			6/87	8/87
	Meet with AID DIU & ASFIS coordinator to discuss ICMRD DB interaction with ASFIS plan for software adjustments			4/87	4/87
E.	LDC Marine Information Services*				
	Investigate methods for furthering Guayaquil MARINFO network via AID Mission library, Quito, Ecuador			2/87	2/87
	FAO Manual on Marine Information Services - joint project with US AID - define and initiate.			1/87	7/87

*Activities in this category require additional funding from AID Missions or other sources.

2. SOCIO-CULTURAL FACTORS: WORKPLANS AND MILESTONES

Output 2.1: Analysis of the Role of Women in Fishing Societies

Most studies of fishing societies have focused on the males who conduct the actual harvesting activities in most societies. Nevertheless, it is important to understand the role of women in fishing societies. The woman frequently participates in decision making with her husband and can affect the outcome of a technological transfer project. Further, in many societies, women play important roles in the processing and marketing of fish. In some they play the role of capitalist, financing fishing operations. It is therefore important to obtain a clearer understanding of women's roles in the fishery in order to prepare projects which will not ignore an important half of the target population and potentially result in failure.

Results to Date:

The division of labor by sex was examined in a worldwide cross-cultural sample of 186 societies. The analysis concentrated on a comparison of activities performed by women in fishing and non-fishing societies. The results were published as Anthropology Working Paper #44, "The division of labor by sex in fishing societies" (by R. Pollnac, 1984). A further cross-cultural sample of 143 societies that depend on fishing for more than 30 percent of their subsistence has been coded. Preliminary field work has also been completed concerning the socio-cultural and nutritional aspects of the role of women in fishing communities in Sierra Leone.

Activities:

Further analysis is being conducted on the same sample of 186 societies and the sample of 143 fishing societies from around the world. This time the focus is on the sociocultural correlates of the participation of women in fishing activities. Computer analysis has been for the most part completed, and the write-up is in progress. Research suggested by this analysis will be proposed and conducted in an LDC context, preferably West Africa. The results of this research will then be applied in at least one LDC fishery development project.

Task Analysis:

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1.	Analysis of extended data sets on the role of women in fishing societies	1,3		1/87	8/87
2.	Preparation of major report on role of women in fishing societies	1,3	XX	8/87	12/87

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
3.	Prepare proposals for further research on role of women in fishing societies	3			
4.	Further field work on role of women in fishing societies (e.g. West Africa)	2		6/88	9/88
5.	Final report on division of labor by sex in fishing societies	2	XX	9/88	12/88
6.	Application of findings in LDC context	2	XX	1/90	5/90

Output 2.2: Factors Influencing Success of Fishermen's Organizations

Fishermen's organizations, such as cooperatives, are frequently included as a part of development programs among small-scale fishermen. For example, they form part of the recent AID projects in both Guinea Bissau and Djibouti. Many Peace Corps fishery projects also involve cooperatives (examples are too numerous to cite). Much research, however, has indicated that there are many more failures with respect to fishermen's cooperatives than successes (see research cited below in "Results to Date" section). The proposed work will provide information which will increase the chances of writing projects which will result in organizations which will succeed.

Results to Date:

Field studies have been conducted concerning fishermen's organizations in New England, Panama, Costa Rica, and the Azores. Results of these studies have been published in various places including (1) Panamanian Small Scale Fishermen: Society, Culture, and Change (R. Pollnac, Ed.) Marine Tech. Report No. 44. ICMRD, URI (1977); (2) Small Scale Fisheries in Central America (J. Sutinen & R. Pollnac, Eds.) ICMRD (1980); and (3) "Attitudes towards cooperation by small-scale fishermen in the Azores" (R. Pollnac & F. Carmo) in Anthropological Quarterly 53 (1980). Analyses of existing literature and research on fishermen's organizations have also been conducted and written-up in several publications including (1) Maritime Anthropology: Sociocultural analysis of small-scale fishermen's cooperatives" (J. Poggie) in Anthropological Quarterly 53 (1980); (2) Sociocultural aspects of developing small-scale fisheries (by R. Pollnac) World Bank Staff Working Paper No. 490 (1982); (3) "Social and cultural characteristics in small-scale fisheries development" (by R. Pollnac) in

Putting People First: Sociological Variables in Rural Development Projects (M. Cernea, Ed.) Oxford University Press (1985); and (4) Evaluating the Potential of Fishermen's Organizations in Developing Countries (Report prepared by R. Pollnac for UNFAO - in process of being edited for publication).

In 1986 research investigating factors influencing the success and failure of 48 fishermen's cooperatives along the coast of Ecuador was carried out, and a preliminary report on the findings has been written.

Activities:

Further analysis of the data collected in Ecuador will be conducted and a final report prepared reflecting the findings. These findings will be incorporated into the draft guide for sociocultural information needs for developing small-scale fishermen's cooperatives. The guide will then be applied and evaluated in an LDC fishery context.

Task Analysis:

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1.	Preparation of further papers and final report concerning factors influencing success of fishermen's cooperatives in Ecuador	1,3	X	1/87	9/87
2.	Completion of guide for socio-cultural information needs for developing cooperatives among small-scale fishermen	1,3	XX	9/87	3/88
3.	Application of guide and findings in LDC fishery	2	XX	1/89	5/89

Output 2.3: Analysis of Traditional Behavior Patterns in Fishing Communities

Most researchers will agree that fishing communities are somehow different from farming communities. A clear understanding of the interrelationships between aspects of both the marine environment and fishing technologies and the society and culture of fishermen will facilitate preparation of social impact statements which should accompany project proposals. This understanding will also facilitate development of fishery projects which are both socially and culturally sound.

Results to Date:

Literature was reviewed in 1976 resulting in Anthropology Working Paper #10, Continuity and Change in Marine Fishing Communities. Additionally, over the past 10 years 44 Anthropology Working papers and numerous journal articles and book chapters have been produced by members of the Sociocultural Factors Human Impediments group which have dealt with this subject. Further, since 1976 (the year AWP #10 was prepared) a continuous review of the literature and accumulation of both articles and data from field work has been in process.

In the past several years reviews of the literature and updating of data sets have continued. Two reports were prepared by Pollnac based on a partial analysis of this data: "Peoples of the sea and coastal zone: an anthropological perspective" (1986) and "Social and cultural characteristics of fishing peoples" (1986).

Activities:

The information compiled to date will be analyzed as a means of updating Anthropology Working Paper #10 resulting in a substantial publication which will increase our understanding of social and cultural aspects of small-scale fishing communities.

Task Analysis:

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1.	Continuing anaylsis and preparation of papers on traditioaal behavior patterns in fishing communities	1,3		1/87	5/88
2.	Preparation of final report (a major volume) on traditional behavior patterns in fishing communities	1,3	X	1/89	12/89

Output 2.4: Model of Interrelationships Between Sociocultural Characteristics of Fishing Communities, Fishing Technologies and Techniques, and Aspects of the Marine Environment and Coastal Zone

A model will be developed which can be directly applied in the preparation of fishery development projects to insure that important social and cultural factors are taken into account. The model can also be applied to the preparation of social impact statements to accompany transfer of technology projects which directly impact fishing communities. The output will provide a "state-of-art"

paper replacing the one prepared in 1976 (Continuity and Change in Marine Fishing Communities).

Results to Date:

Almost all of the Anthropology Working Papers prepared to date deal with some aspect of this output. Additionally, both "Socio-cultural aspects of technological and institutional change among small scale fishermen" (in Modernization and Marine Fisheries Policy, J. Maiolo & M. Orbach, eds., 1982) and "Social and cultural characteristics in small-scale fisheries development" (in Putting People First: Sociological Variables in Rural Development Projects, M. Cernea, Ed., 1985) by R. Pollnac deal with the central issues involved with this topic. Recent papers prepared by Pollnac concerning this topic include "Sociocultural issues in West African Fisheries Development" (1985) and "Traditional resource use rights and fishery management in LDCs" (1986).

Activities:

Literature and data sets accumulated since 1976, in addition to the State of Art paper prepared in 1976 (Anthropology Working Paper #10, "Continuity and Change in Marine Fishing Communities," by R. Pollnac), can be considered as inputs to this output. This earlier work will be analyzed to develop the model. Proposals will be prepared which will result in the field testing of the model in fishing communities in developing countries where technology transfer projects are planned or ongoing. Ideally, the application of the model will be tested in areas where research is being conducted concerning other areas of the Cooperative Agreement. Field work will be conducted and results will be used to modify the model, and a report will be prepared which can be used as a guide for its application.

Task Analysis:

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1.	Completion of analysis of data sets in conjunction with review of existing literature	1,3		4/87	9/87
2.	Develop model	1,3	X	1/88	3/88
3.	Prepare proposals for testing aspects of the model	1,3	X	5/88	6/88
4.	Field work in LDC fisheries testing the model	1,2		1/89	1/90

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
5.	Preparation of report containing results of model testing	1,3	XX	2/90	6/90
6.	Prepare guide for application of model to problems in technology transfer among fishermen	1,3	XX	1/91	5/91
7.	Evaluation of application of guide in LDC fishery context	1,2	XX	1/92	5/92

Output 2.5: Response Capability in Sociocultural Aspects of Fishery Development.

Most fishery projects need sociocultural input into various phases of development. For example, social soundness analyses are needed in the various stages of planning a fishery development project. Preparation of fishery sector studies requires an analysis of the human resources. Projects involving everything from training, through technology transfer, to institution building need to account for social and cultural factors which may influence the success of failure of the projected activities. This output will make personnel available to provide this information.

Results to Date:

In the past five years fishery social scientists from ICMRD have been involved in technical assistance in the areas of fishery sector studies, development of fishery development strategy papers, conducting social soundness analysis for project development, setting up project monitoring and evaluation programs in developing fisheries, assisting LDC educational institutions in preparation of proposals for research in social aspects of fishery development, and conducting sociocultural baseline studies for fishery projects.

Activities:

A social scientist who is involved in the applied research component of this proposal and who has extensive experience in fisheries development will be available to respond to requests received from USAID Missions, USAID S&T, and LDC countries.

Task Analysis:

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1.	Available for TDY technical assistance concerning social and cultural aspects of fishery development	1,2		7/87	6/92

3. FISHERIES MANAGEMENT: WORKPLANS AND MILESTONES

The work planned here is related to but different from the work planned under the Fisheries Stock Assessment CRSP. Only one of the eight CRSP projects involves economic analysis and modeling, whereas all of our outputs (projects) emphasize economic analysis and modelling. Our economic analysis and modelling work will be more detailed and focus on specific types of fisheries (e.g., pelagic, multispecies), while the CRSP economic work will involve less detail and be more general.

The research plans for technology transfer in fisheries management fall into two categories: 1. research to develop and analyze policies designed to meet the objective of fisheries management plans (both production and distribution goals will be included); and 2. research into domestic and international markets for both the output from aquaculture systems and from capture fisheries.

Output 3.1: Management Policy Analysis

It is anticipated that over the next five years there will be an increased interest in the economics of enforcement of the laws and regulations that have been developed in the LDC's to meet both output and distribution objectives. For example, conflicts between inshore artisanal fishermen and newly capitalized trawler fleets for near-shore stocks result in attempts to regulate fishing effort in inshore waters. The costs and effectiveness of these types of restrictions are being seriously questioned in a number of countries (for example, Thailand and Somalia).

Conflicts also have developed between countries over fishing rights in territorial waters. This is mainly a consequence of over-capitalization of fishing fleets in some countries, resulting in their seeking new stocks to exploit. Again, the economics of enforcement of existing regulations is of great interest and relevance for fisheries management.

Another area of resource use conflict involves mariculture systems which co-opt resources such as mangrove forests and close shore waters. The social costs, including production costs, and benefits of the development of this industry is of great concern in a number of countries. There is a need to analyze policy options which will allow for any regulation of this industry which may be deemed appropriate for meeting coastal resource management goals.

In all of the above research areas it will be necessary to include an analysis of the institutions which have been developed around the attempts at resource management. This analysis, while difficult, will enhance the overall usefulness of management policy analysis.

Expected Output:

A. More economically viable mariculture production systems

B. More economic efficiency in the use of coastal resources and policies which guide resource use in those areas

C. Fisheries regulations and enforcement systems which result in in benefits from regulations which are greater than the costs of enforcement

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1. Literature review	1,3		7/87	9/89
2. Site selection	1,3		6/88	8/88
3. Data collection	1,2	X	7/89	10/89
4. Analysis	1,2	X	9/89	5/90
5. Report writing	1,2,3	XX	5/90	9/90

Output 3.2: Market Analysis: Research on Domestic and International Markets for Mariculture

Mariculture production systems are rapidly developing in many LDCs for shrimp, types of finfish, and shellfish. A great number of economic issues around these emerging industries have been identified, including 1. the domestic and international demand for these products, 2. the economics of quality, 3. the effects of trade barriers on market development, 4. domestic market structure, 5. the economics of processing, and so on. Market analysis (in addition to an economic analysis of production systems and resource use conflicts mentioned in Section 3.1) is important to help devise policies which will result in optimal returns to the countries involved.

Expected Output:

A. Policy recommendations on rate and type of mariculture market and industry development

B. Understanding of the distribution of benefits and costs from industry development

C. Immigration of the costs associated with resource use by the industry

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1. Literature review	1,3		7/87	3/90
2. Site selection	1,3		6/88	8/88
3. Data collection	1,2	X	1/90	4/90
4. Analysis	1,2	X	3/90	1/91
5. Report writing	1,2,3	XX	1/91	4/91

Output 3.3: Market Analysis for the Capture Sector

There is a heightened concern in response to 1. increased global demand for fish products, 2. in some countries a goal of earning foreign exchange from fisheries exports; and 3. because, in some places, of over capitalization of the fishing fleet in relation to stocks in the economics of joint ventures including the effect on investment in the capture sector, the effect on the structure of the domestic industry, the effect on investment in the capture sector and the effect on domestic processors and prices.

Expected Output:

A. The development of policies which encourage or limit the establishment of joint ventures dependent on their implication for the native fishermen and consumers and on their effect on the general economy

B Increase in number of joint ventures

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1. Literature review	1,3		7/87	8/89
2. Site selection	1,3		6/88	8/88
3. Data collection	1,2	X	6/89	9/89
4. Analysis	1,2	X	8/89	4/90
5. Report writing	1,2,3	XX	4/90	9/90

Output 3.4: Mathematical Programming Algorithms

The methods of mathematical programming are widely used in economics and management science. Algorithms to solve mathematical programming problems on large (mainframe) computers have been available for several years. Such algorithms for microcomputers currently are either not available or exceedingly cumbersome to use, i.e., not user friendly. Having user friendly algorithms available to solve mathematical programming problems on microcomputers will enable fisheries researchers and decision makers in LDCs to make use of the latest technology for setting management policy in their countries.

Results to Date:

Several algorithms are being developed at URI which solve mathematical programming problems and are user friendly. These are based on algorithms created years ago by some URI faculty.

Activities:

The major activities to produce Output 3.4 include:

1. Preparation of an algorithm for solving linear programming problems on an IBM PC.

2. Preparation of a file editor program.

3. Write a user's manual.

4. Provide full documentation of the program.

5. Testing of the program.

6. Establish a means of distributing the program to potential users.

7. Demonstration of algorithm at an International Workshop on Fisheries Management.

The first five activities involve research. Few information services will be needed for any of these activities. Training of potential users of the programs will be a by-product of this project.

The external conditions necessary for successful completion of this project are (1) the existence of sufficient IBM PC equipment in the Department of Resource Economics, and (2) cooperation of a few LDC researchers in testing the program.

Task Analysis:

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1.	LP algorithm preparation	1,3,4	X	9/87	6/88
2.	File editor program preparation	1,3,4	X	6/88	9/88
3.	User's manual	1,3,4	X	9/88	9/89
4.	Documentation	1,3,4		9/88	12/89
5.	Testing	1,3,4		1/90	6/90
6.	Distribution	1,3,4	XX	9/90	12/90

Output 3.5: Utilization of Fish Bycatch of the Shrimp Fishery

A common problem is the failure to use the incidental catches of major fisheries such as those for shrimp. This fish bycatch may amount to as much as 20 tons of finfish caught for every ton of shrimp caught. Yet, only a small fraction of the bycatch is landed and sold to consumers. Special problems also arise if the bycatch must be controlled for management purposes (as in the case where the bycatch is comprised of juveniles of valuable species which are either disposed of at sea or directed to low value industrial uses). Monitoring and control of incidental catches represents a particularly difficult problem for fisheries managers.

Results to Date:

While considerable attention has been given to the technical aspects of bycatch utilization, no significant work has been done examining the bycatch issue in the context of the whole system. Virtually no work exists on the problem of management of bycatch resources. This is an important area where a comprehensive, integrated research program is needed.

Activities:

The major activities to produce Output 3.4 include:

1. Selection of the site or fishery to be used as the case study, e.g., Ecuador.

2. Data collection on the selected fishery.

3. Development of a bycatch model.

4. Testing, refining and calibration of the bycatch model.

5. Writing of a report explaining the results of the model.

6. Presentation of results to an International Workshop on Fisheries Management.

All activities involve research. Information services will be essential for activities 1, 2 and 5. Training will be involved in activities 2 through 4.

The external conditions necessary for successful completion of this project are (1) availability of adequate data and (2) cooperation of counterparts and authorities in the selected country(-ies).

Task Analysis:

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1.	Site selection	1,3		5/88	5/89
2.	Data collection	1,2	X	6/88	8/89
3.	Model development	1,2	X	9/87	6/90
4.	Model testing	1,2		7/88	10/90
5.	Report on model results	1,2,3	XX	9/88	12/90

Output 3.6: A Bioeconomic Management Model for Tropical Multispecies Fisheries

The need for management of fisheries resources has long been recognized in the professional community, but only recently have development authorities recognized that fisheries development without consideration of management may imperil the resources themselves. Unfortunately, most approaches to management are implicitly based on models of temperate water demersal fisheries. Tropical water demersal fisheries, however, exhibit significantly different biological and economic characteristics than their temperate water counterparts. Therefore, it is important to extend and adapt conventional management models to appropriately reflect the salient features of tropical fisheries.

Results to Date:

The most recent result is a bioeconomic management model that is both stochastic and dynamic and includes multiple species and vessels with different characteristics. The model was tested on U.S. Northwest Atlantic demersal fisheries with good results. The next step is to adapt the model to tropical demersal fisheries, which exhibit biological and economic characteristics different from temperate water, developed fisheries.

Activities:

The major activities to produce Output 3.6 include:

1. A review of the literature on tropical multispecies fisheries and stochastic dynamic fisheries models.

2. Development of a preliminary bioeconomic model to approximate the conditions of tropical multispecies fisheries.

3. Collection of biological and economic data on selected tropical fisheries (e.g., Indonesia, Ecuador).

4. Analysis and preparation of collected data for use by a bioeconomic model.

5. Development of a final bioeconomic model for a selected tropical multispecies fishery.

6. Analysis of selected management alternatives for the fishery.

7. Writing of a report explaining the model and its use.

The first seven activities include research. Information services will be needed for the first activities, and training of a graduate student in the development and use of bioeconomic models will be a by-product of this project.

The external conditions necessary for successful completion of this project are (1) the availability of appropriate data and (2) cooperation of colleagues and authorities in the selected countries.

Research Program

To be proposed at a later date as funds become available.

Task Analysis:

	Activities/Tasks	Funding Source	Selected Milestones	Target Dates Start	End
1.	Literature review	1,3		9/90	1/91
2.	Preliminary model	1,3		1/91	5/91
3.	Data collection	1,2	X	6/91	9/91
4.	Data analysis	1,2	X	8/91	11/91
5.	Final model	1,2,3	X	9/91	1/92
6.	Management analysis	1,2,3	X	1/92	3/92
7.	Report writing	1,2,3	XX	2/92	6/92

4. USE OF MARICULTURE IN DEVELOPING COUNTRIES: Work Plans and Milestones

One of the major reasons for the low use of mariculture in developing countries is the difficulty in rearing larval stages of marine organisms. URI can be of significant assistance in the alleviation of this difficulty through its expertise in the nutrition of larval organisms.

Brine shrimp (Artemia) nauplii are probably the most widely used food worldwide for the culture of larval fish and crustaceans.

For the last ten years URI together with the EPA laboratory in Narragansett and the Artemia Reference Center in Gent, Belgium, have supplied the base for the research on Artemia quality. Because of this research we can predict a good Artemia and one that will not supply good nutrition to the predator. It has now been established that the survival of the post larval shrimp in the growout ponds is directly related to the Artemia that is fed to the pre-larval shrimp in the hatchery. At present there is no shortage of Artemia on the world market. The supply of good Artemia is however very short. At present the survival of the shrimp fed for a short period of time on Artemia in the hatcheries is good. Based on unpublished data we would predict that the survival of post larval shrimp in the ponds of present hatchery shrimp is much lower than sea captured post larval shrimp. This estimate is based on feeding studies of commercially available Artemia compared to "enriched" Artemia. In the short term the hatcheries will be compelled to use existing supplies of Artemia. If these are enriched their production will be higher. The other alternative is to buy "good" Artemia. In the latter regard we have been contracted to analyze samples of Artemia for fatty acids and pesticides for several companies before large purchases are made.

Three countries which URI could help immediately with Artemia quality are Ecuador, Thailand and the Philippines.

This project would complement the effort in Ecuador.

Output 4.1: Development of Artemia Production and Quality Control in Ecuador

In 1970 the shrimp industry in Ecuador was $2.9 million. This production expanded in 1983 to a total of $183 million. In 1984 a decline to $154 million was experienced. In 1985 the production has been estimated to be even lower. This lowered production has taken place in spite of the fact that pond construction has continued at a very fast pace. The simple explanation is that the shrimp farms cannot get enough post larval shrimp to stock the ponds. The long-term solution to the problem is the construction of shrimp hatcheries rather than importation of post larval shrimp or intensified activity in the collection of post larval shrimp from the sea.

The hatchery production of post larval shrimp is not without its problems. The pre-larval shrimp require a series of live foods--the last being Artemia. Evidence is now emerging that the survival of the post larval shrimp in the ponds is directly related to the quality of the Artemia fed in the hatchery. Thus, increased production of post larval shrimp by the hatcheries will not result in a proportional increase in market shrimp if the pre-larval shrimp are fed existing supplies of Artemia. ESPOL should, for price, analyze the quality of Artemia used in the hatcheries. It is the intent of this project to give ESPOL that capacity.

In the long term, Ecuador should raise its own Artemia. The climate would appear to be suitable--Ecuasol has been making solar salt for many years. However, Ecuasol's ponds probably are not suitable for the level of Artemia production that is required; this due to the difference in pond management required for Artemia production and human salt production. ESPOL has land available for large experimental Artemia ponds.

Results to Date:

We have been asked many times to analyze brine shrimp lots from commercial companies and recommend certain lots over others. This has been done in 1986 for some hatcheries in Ecuador. One of our goals was to train ESPOL personnel in these analyses and help with the procurement of the equipment. In August, Ing. Mariano Montano came to URI on a training and shopping mission. He was trained in Fatty Acid and Pesticide Analysis and made arrangements to buy a reconditioned gas chromatograph. The GC was paid for by ESPOL and some supplies were bought out of the grant.

In April 1986, Dr. Bengston went to Ecuador to take part in the training of shrimp hatchery technicians. The course was self supporting and all the expenses for Dr. Bengtson were paid by ESPOL. Dr. Bengtson also gave a public lecture attended by some 150 people.

In 1986 we had an exchange research scientist from Spain working on Artemia. Together with the URI lab personnel a laboratory Artemia manual in Spanish is being prepared.

Activities:

We have shipped the GC to Eucador complete with the needed chemicals and supplies. We expect to visit the lab and assist in the quantification and analysis of the data. We have been asked if we would host Ing. Montano from ESPOL for further training. As the lab work with GC and other biochemical techniques we will be on call to help them in sending standards and further training.

ESPOL intends to establish Artemia ponds in new and projected salt works. We would assist in the planning, construction and operation phases.

We are currently working on an updated Spanish Artemia manual.

Task Analysis:

4.1a. Work with Pond Systems

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Pre-feasibility examination, incl. collection of samples	1,3		5/87	6/88
2. Identification of site for full feasibility study	1,3,4			6/88
3. Full feasibility study, incl. algal culture (requires on-site ESPOL personnel)	1,3,4	XX	7/87	6/88
4. Experiment with inoculation and fertilization schemes (requires on-site ESPOL or hatchery personnel)	1,3,4		1/88	6/90
5. Site visit to collect and analyze experimental results	1,3,4	X	12/88	12/87
6. Development of country-wide plan for Artemia production	1,2,3,4	XX	1/88	12/88
7. Implementation of country-wide plan (depends on Ecuadorian government	1,2,3		?	?
8. Spanish Artemia Manual	3,4		7/87	12/87

Output 4.2: Development of Artemia Production and Quality Control in Thailand

Artemia are not native to Thailand, yet it is an area suited to the cultivation of Artemia. Since its inoculation, cyst and biomass production has increased and many small farms have been devoted to Artemia as part of poly culture. Preliminary results indicate marginal quality for the Thai cysts. The ponds are available for our inputs and are in production.

The proposed Thailand project aims at the analyses of the nutritional values and the pesticide residues of the Thai Artemia cysts, nauplii and adults as well as on their suitability as live food for tropical marine organisms. The project will also include the effects of environmental factors on the nutritional quality of Artemia. However, with the lack of personnel who specialize in nutritional quality analysis and control, the proposed project also

aims at the training of a faculty staff person who will be assigned to participate in the Artemia project in the above-mentioned aspects.

Results to Date:

Both Thailand and the Philippines are areas of great interest in Artemia production. These organisms are not native to these countries yet production of these organisms are greatly needed. In May 1986 a visit was made to both countries. Thailand has been in commercial production of Artemia biomass for some time. One farm that was visited is air shipping large amounts of biomass to Hong Kong. It has been found contrary to the general belief among salt producers that conditions favorable to Artemia production does not depress salt production. The ponds that were visited certainly bore that out. Samples were collected and tested at URI were found to equal the highest quality that we have found. Thus we have a model system as some other ponds that we tested were not as good.

Good contacts were made with FAO, USAID Mission and various other universities and groups. The prospective trainee Instructor Mayvree Charyawat was interviewed and she is now in training at URI. Once she has established a research protocol she will return to Thailand to work on the question of how is a pond managed to yield superior Artemia.

In the same trip a visit has been made to a SEAFDEC facility that is beautifully integrated. Cows, pigs and chickens are raised for meat and eggs. The fertilizer is used to grow algae which is fed to milk fish and Artemia. The Artemia is fed to some shellfish and marine fin fish. Salt is finally produced as the water is evaporated. Sugar cane waste is also used in the system and in fact the plantation originally was only a sugar producing farm. They are now a model for other farms and are shipping milk fish to the Manila market. Samples of the Artemia were taken back to URI and were also found to be of good quality.

During the time at SEAFDEC a Memorandum of Unde standing was written and has now been revised. It has been sent back to SEAFDEC for signatures.

Activities:

Our major effort is concerned with the training of instructor Chaiyawat and the analysis of samples from Thailand and the Philippines. MOUs have been signed with KU and are being processed with SEAFDEC.

Contact has been made with a large supplier of Artemia in California and we hope to gather data from these ponds.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Present seminar	8/87	12/91		
2. Advise on design of setup of quality control laboratory	1,3,4		8/87	12/88
3. Interlaboratory calibration (URI and K.U.) on Artemia quality from pond studies	1,3,4	X	8/87	12/91
4. Water quality analysis of Artemia ponds	1,2,3		8/87	12/91
5. Analysis of Artemia samples for fatty acids and chlorinated hydrocarbons	1,3	XX	8/87	12/91
6. Start training of Thai student at URI	1,2,3	X	8/86	1/91
7. Pond research in Thailand	2		1/89	12/91

Output 4.3: Fundamental Studies on Artemia Quality

One of the critical factors in Artemia quality for marine organisms is the amount of essential fatty acid. That amount is primarily a reflection of the essential fatty acid level in the diet, i.e., in the algae that the Artemia eat. Very little is known about the fatty acid profiles of the hypersaline algae that Artemia eat in their natural environment. We intend to culture several species of these algae to determine their profiles and the effects of environmental changes on them. The results obtained could then be applied to algal culture in Artemia ponds.

Artemia can theoretically be replaced someday by microencapsulated diets that are mass-produced in laboratory conditions. The development of these diets requires a more complete understanding of Artemia quality, especially with regard to lipids and enzymes.

Results to Date:

Work has continued on the methods for the isoelectric focus of proteins to objectively determine the origin of Artemia samples. It was found that a single Artemia could be analyzed. The staining techniques were perfected such that isozymes could specifically be detected.

Work is progressing on the encapsulated foods for the possible replacement or sparing of Artemia needs. Several review papers have been published or are in Press on Artemia quality. These papers are in conjunction with the ISA Group.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Analysis of Artemia samples for fatty acids and chlorinated hydrocarbons	1,3,4		6/85	12/88
2. Research on microencapsulated diets	1,3,4		1984	12/88
3. Research on fatty-acids of algal species in culture	1,3,4		1/86	12/ 3
4. Application of item 3 to pond conditions	1,3,4		1/87	1/88
5. Participation in and co-sponsorship of ISA Workshops	1,3,4		6/87	6/91
6. Publication of a review paper on Artemia nutritional quality	1,3,4	XX	6/87	6/87

Output 4.4: International Study of Artemia Workshop

The idea of an International study of Artemia group came out of discussions held in Poland at an aquaculture conference in 1977. It was felt at the time that there was a need to have a comprehensive study of Artemia salina in which laboratories from various parts of the world would contribute for a complete study. Thus, laboratories from the United Kingdom, Belgium, Italy, the United States and Spain cooperated on this committee bringing in such aspects as genetics, morphology, biochemistry, aquaculture, physiology, etc. Some 40 to 45 papers have resulted from this collaboration including perhaps 15 papers out of The University of Rhode Island, some of which have been USAID cooperative efforts. In the past we have hosted, under the ISA, research workers from a number of developing countries including Indonesia, Thailand and the Philippines for specific training as well as researchers from Belgium and Spain.

The next conference is to be held in Rhode Island in June 1987. Under past protocol The University of Rhode Island would be the host for meals and lodging for this group. At present our proposals for work in Ecuador and in Thailand are coordinated very

closely with the Belgium initiative in Artemia and are coordinated under the ISA group. In addition, we are working on an initiative in Egypt which the Belgians have initiated. We have cooperated in significant ways with the Philippine groups in aquaculture together with the laboratories of Belgium and the United Kingdom. Thus, it is extremely important that we maintain our ties with this group, because in the past it has been shown to be a very valuable contact for coordinating activities in the brine shrimp quality and pond production areas.

Activities:

Plans were made for the ISA group to meet at URI in September 1986. Because of condition beyond our control the meeting was cancelled. The meeting is being scheduled for June 1987. A joint review paper has been published and some 6 papers will be published in the coming out of the 2nd International Conference on Artemia. Dr. Bengtson is the US editor for the 3 volume publication.

Dr. Simpson was invited to visit the Peoples Republic of China in the summer of 1987 to give lectures and consultation on Artemia production. During the same trip visits will be made to the Philippines and Thailand. Dr. Simpson has also been invited at Belgium's expense to take part in an International Artemia Training course in Genfo under the ISA group.

5. POSTHARVEST FISHERY LOSSES: WORKPLAN AND MILESTONES

Output 5.1: Reduction of Postharvest Fishery Losses (PHFL) due to Spoilage and Contamination

Approximately 53% of the world's fishery harvest is done by lesser developed countries (LDC's). Furthermore, developing nations themselves utilize 47% of the catch. Considering the nutritional aspects, fish is one of the more important animal protein foods available for peoples of many developing nations and its quality and availability will continue to make a significant impact on food supplies in LDC's. A large percentage of the harvest in LDC's can be lost due to improper handling, contamination and related factors resulting in fish spoilage. Increased losses can also occur due to poor methods of preservation during storage, transportation and marketing. Accordingly, the adaptation and evaluation of improved methods associated with these losses are the basis of reduction of these losses.

Results to Date:

Work by several members of the Food Science and Nutrition Department at URI have shown in Costa Rica that one of the primary causes of postharvest fishery losses was temperature abuse with subsequent bacterial growth. Several chapters on fish freshness assessment were published in the text of "Small Scale Fisheries In Central America: Acquiring Information For Decision Making" (1981). An on-site visit to Ecuador was made in 1986 to identify specific problem areas in postharvest fishery losses. Seminars in freshness assessment were given at Escuela Superior Politecnica del Litoral (ESPOL) in the assessment of fish freshness. Contacts were made not only with ESPOL but also Institute Nacional de Pesca (INP) and Mission Britanica concerning PHFL in Ecuador. An in-country workshop on artisanal fisheries, including the aspect of training in PHFL, was begun with the primary sponsors being INP and ESPOL.

Activities:

A preliminary proposal has been sent to the Subsecretary of Fisheries of Ecuador to establish a quality control system for the exportation of fish captured by artisanal fishermen. There have been past problems in the area of high bacterial counts and contamination where exported fish has been refused entry into developed countries. The in-country workshop in artisanal fisheries has been set for mid June and has been designed to identify and offer solutions in aiding the small scale fisheries sector. There is a hope among several investigators at INP that working projects be developed between ICMRD and INP as a result of the workshop.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Development of methodology for PHFL analysis	1	XX	8/87	12/87
2. Site visit to initiate program (Latin America)	1,2		1/88	1/88
3. Measurement of PHFL	1,2		2/88	3/88
4. Introduction of Improved Preservation Methods for reducing PHFL	1,2	XX	8/88	12/88
5. Site visit to initiate program (West Africa)	1,2		1/89	1/39
6. Measurement of PHFL	1,2		2/89	3/89
7. Introduction of Improved Preservation Methods for reducing PHFL	1,2	XX	8/89	12/89
8. Site visit to initiate program (Asia)	1,2		1/90	1/90
9. Measurement of PHFL	1,2		2/90	3/90
10. Introduction of Improved Preservation Methods for reducing PHFL	1,2		4/90	7/90
11. Follow up analysis in one LDC to determine success of technology transfer	1,2		1/91	3/91
12. Final report: Reduction of PHFL in LDC Manual: Methodology of measuring PHFL	1		4/91 9/91	12/91 12/91

Output 5.2: Processing Methods for Fishery Products

Significant postharvest fishery losses occur due to poor methods and practices of processing the fresh fish. Improved traditional methods of processing fishery products and their use address the post-harvest processing system in relation to primary processing (product form) and secondary processing (salting, smoking, and drying). Improved processing of a properly handled

and stored fish catch results in obtaining fishery products having high nutritional quality and consumer acceptability with minimum product loss. Program areas address improvement in the processing of fishery products as follows:

1. The development of an adaptive research project focusing on basic preservation methods applicable to the most popular fishery products in developing countries, e.g., salting , drying, smoking, or combinations thereof in relation to fishery product usage and the effect of processing on their nutritional quality. Innovative processing will also be studied to increase utilization potential.

2. Based upon where losses occur in the post-harvest fishery system, the development of a report outlining product models to address specific problem areas - in processing and the use of alternative processing techniques.

Results to Date:

Following an on-site visit to Ecuador and the facilities at ESPOL, a written proposal was submitted to finance equipment and materials for projects in seafood processing.

Activities:

The written proposal submitted to Ecuador is a request for in-country funds to expand the facilities of their food processing pilot plant, specifically in the area of seafood processing and the production of fish mince. The project is currently being evaluated. The international workshop that will be held April, 1987 at the Alton Jones Center will have a seafood processing section. Methodologies in the optimization of traditional methods as well as the utilization of fish minces and new methods of preservation will be presented and guidelines will be formulated for future research. At present there is a student from ESPOL who is seeking her Master's in Food Science and Nutrition and will be doing research in this area at URI.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Identify basic fish processing methods for fishery products				
LDC - Latin America	1,2		1/88	2/88
LDC - West Africa	1,2		1/89	2/89
LDC - Asia	1,2		1/90	2/90

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
2. Develop methodologies for improved fish processing		X		
LDC - Latin America	1,2,3,4		4/88	7/88
LDC - West Africa	1,2,3		4/89	7/89
LDC - Asia	1,2,3		4/90	7/90
3. Transfer of technology		XX		
LDC - Latin America	1,2,3,4		9/88	12/89
LDC - West Africa	1,2,3		9/89	12/89
LDC - Asia	1,2,3		9/90	12/90
4. Report on the transfer of processing technology	1		6/91	8/91
5. Follow-up on transfer of technology in one LDC	1,2		9/91	12/91
6. Manual on innovative fish processing for LDC's	1	X	4/92	6/92

5.3: Products from Underutilized Species

In many areas of the world, fish as food, is known only as the white flesh fillet of the more popular and expensive species. If we are to increase the utilization of fish in the diet, it is up to the food scientist/technologist to develop acceptable products that will be assimilated into the traditional diets of peoples from developing countries. The last decade in fishery science has witnessed a revolution in seafood technology and the potential for product formulation using protein sources from the sea has changed from a laboratory experiment to a profitable industry. In this section we will use innovative processing technology to develop products that have potential domestic and foreign markets.

Results to Date:

An on-site visit in Ecuador revealed that the main problems that exist in other Latin American countries in terms of shrimp by catch utilization have been overcome by natural economic trends in Ecuador. Essentially, what was discovered is that a large

percentage of the by-catch is being collected by smaller boats at the end of each day. This harvested fish is transferred to trucks and then brought to the marketplace. The possibilities of expanding the utilization of the by-catch for both product development and normal marketing procedures exists because of this collection meth

Activities:

Written proposals have been submitted to ESPOL (Ecuador) for requesting in-country funds for seafood processing equipment and project funds to produce surimi from several underutilized species that are common to the Ecuadorian waters. Another proposal has been submitted to NESTLE of Quito for the use of shrimp by-catch and other underutilized species in the development of shrimp diet feed. Both proposals are currently under review. Research at the Food Science and Nutrition Department is currently going to expand the uses of underutilized species from both tropical and temperate waters.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Analysis of capture and handling of species	1,2		3/88	5/88
2. Analysis of organoleptic, physical properties of underutilized species	1,2,4		4/88	6/88
3. Product development and market distribution		X	8/90	12/91
4. Report describing success and failure of increasing utilization of species	1	XX	3/92	5/92

Output 5.4: Development of Human Resources
Training in Postharvest Fishery Losses

Because the subject matter of postharvest fishery losses is diverse and encompasses a multitude of disciplines (food science, fishery science, microbiology, biochemistry, quality control, etc.), integrated training programs are essential to facilitate the transfer of technology in this area to LDC's. Several institutes in LDC's have undergone institutional building in terms of infrastructure, including laboratories and pilot plants, but still lack the human resources, especially at the higher academic level, to develop good fishery science programs in terms of seafood products. For this reason, the priority area of postharvest fishery losses at ICMRD can satisfy a real need in LDC's in terms

of training workshops and the development of human resources. An in-country training workshop, although at times logistically problematical, would be more beneficial to the developing nation and host institution in that a wider audience within the area would be reached, and extracurricular costs such as room and board could be substantially reduced.

Results to Date:

A successful training program was held at ICMRD in postharvest fishery losses for a group of ten middle level LDC fisheries personnel in 1985. An international training course in the same area, aimed at higher level administrative personnel, is planned for July, 1987. Contacts have been made with several institutes that have memorandums of agreement with ICMRD to determine the feasibility of hosting an area workshop in postharvest fishery losses at that institute.

Activities:

Complete revision of the training manual on seafood preservation and processing is partially completed. The manual will be approximately 200 pages long and in both English and Spanish. Fifty percent of the text is in the final form and all the laboratory part is complete. Information on training courses are being disseminated to LDC's. Determination of the feasibility (lab and pilot plant facilities, costs, etc.) is being done for the purpose of holding training programs in postharvest fishery losses in LDC's.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Postharvest fishery losses training workshop at URI	1	X	7/87	8/87
2. Determination of LDC and host institutions to hold workshop	1		8/87	10/87
3. PHFL workshop (Latin America)	1,2	X	2/88	2/88
4. PHFL workshop (West Africa)	1,2	X	2/89	2/89
5. PHFL workshop (Asian)	1,2	X	2/90	2/90
6. PHFL International Symposium *	1,4	XX	5/90	5/90
7. New manual revision to suit LDC needs	1		6/90	8/90

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
8. PHFL workshop (new LDC)	1,2		2/91	2/91
9. PHFL workshop (new LDC)	1,2		2/92	2/92

* The International Symposium in PHFL should have joint sponsorship among several institutes in developing countries that are working in postharvest fishery losses.

6. Resource Development and Utilization

Introduction

In 1986, a new working group was formed entitled "Resource Development and Utilization". The goal of this working group is to enhance the productivity of fisheries in lesser developed countries with the introduction of appropriate technology. The staff of this group includes members of the Department of Fisheries Science and Technology and the Graduate School of Oceanography faculty and graduate students. The experience of the group includes the teaching of fishing gear technology and marine engineering technology, commercial fishing in small-scale and industrial fisheries, fisheries extension in Sea Grant and the Peace Corps, fishing vessel construction and maintenance, fisheries biology, population dynamics and other related subjects. During 1986, several projects were initiated including a crab fishery development activity in Ecuador and the development of a training manual for basic twinework. Other projects are in the conceptual stages. General objectives and methods of this group are outlined in the sequel. This is followed by detailed descriptions of ongoing and proposed projects. It must be noted that the intention of this working group is to develop core faculty membership partially supported by US AID S&T funds, then to obtain mission funds to support graduate student activities in specific projects. Additional project support is anticipated from the in-county U.S. AID Mission offices. While several of the projects described in the following sections are based in Ecuador, it is the hope of the working group to expand this knowledge to other countries with similar environments, particularly.

Resource Development and Utilization

General Objectives and Methods

The general objective of this working group is to increase the production of fishery resources of lesser developed countries (LCD's) by:

1. Assessing the resource potential of specific non-exploited or under utilized species, applying appropriate technology to harvest the resources, and assisting in the complementary development of processing and marketing technologies for the new fishery products if required.

2. Assessing the resource potential of certain over-harvested species and applying basic cultivation of mariculture technology where appropriate, for the stabilization and enhancement of the resource.

3. Transferring of appropriate technology to fishermen of lesser developed countries to increase the effectiveness of their fishing

effort. Subtle changes in design or construction of fishing gear, or the mechanization of fishing activities can have dramatic effect on the efficiency of fishing activity.

4. Training of LDC university faculty, in-country extension agents, and small scale fishermen in the methods and techniques of fishing stock assessment, resource enhancement and technology transfer.

5. Developing manuals and distributing for use in fisheries science and technology training programs.

Resource Development and Utilization

Workplans and Milestones

Output 6.1: Investigation into the Feasibility of Developing of Swimming Crab Fishery in Ecuador

Results to Date:

A preliminary investigation of the Portunidae swimming crab resources in Ecuador was jointly conducted by investigators from the University of Rhode Island (URI) and Escuela Superior Politecnica del Litoral (ESPOL) under USAID Title XII funding during the period 6 July through 5 August 1986.

Five species of Portunidae crabs were captured, with two species belonging to the genus Callinectes. C. toxotes was the largest and most abundant species of the swimming crabs found in the Ecuadorian waters and shows the greatest potential for the development of a new fishery. C. arcuatus, a slightly smaller crab, also has good potential to be a resource for both artisanal and commercial fishing industries.

At the conclusion of this investigation, the results were presented to the USAID Mission in Quito and a proposal was made for two phases of future studies. Phase I studies include determining the abundance, distribution and catchability of the Callinectes crabs in the Guayas Estuary. Phase II studies include developing the harvesting and processing sectors of the industry. Verbal commitment for USAID funding for Phase I studies was obtained for 1987 and for Phase II studies if the results justify further investigation into the development of the fishery.

Based on the URI proposal, ESPOL investigators submitted a proposal to their in-country funding agency, Consejo National de Universidades y Escuelas Politecnicas (CONUEP), requesting 3 million sucres per year for a two year project. ESPOL is providing matching funds of 3 million sucres per year for a total project value of 12 million sucres. In October of 1986 ESPOL was authorized CONUEP support for the project. The project was

initiated jointly by the URI and ESPOL investigators in January of 1987. The URI investigators were supported jointly by U.S. AID, ESPOL and URI. In January 1987, the field work was continued in the Guayas estuary and the results indicate commercial quantities of C. arcuatus in the mid-estuary region, and sufficient quantities of C. toxotes in the upper estuary for an artisanal fishery.

Future Activities

It is planned to continue this project into 1987 and 1988. Future activities in 1987 include assisting ESPOL with field sampling in June and December and a graduate student working on a thesis project related to the abundance, distribution and catchability of the Callinestes crabs in the upper estuary during June, July and August. During 1988, URI investigators will assist ESPOL with the analysis of the field data, and the interpretations relative to the feasibility of initiating commercial harvesting activity. Although the project has received the endorsement of the U.S. AID Quito, Ecuador Mission office, and support has been promised, actual support is pending final approval.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Field data collection, assist assist ESPOL	1,2,3,4		Jan 87	Dec 87
2. Applied research project, upper estuary	2,3,4		Jan 87	Aug 87
3. Completion of research project thesis	2,3	XX		Dec 87
4. Data analysis and interpretation	1,3		Jan 88	Dec 88
5. Completion of Final Report	1,3	XX		Dec 88

Output 6.2: Investigation into the Feasibility of Developing an Cultivation Fishery for the Mangrove Oyster Crassostrea columbiensis in the Guayas Estuary, Ecuador

Results to Date:

This would be a new project for U.S. AID and URI. ESPOL has been conducting limited research on the mangrove oyster since 1979. This bivalve is prolific in the high salinity regions of the

estuary, with natural populations existing in the upper Estero Salado, and in the mangrove of the lower estuary. The results of studies to date indicate a rapid growth rate to 7 cm in 8 months in the natural environment. This compares with 8 cm in 3 years for Crassostrea virginica in Mid-Atlantic region of the United States. At the present time, there is some artisanal fishing for the mangrove oyster in Ecuador, and it is over-fished in some areas. If basic cultivation techniques were applied to this fishery, the resource production could be enhanced. Both ESPOL and the U.S. AID, Quito Mission office have indicated interest in developing a project of this type.

Future Activities:

The first phase of the proposed project will be to inventory the existing resource throughout the estuary region. Then using biweekly or monthly spat collectors, the spawning and setting seasons will be determined. Alternate cultch materials will be investigated including mangrove roots and oyster shells. Bottom and off-bottom cultivation techniques will be evaluated. Finally, demonstration cultivations will be conducted in several different environments including shrimp pond discharge channels, and shallow mangrove estuaries.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Develop Project Plan. Present Proposal to Quito Mission Mission	1,3	XX	Jan 87	Dec 87
2. Initiate work on the project basic field studies	1,2,3		Jan 88	Dec 88
3. Continue Basic Studies	1,2,3		Jan 89	Dec 89
4. Conduct Demonstration Projects & Training Activity	1,2,3,4		Jan 90	Dec 91
5. Complete Final Report Report	1,2,3	XX		Dec 91

Output 6.3: Transferring of Appropriate Technology to Fishermen of Lesser Developed Countries to Increase the Productivity of their Fisheries.

Results to Date:

Activities conducted to date in this area have been incidental to the crab fishery development project being conducted in Ecuador. The construction and use of wire traps has been demonstrated to artisanal fishermen, shrimp farmers, and university faculty and students. The response and interest of local industry is encouraging.

Future Activities:

It is planned to develop a program of demonstrating the constructing and use of appropriate technology in lesser developed countries, particularly in Latin America. The emphasis will be on the making of minor and appropriate changes in boats, fish gear or operations that will increase productivity. In addition, it is hoped to introduce technologies for new fisheries in order to increase the diversity of fishing activities.

Task Analysis:

Activities/Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Available for TDY assistance concerning appropriate fisheries technology	1,2,3,4		7/87	6/92

Output 6.4: Preparation of Technical Fisheries Training Manuals.

Results to Date:

The faculty of the Fisheries Science and Technology Department has been involved in fisheries training activities for more than two decades. Because of the specialized types of activities related to fisheries training it is often impossible to find an appropriate book or manual to utilize for a given course. For example, in basic twinework and net making, while there are many books and manuals on various aspects of the subject matter, there is no single text that encompasses the entire subject. In that regard, a draft manual has been prepared entitled "Practical Twinework for Fishermen and Gear Technologists"

Future Activities:

It is planned to revise and finalize the twinework manual in 1987. Beyond that project, it is planned to author a manual on the design, construction and outfitting of a 12 meter fiberglass

fishing vessel. It is proposed to document with photographs and video recording the actual construction and outfitting process, then to combine the photographs with text for a training manual, that will be supplemented with a video recording. The construction of intermediate sized fiberglass fishing vessels is a logical expansion step in the fisheries of lesser developed countries. The construction of fiberglass boats does not require skilled craftsmen as compared to wood and steel. The proposed manual will serve as the basis for training courses in fiberglass vessel construction. The author of the manual is a former fiberglass fishing vessel builder and operator, having constructed 8 vessels in 10-15 meter size range. Additional projects will be proposed in the later years of the funding cycle.

Task Analysis:

Activities Tasks	Funding Source	Selected Milestones	Target Start	Dates End
1. Complete twinework manual	1,3	XX		Dec 87
2. Document vessel construction	1,3		Jan 88	Dec 88
3. Complete construction manual	1,3		Jan 89	Dec 89
4. Conduct other projects	1,2,3		Jan 90	Dec 91

FISHERY DEVELOPMENT SUPPORT SERVICES
Proposed Budget July 1, 1987 - June 30, 1992
(In Thousands)

FIVE YEAR SUMMARY

	TOTAL AID S&T/AGR	MISSION	ICMRD/URI	GRAND TOTAL
1.0 SALARIES, WAGES				
Director, URI Faculty Research Associates, Graduate Students.	975	-	360	1335
1.2 Support Staff	140	-		140
1.3 Consultants	-	860		860
2.0 FRINGE BENEFITS				
2.1 Non Classified 22%	215	-	79	294
2.2 Classified 32%	45	-		45
3.0 OPERATING EXPENSES				
3.1 Communications	10	20	5	35
3.2 Office Supplies	20	20	5	45
3.3 Equipment	20	20	5	45
3.4 Printing and Other Office Expenses and Direct Costs	30	40	5	75
4.0 TRAVEL				
4.1 Domestic	15	-	5	20
4.2 International	121	631	10	762
5.0 INDIRECT COSTS				
10% on total excluding tuition and capital items over $500.	159	159	942	1260
TOTAL	1750	1750	1416	4916

FISHERY DEVELOPMENT SUPPORT SERVICES
Proposed Budget
Years 1 - 5
(In Thousands)

		Year 1			Year 2			Year 3			Year 4			Year 5		
		S&T	AID Missions	ICMRD URI	S&T	AID Missions	ICMRD URI	S&T	AID Missions	ICMRD URI	S&T	AID Missions	ICMRD URI	S&T	AID Missions	ICMRD URI
1.0	Salaries, Wages															
1.1	Director, URI Faculty, Research Associates, Graduate Students	167		68	181		70	195		72	209		74	223		76
1.2	Support Staff	24			26			28			30			32		
1.3	Consultants		148			160			172			184			197	
2.0	Fringe Benefits															
2.1	Non-Classified 22%	37		15	40		15	43		16	46		16	49		17
2.2	Classified 32%	8			8			9			10			10		
3.0	Operating Expenses															
3.1	Communications	2	3	1	2	4	1	2	4	1	2	4	1	2	5	1
3.2	Office Supplies	3	3	1	4	4	1	4	4	1	4	4	1	5	5	1
3.3	Equipment	3	3	1	4	4	1	4	4	1	4	4	1	5	5	1
3.4	Printing and other Office Expenses and Direct Costs	5	7	1	6	7	1	6	8	1	6	9	1	7	8	1
4.0	Travel															
4.1	Domestic	3		1	3		1	3		1	3		1	3		1
4.2	International	21	109	2	21	116	2	24	126	2	27	136	2	28	144	2
5.0	Indirect Costs - 10%	27	27	161	30	30	176	32	32	188	34	34	202	36	36	215
	TOTAL	300	300	251	325	325	268	350	350	283	375	375	299	400	400	315

Annual Projections by Person-Months

The following table lists by activity, and/or type of employment, the person-months to be provided by S&T/AGR and URI/ICMRD under this project. Note it is estimated that S&T/AGR will fund a total of 83.5 person-months per year; whereas URI/ICMRD plans to contribute another 23.0 person-months from its own resources for the same period to assure successful achievement of the project purposes. URI/ICMRD key personnel supported in full or part by the core funding are included in the working group resumes appended to this proposal. Other working group members which are available for consultation, but not charged to the project are also listed in the resumes.

Person-Months Per Year

		S&T/AGR	URI/ICMRD
1.0	Staff Support		
	Director, FDSS		6.0
	Research Associate/Training	9.0	
	Librarian/Information Services	15.0	
	Clerical/Word Processing	18.0	
	Fiscal	6.0	3.0
	Publication Specialist	3.0	
2.0	Socio-Cultural Factors		
	Professor of Anthropology	4.5	2.2
	Professor of Anthropology		1.8
3.0	Fisheries Management		
	Graduate Research Assistant	6.0	
	Assistant Professor of Resource Economics		2.0
4.0	Use of Mariculture		
	Graduate Research Assistant	6.0	
	Professor of Food Science and Technology		2.0
5.0	Post Harvest Fishery Losses		
	Research Associate	10.0	2.0
	Professor of Food Science		2.0
6.0	Resource Development and Utilization		
	Graduate Research Assistant	6.0	
	Assistant Professor of Fisheries Technology		2.0
Total Annual Person-Months		83.5	23.0

External Evaluation of Fisheries Development
Support Services (Project 936-4024) at the
University of Rhode Island Nov. 5-7, 1986

Prepared by

John J. Magnuson
Manuel Murillo
Douglas Pickett

We were asked to "determine whether the project is proceeding on course, and" to make recommendations concerning extension of the project after completion of the initial five years of this agreement." In particular we were asked to address seven items:

1) Is the project purpose in technical assistance and training being achieved?
2) Has the work schedule been adhered to?
3) Are the research activities satisfactory?
4) Are training and technology transfer targets being meet?
5) Is the staff competent and sufficient?
6) Are their identifiable gaps?
7) Is the collaboration between research and extension satisfactory?

To achieve the review the panel, along with Lamarr Trott and Richard Neal of the United States Agency for International Development (USAID) met with staff and students at the University of Rhode Island (URI) for 3 days. On day 1 we met with administrators of the university and the International Center for Marine Resource Development (ICMRD) and were presented background and results of the research groups by the researchers. On day 2 we reviewed information services and training programs, toured facilities, were briefed on other

programs at the University of Rhode Island (the Coastal Resources Management Project [CRMP], the Collaborative Research Support Program [CRSP]) and the status of fisheries development in the South Pacific Region, and interacted with the international students on the program. On day 3 we received an overview of the project from Dr. McCreight, worked on our report and gave our first impressions to the program leaders.

We enjoyed our brief visit with the staff and students and greatly appreciated the hospitality extended by all.

B. Project Background provided by AID

The "Fisheries Development Support Services" project was implemented in July, 1982 with the University of Rhode Island for a five year period. The project purpose was:

> "to provide for the development and maintenance of a "Resource Center" at the recipient institution that will be a repository for skills and information in fishery development and management through the combination of applied research and practical experience; and to strengthen and expand the recipients institutional capacity to assist programs in developing countries aimed at improving the nutritional, employment and living conditions of the poor majority.

During the early years of the project, emphasis was placed primarily on three activities in accord with the program description of the Cooperative

Agreement. These three areas of activity are:

1. library and information services
2. a short-term advisory and consultant services
3. long- and short-term training.

Development and maintenance of a capacity through applied research was not given high priority during early years of the project, as the AID project managers encouraged that attention be directed initially to the three activities identified above.

In an effort to better focus the program, at a mid-point in the project period AID requested that the University redesign its work plan to be more goal oriented, with defined objectives and outputs. Work was begun in this regard the beginning of the calendar year 1985. A consultant was hired with experience in MBO and project design to assist in this process. The outcome was a division into four principle subject areas: 1. fisheries management and resource utilization, 2. socio-cultural factors, 3. use of mariculture, and 4. post-harvest fishing losses. For each area an interdisciplinary committee was formed, and each began work on a newly defined work plan. The work plans are supplemented by Gantt charts describing the timing and outputs of work by each group. The final work plan was not completed until recently (end of FY 1986). Gantt charts were developed for a four year period beginning in January of 1985. Although the startup was July of 1982, AID-instituted changes in budgeting suggested a change to calendar year reporting, as reflected in the charts.

C. Overview of Fishery Development Support Services

"Fishery Development Support Services" is a cooperative agreement between USAID and the University of Rhode Island's International Center for Marine Resource Development. This agreement provides a unique capability in fishery development in developing countries through training, applied research and technical assistance.

Many developing countries can make significant increases in food production, export of products for international trade, and economic development through fuller and more efficient use of the living marine resources. Barriers to their development can often be accomplished by transfer of existing technology and information, training and, in some cases, applied research. Fishery development is often neglected in a development plan, but can be a dramatic way to influence the economics of less developed countries. The rights of coastal states now extend 200 miles off shore and give many less developed countries significant responsibilities and access to major food resources. These countries often have new resources at their doorstep and can prevent the decline of existing resources with the aid of technical resources and information available in the United States.

The University of Rhode Island has put together with AID's help an ability to respond to the needs of less developed countries in the area of marine fisheries. Interdisciplinary programs incorporating resource economics, fishery biology, anthropology and food technology and marine science in

general provide the base for this capability. Equally important, is the structure of the Center, the Library Services, and the experience in both academic and technical training available at the Kingston and Bay campuses.

The history of USAID and URI cooperation since 1969 has led to a growing ability to meet the needs for assistance in fishery management and development in less developed countries. The building blocks of the present program: training, technical assistance and applied research (fig. 1) are interacting components including faculty, staff and facilities of the university. The training component includes both formal degree programs at the undergraduate and graduate levels and an ability to provide specialized training programs for groups such as Peace Corps volunteers, fishers, and fishery development specialists both at the University of Rhode Island and within country sites. The technical assistance portion draws on the interdisciplinary team from across the campus with a sensitivity to local conditions and situations. Assistance is provided in a range of levels from analysis of fisheries to design or repair of fishing gear. Technical assistance also includes an excellent library facility for providing information from a wide range of library sources through a microcomputer database, the products of which are made available at the request of less developed countries. The applied research capabilities are extremely broad and include fishery science, mariculture, anthropology, fishery resource economics, food technology, fishery gear design and testing and others.

The cooperative agreement provides for an umbrella organization to coordinate,

plan and conduct fishery development activities. The plan called a cost-sharing arrangement between the S&T-funded Cooperative Agreement and AID Missions, with the latter expected to cover travel and associated costs of experts supplied by the Center. Activities include publication and dissemination of information pertinent to funding development and training. The coordinating role also easily stretches to activities funded by developing countries, world banks, Peace Corps and developing agencies in other countries.

Four priority areas have been identified by the program: socio-cultural factors, fisheries management and resource utilization, mariculture and the reduction of post-harvest fishery losses. The program has a flexible structure which can incorporate new and eliminate lower priority areas as the need arises. The group is dedicated to its missions and is a ready source of expertise and capabilities for fishery development.

1. Is the project purpose in technical assistance and training being achieved?

Owing to world-wide economic recession and consequent development program funding cut-backs, AID's host countries have been unable to support enhanced fisheries program levels anticipated at the time the Cooperative Agreement was signed in 1982. U.S. Government's deficit reduction efforts, most particularly the Gramm-Rudman-Hollings legislation, also have severely curtailed AID's ability to follow through on fisheries initiatives given a

high priority.

These funding developments notwithstanding, the university has been able, with support from the Cooperative Agreement's funding, to respond effectively to calls for assistance from a good number of places around the world. It has also been able to significantly enhance the Center's response capability while maintaining and effectively using its strengths across the broad range of activities included in fishery development. These achievements have been greatly facilitated by adoption of the more focused approach to the problems of fisheries development instigated in 1984.

Sharpening the working agenda and establishment of applied research goals significantly improved the Center's ability to apply its existing skills and tools in fishery development than had been experienced earlier. The narrowing of foci also made it easier for AID Missions and host governments to identify ways to obtain help from the Center, even when funding was limited. These committees also have helped increase activity directed toward the purposes of the Cooperative Agreement. While obligations have been lower than anticipated, actual expenditures and the number of person months utilized for project activity have increased substantially and demonstrate that the objectives are being obtained. (See Appendix I), Project Expenditures and Person Months Involvement.")

The Cooperative Agreement has generated an impressive number of written products which document levels of effort in training and the provision of

technical assistance. Summary statements listing training manuals completed or in process, working papers produced, and trip reports completed are presented in Appendix II. The documents referenced in these listings appear to be generally of high quality. While the review team was unable to thoroughly examine all the documents during its three day site visit, its perusal of samples convinced the team that work undertaken was well-directed, appropriately focused and of good professional quality. Some of the training manuals are still in draft form.

We were concerned by a low level of activity in short-term, in-country training abroad. USAID Missions and governments of less developed countries are experiencing substantial problems in funding costly training in the United States. The number of "clients" reached through training within the less developed countries can be very large; thus some project objectives can be greatly enhanced at relatively low cost. Benefits accruing from enhanced activity in this area can be substantial, both in terms of reduced costs to the project and in opening up or expanding project client relationships.

In general, the review panel is most pleased with performance in training and providing technical assistance. We are very much aware of the constraints placed on this project by short-falls in anticipated funding levels, both centrally and through USAID Mission buy-in agreements. In spite of these constraints which have limited the geographic range of project activities, we conclude that the project purpose is generally being met, especially after the project was modified and focused in the 1984 amendment. The team is satisfied

that these two project components are experiencing effective management and task-oriented work. Relations between the USAID project managers and key personnel at the Center are close and productive and include most of the project-oriented personnel we met during the site visit.

2. Has the work schedule been adhered to?

The training and technical assistance work schedules agree to by the Center and AID/S&T has been adhered to, to the extent possible under the circumstances involved.

3. Are the research activities satisfactory?

Applied research was added to the agreement in 1984. The Center staff were enthusiastic about this addition to the program and significant accomplishments have been made already.

Perhaps the most impressive are the activities in "Fisheries Management and Resource Utilization." The group has strong leadership, has a solid faculty base in several departments, and is acknowledged nationally and internationally for its strength and high quality. The efforts in combining fishery economics and fishery population models are excellent and much needed. The developments in multispecies management models are also significant and important to development of sound management strategies in tropical fisheries of the developing countries. The group is a valuable resource with many

useful insights for meeting USAID goals in fishery development and management. The group is productive, talented, and well balanced between the applied research and assistance, and contains leaders in the field. Of concern is the recent loss of a faculty member in Resource Economics who has not yet been replaced.

The activities under "Social-cultural factors" were also strong. The University of Rhode Island program is especially fortunate to have strength in this area. Assistance to less developed countries are often ineffective owing to a lack of sensitivity and understanding of the social context of development efforts. This topic area has an important agenda, a very able staff who has been productive both in applied sociological research and in making assistance more relevant and more harmonious to the ways of the fishing communities.

The "Use of mariculture" priority area is focusing on Artemia mariculture and has a good project going. The Artemia project is of value to develop predictable and nutritional supplies of food for shrimp culture. Significant progress has been made on this strongly focused program.

The priority area to reduce "Post Harvest Fishing Losses" has just changed leadership and is just beginning its new program. The mission and needs are great in this area. The program area should be reviewed after the new leadership has had an opportunity to initiate its program. It would be very easy for this group to spread its research too thinly. Applications of new

technology in less developed countries also may continue to be a bottleneck unless specific actions are taken in assistance programs.

The relation between research, assistance and training can be so close that distinguishing one from the other can be difficult. Activities related to developing new fisheries were not identified as a research area but it is clear that research activities related to developing specific new fisheries would enhance assistance and training used to develop new fisheries. Identifying "initiation of new fisheries" as a research area would be a significant help to assistance and training relevant to stimulating the use of unexploited living resources.

4. ,Are training and technology transfer targets being met?

The program description calls for the Center to engage in the development and maintenance of a staff of trained, experienced professionals and the necessary facilities to make possible long term academic and short term technical training of students from developing countries, and to conduct in-country short courses and seminars on various aspects of fisheries for participants from such countries.

Training and technology transfer are essential activities at the Center. A review of the developments and accomplishments under the Cooperate Agreement as related to these purposes, is indicative of the continued efforts undertaken buy the Center to comply with its contractual obligations in this

particular component.

The build up of a highly qualified scientific and technical staff as well as the long term commitment by the University of Rhode Island to develop and maintain a capacity to address multiple aspects of fisheries development and management, constitute unique conditions that have been instrumental in the success of the component on training and technology transfer. The review of the program shows that most elements of the training component have been adequately implemented. A significant number of students have entered the long term degree programs in fisheries economics, fisheries biology, fisheries technology and food technology. Non-degree training, in the form of short term courses, has also been adequately organized and executed.

Efforts undertaken to establish effective communication with appropriate institutions in less developed countries have resulted in the formalization of memoranda of understanding with eight institutions from abroad. Such memoranda of understanding constitute an important step toward the promotion of the program in potential recipient countries and institutions concerned with marine fisheries.

A detailed review of efforts made at the Center to effectively pursue the transfer of technology indicates a series of timely accomplishments that contribute to the overall success of this element of the Cooperative Agreement. Pertinent examples of adequate actions in this respect are the initiatives undertaken in the areas of food and fisheries technology as well

as in the transfer of expertise and support in information services.

A review of the series of manuals, reports of project activities and technical publications for distribution among specialized institutions, shows that there has been continuous concern for the dissemination of information pertinent to the purpose of the agreement.

Attention has also been paid to the planning and implementation of short courses and seminars in less developed countries on subjects pertinent to marine fisheries management. There are ample possibilities to intensify efforts to effectively transfer technology and expertise to recipient institutions. A more thorough integration and coordination of ongoing activities in the Center would contribute to achieving this potential to a greater extent.

5. Are research, training, and technical assistance personnel competent, and is staffing adequate?

We observed a high level of enthusiasm among project participants during the review. Administrators, senior and junior factor staff members, all seemed to have an essential grasp of project purpose and objectives, and to understand how their roles meshed into the larger picture. They appeared to view their activities and relationships as being of importance to the accomplishment of goals, and evidenced both commitment and pleasure in their involvement. The students we met seemed to be well-informed and serious about their work and

pleased with interaction with project-related staff and activities. All of these are good signs, arguing well for project success, and the team was pleased to see them.

The overall faculty and staff represent a valuable academic and technical resource worthy to support. The Center has successfully drawn talent from several areas at the university and has organized a program to promote research, to facilitate training, and to provide technical assistance to small scale fishery development. The experience accumulated by the staff in international programs with less developed countries from several regions of the world adds greatly to the present capability of the group. As a coordinating entity within the university, the Center has access to a wide array of facilities and a working infrastructure, to complement the highly qualified scientific and technical personnel.

On closer analysis several components stand as the most balanced and mature activities within the Center. Such is the case of the programs on Fisheries Management and Resource Utilization, on Socio-Cultural Factors, on the use of Mariculture Developing Countries, and on Fisheries Training, as well as the program on Information Services.

With the diversity and high quality of scientific and technical talent, the Center has a significant potential to become a center of excellence in research, training and technical assistance, in most disciplines related to small scale fisheries. Provided continued support from URI and strong

internal leadership, the Center could develop their potential to this high level.

URI has generally exceeded expectations in making faculty available to the project, but recently has not filled two important faculty positions vacated when incumbents moved out. Of particular importance is the position previously filled by Dr. Harlan Lampe, who was especially valuable in achieving project objectives. We hope that the university views this loss as serious and takes steps to fill these positions with well-qualified, personnel who can play an important role in the Center's activities.

6. Are there identifiable gaps?

The energies of a program of this strength and such real world challenges can easily be dissipated. There is so much to be done in so many places that the potential number of gaps are endless in terms of what they could do for which less developed country. They have shown good judgement in choosing activities within their abilities on a limited number of problems. When opportunities are available they have concentrated their activities in certain countries. One could wish that future challenges and funding resources will give them opportunities to do more work in Africa and in the Pacific than have developed to date.

7. Is the collaboration between research and extension satisfactory?

The review team was impressed by the abilities and program in non-degree training. Clearly the group has unique abilities to contribute technical training to specialized groups. Training provided to Peace Corp volunteers and to Oman are excellent examples of off and on campus training. The Oman situation demonstrated that they had the ability to pick up an extremely difficult training task on short notice.

Research on food technology has not been picked up readily and transferred to new applications. However, the need to reduce post harvest losses have been identified by the program, new staff have been employed and an effort has begun to reduce post harvest losses in at least one less developed country. These new directions should be evaluated in a couple years.

SUMMARY AND RECOMMENDATIONS

The International Center for Marine Resource Development at the University of Rhode Island conducts an important program of training, assistance and applied research in marine resource development in less developed countries. The university has a unique combination of capabilities to advance this mission and is responsive to the needs and opportunities in fishery development. The components of training, technical assistance are organized into interdisciplinary programs tied to strong academic programs. The program is sensitive to human factors and the context for development within developing countries. The facilities for information services, training, and applied research at URI are good. The program focus has sharpened with the addition

of applied research and priority areas for activity under the agreement. Clearly this valuable capability should be maintained by the United States at the University of Rhode Island. We know of no group who could do it better; these unique capabilities are an important national resource for assistance in less developed countries. The need and potential benefits for marine resource management and development in less developed countries are great and the University of Rhode Island's program is the right place to do it. To let the program lapse and then start over at a later date would be an unfortunate mistake. We believe a more constructive goal is to help this program develop to a center of excellence in training, applied research and technical assistance in fishery development for less developed countries which will complement agricultural programs.

Recommendations

1. USAID should provide a stable enough base of support so that the university can carry out this program and make the long term decisions regarding faculty replacement, facility allocation, and staff development required for a continuing effective program. The university should be encouraged to maintain faculty and staff strength in areas related to this Agreement.

2. USAID and the Center should make a significant attempt to increase the opportunities to conduct overseas through AID missions. In-country training is a cost effective way to train larger numbers of people. The need is great,

the mechanisms to approve and fund such efforts seem awkward.

3. Do not focus more and more of the effort in fewer and fewer countries, rather consider broadening the reach of the Center so that more developing countries have access to the unique opportunities offered by the Center for technical assistance in marine fisheries.

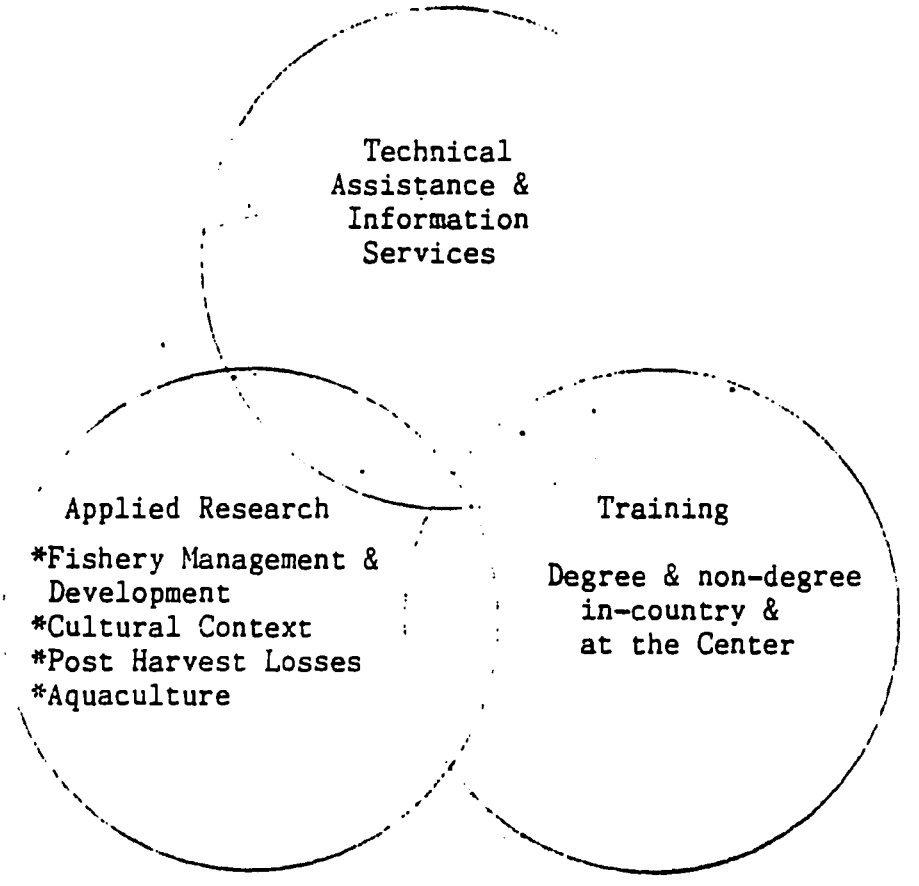
4. Seek effective ways to promote the access of more institutions in the developing countries to the excellent information and documentation services at the Center. The scientific and technical expertise in the field of documentation and information is of the highest possible level. This expertise, together with the modern facilities and infrastructure, constitute valuable resources that should be brought to the attention of the appropriate institutions and individuals in less developed countries.

5. Undertake specific actions to ensure effective planning and coordination of all activities on technology transfer. In some instances results of technology transfer activities, as summarized by the responsible staff member, did not provide a clear indication that an effective transfer was indeed accomplished.

6. Complete draft training manuals and make them available to user groups. Development of native language documents are encouraged.

-16

Figure 1. Functional organization of integrated program of fishery management and development at the International Center for Marine Resource Development at the University of Rhode Island.



Appendices

I. Project expenditures and staff involvement

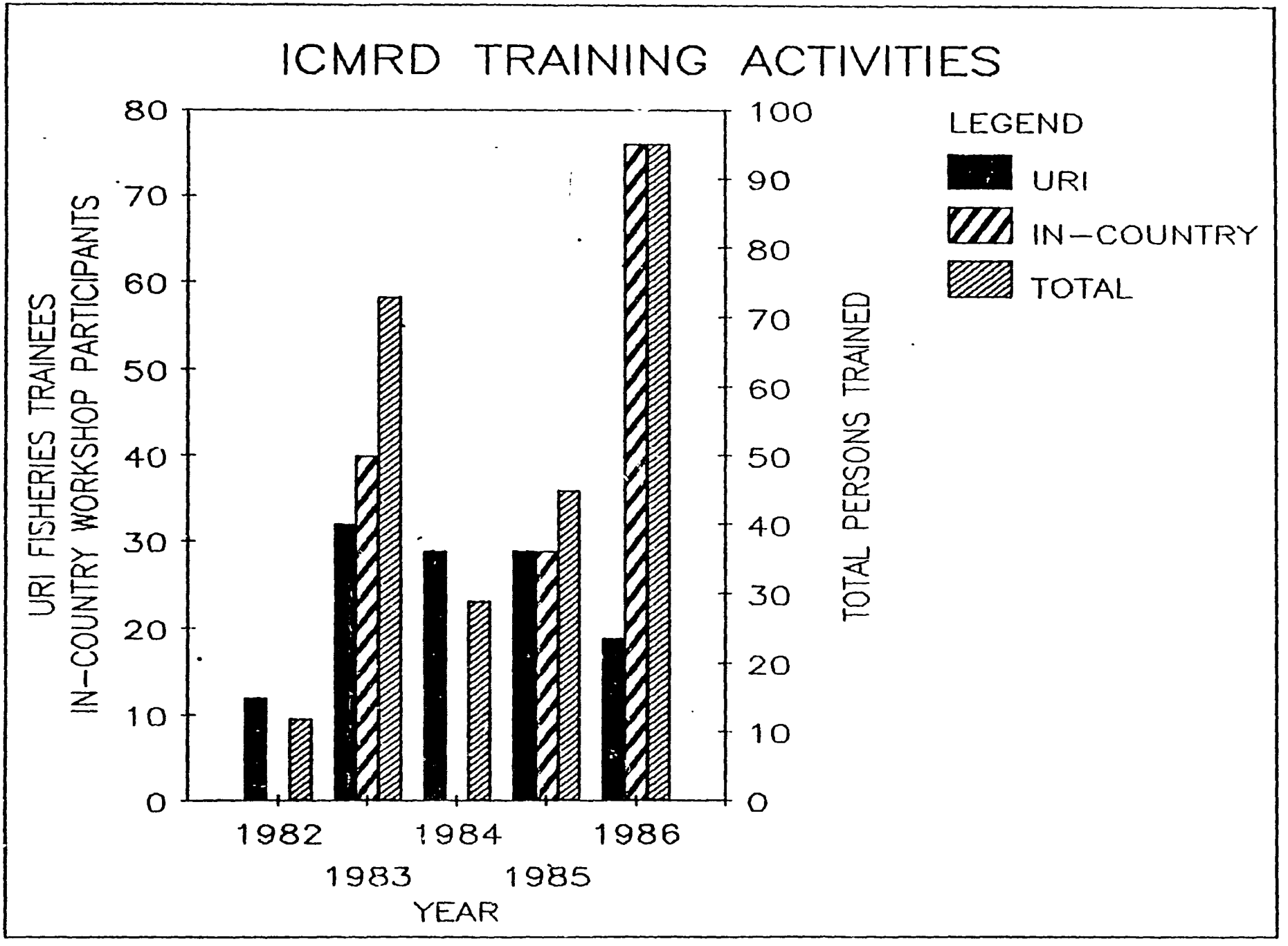
II. Selected outputs from the program.

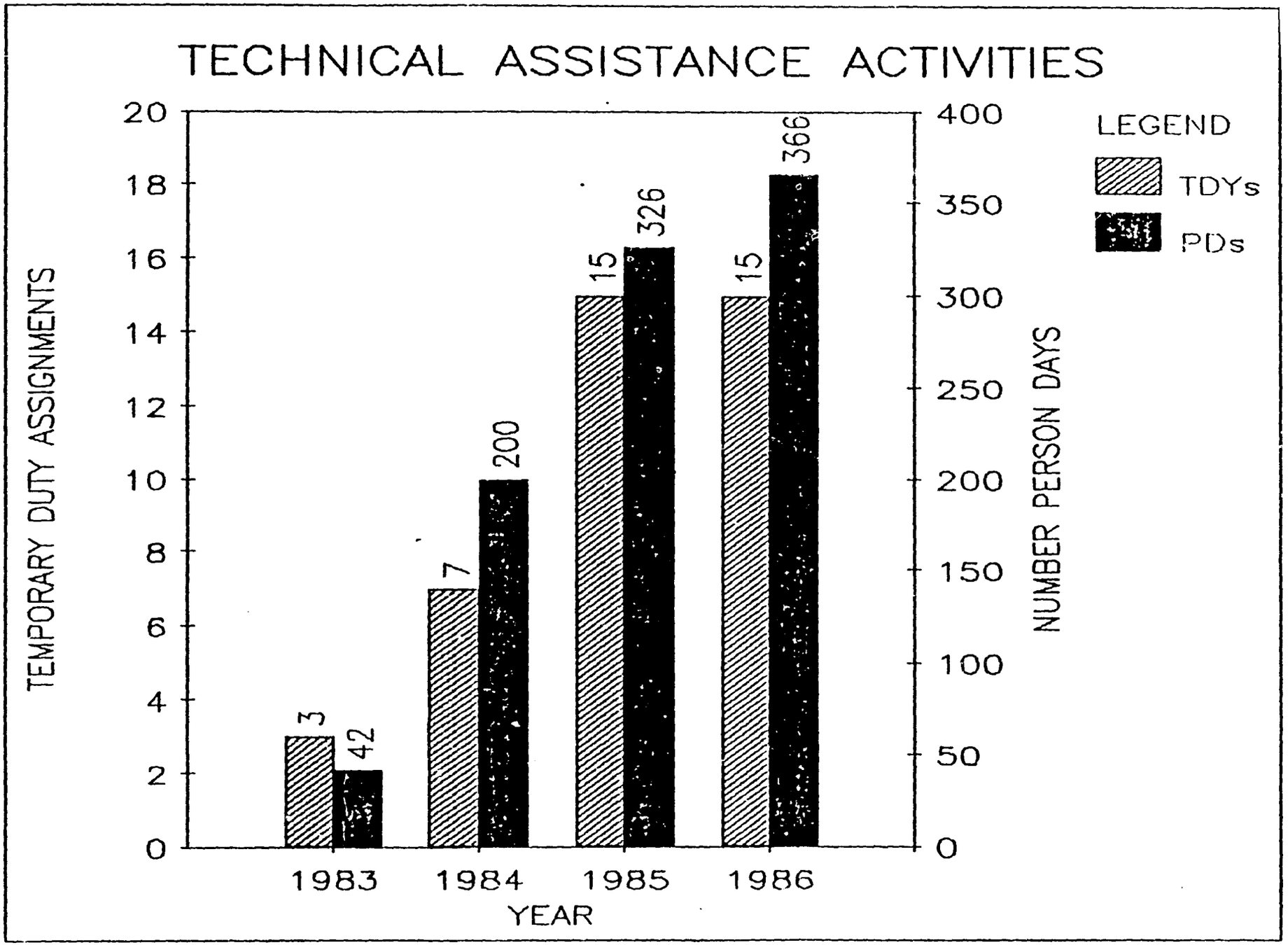
(Note - Perhaps the Center can supplement these with additional or more quantitative lists-JJM)

Appendix I

PROJECT EXPENDITURES AND PERSON MONTHS INVOLVEMENT
USAID "FISHERIES DEVELOPMENT SUPPORT SERVICES"
Cooperative Agreement DAN 4024 A-00-2072

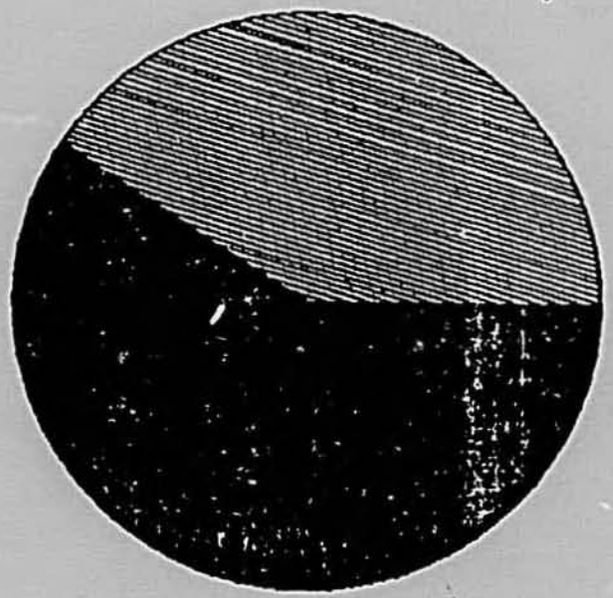
Yr.I	Actual Expenditures	Total Person Months	Technical Assistance Missions Reg.Bureaus	Applied Research	Training	Information Services	Admin. Support Services
7/1/82 - 6/30/83	102,802	40.75	1.0	--	6.75	18.5	13.5
Yr.II							
7/1/83 - 6/30/84	251,347	76.30	7.75	--	30.25	18.00	20.30
Yr.III							
7/1/84 - 6/30/85	293,621	79.00	8.50	--	14.0	25.5	31.0
Yr.IV							
7/1/85 - 10/31/86	369,053	130.25	12.25	37.0	16.0	26.0	39.0
TOTAL PROJECT	1,016,823	326.30	29.50	37.00	67.00	88.00	101.8


ICMRD TRAINING ACTIVITIES
URI FISHERIES TRAINEES
IN-COUNTRY WORKSHOP PARTICIPANTS
TOTAL PERSONS TRAINED
LEGEND
URI
IN-COUNTRY
TOTAL
0
10
20
30
40
50
60
70
80
90
100
1982
1983
1984
1985
1986
YEAR


TECHNICAL ASSISTANCE ACTIVITIES
TEMPORARY DUTY ASSIGNMENTS
NUMBER PERSON DAYS
YEAR
LEGEND
TDYs
PDs
0
2
4
6
8
10
12
14
16
18
20
0
50
100
150
200
250
300
350
400
3
42
7
200
15
326
15
366
1983
1984
1985
1986

NUMBER OF PERSONS TRAINED BY ICMRD
1982–1986

URI (100) 40.8%



IN–COUNTRY (145) 59.2%

Appendix II

TRAINING MANUALS

Title	Authors	Status
A Guide for the Small Scale Fishery Administrator: Information from the Harvest Sector (Spanish and English versions)	D. Stevenson, R. Pollnac & P. Logan	English - Final Spanish - Final
Plywood Workboats for Small-Scale Fisheries	T. C. Visel & W. H. Highsmith	Final
Building the FAO 6-2 Meter V-Bottom Boat	C. Recksiek & A. Giblin	Final Draft
Business Management for Small-Scale Fishermen's Organizations: A Training Program	M. M. Drew	Final Draft
Sociocultural Information Needs for Developing Cooperatives Among Small-Scale Fishermen	R. B. Pollnac	Draft
Seafood Processing and Utilization: Preservation and Processing of Fishery Products	A. Siegel & M. Morrissey	Draft
Bioeconomic Modelling of Fisheries	H. Lampe & P. Logan	Draft
Practical Twinework for Fishermen and Gear Technologists	J. DeAlteris	Draft
Artemia	K. Simpson	Draft
Small-Scale Marine Fisheries Development and Extension	B. Crawford, K. Castro, S. Drew, et al.	Preliminary draft/concept stage
The Fishery Science Applications System (FSAS), A Compendium of Microcomputer Programs and a Manual of Operations	S. Saila, C. Recksiek & M. Prager	Final Draft

WORKING PAPERS

(1982-1986)

ICMRD Working Papers

Brainerd, T. R. July 1986. Lessons from Fisheries Development in West Africa: Overview. ICMRD Working Paper #9.

Lepiz, L. G. and Jon G. Sutinen. February 1985. Surveillance and Enforcement Operations in the Costa Rican Tuna Fishery. ICMRD Working Paper #14.

Hendrix, M. H. November 1984. Technical Change and Social Relations in a West African Maritime Fishery: A Development History. ICMRD Working Paper #21.

Brainerd, T. R. June 1984. Lessons from Fisheries Development in West Africa: Artisanal Fisheries, Senegal. ICMRD Working Paper #13.

Brainerd, T. R. June 1984. Lessons from Fisheries Development in West Africa: Artisanal Fisheries, Guinea Bissau. ICMRD Working Paper #12.

Brainerd, T. R. June 1984. Lessons from Fisheries Development in West Africa: Oyster Culture Project, Sierra Leone. ICMRD Working Paper #11.

Brainerd, T. R. June 1984. Lessons from Fisheries Development in West Africa: Purse Seine/Trawler Construction, Ghana. ICMRD Working Paper #10.

Hendrix, M. K. 1983. Technology and Tradition in West African Maritime Fisheries: Tombo, Sierra Leone. ICMRD Working Paper #8.

Epler, B. June 1983. The Fisheries of Guinea-Bissau. ICMRD Working Paper #7.

Anthropology Working Papers

Pollnac, R. B. December 1985. Sociocultural Issues in West African Fisheries Development. Anthropology Working Paper #45.

Pollnac, R. B. September 1984. The Division of Labor by Sex in Fishing Societies. Anthropology Working Paper #44.

Pollnac, R. B. January 1984. Sociocultural Aspects of Small-Scale Fisheries Development in West Africa. Anthropology Working Paper #43.

Pollnac, R. B., A. Dickson, N. Razo and A. Sualog. August 1982. The Effects of Formal Education and Government Services on Aquaculture Practices in Region II of the Philippines. Anthropology Working Paper #42.

Bibliographies

Hendrix, M., T. Brainerd and T. Omara-Alwala. June 1984. A Working Bibliography on East African Fisheries. ICMRD.

TRIP REPORTS

1986

EVALUATION OF FISHERIES DEVELOPMENT PROJECT IN DJIBOUTI
by Harlan Lampe and others
(This work was completed for PPC Division of USAID - not available for distribution by ICMRD.)

A PROPOSED PROGRAM OF RESEARCH & STAFF DEVELOPMENT FOR THE SOCIAL ECONOMIC DEPARTMENT OF FACULTY OF FISHERIES, INSTITUT PERTANIAN BOGOR
by Harlan Lampe

PRELIMINARY INVESTIGATION OF THE PORTUNIDAE CRAB RESOURCES IN COASTAL & ESTUARINE WATERS OF ECUADOR
by Joe DeAlteris, Kathleen Castro

SOCIAL SOUNDNESS FOR INDONESIAN FISHERIES PROJECT
by Richard Pollnac

RECOMMENDATIONS FOR STRENGTHENING THE EDUCATIONAL, RESEARCH & DEVELOPMENT CAPABILITIES OF DEPARTMENT OF FISHERIES PRODUCT TECH., INSTITUT PERTANIAN BOGOR, INDONESIA
by Joe McAlister

TRIP REPORT - Ecuador
by John Poggie

1985

REPORT OF U.R.I. CONSULTANCY ON POTENTIAL ROLE OF ESPOL IN ARTISANAL FISHERY DEVELOPMENT IN ECUADOR
by S. Drew and R. Pollnac, Consultants

Technical Assistance to Barbados AID Mission
"Development of RFP for Marine Resources Assessment in the Eastern Caribbean"
by Dr. John Poggie and Dr. David Stevenson

THE ROLE OF WOMEN IN FISHERIES IN SIERRA LEONE
by Alexa Albert, Marjorie Caldwell

TITLE XII PROJECT TO ASSIST IN THE DEVELOPMENT OF IN-COUNTRY PRODUCTION OF BRINE SHRIMP (ARTEMIA) FOR USE AS FOOD FOR AQUACULTURE ORGANISMS IN INDONESIA
by Dr. Paul D. Maugle

Report of URI, UPR, ESPOL Meeting
June 3-7, 1985
Cooperative Agreement DAN 4024 A-00-2072-00
"Fisheries Development Support Services"

1985 (continued)

A REVIEW OF THE FISHERIES TECHNOLOGY PROGRAM AT THE SCHOOL OF FISHERIES - ESCUELA SUPERIOR POLITECNICA DEL LITTORAL GUAYAQUIL, ECUADOR
by Prof. Joseph DeAlteris

REPORT ON ICMRD TECHNICAL ASSISTANCE TO THE BUREAU OF FISHERIES AND AQUATIC RESOURCES - THE PHILIPPINES
by Richard B. Pollnac

1984

PANAMA, INITIATION OF TROPICAL BIVALVE HATCHERY CULTURE IN PANAMA.
by Dr. Melbourne Carriker

COMMERCIAL SHRIMP CULTURE, SRI LANKA
by Clarence Idyll, Harry Cook

WEST AFRICAN FISH, INITIATIVE PROJECT
by J. Sutinen, B. Epler

1982-1983

EAST AFRICA EFFORT: DJIBOUTI
by D. McCreight

HONDORAS EFFORT
by D. McCreight

PHILIPPINES GOV. BFAR, SOCIO-CULTURAL ASPECTS OF SMALL-SCALE FISHERIES DEPARTMENT

Actual and Proposed Training Program
1979 to 1988

Funding Source	Dates	Number of Trainees	Discipline	Origin of Participants
U.S.A.I.D.	5/18 to 6/12/		Information From the Harvest Sector at URI	Open to all countries
U.S.A.I.D.	6/15 to 6/26/		Microcomputer Applications in Fisheries at URI	Open to all countries
U.S.A.I.D.	6/29 to 7/24/		Minimizing Post Harvest Losses at URI	Open to all countries
U.S.A.I.D./ESPOL	1986	4	Naval Engineering Technical Fisheries./Artemia Lipidology and Pesticide Research at URI	Ecuador
U.S.A.I.D.	1986 - 1988	11	Technical Fisheries at URI and in Puerto Rico	Oman
U.S.A.I.D.	1982 - 1983	1	Fisheries Management at URI	Nigeria
U.S.A.I.D.	1979 - 1981	16	Commercial Fisheries at URI	Guinea Bissau
Peace Corps	1981	10	Small Scale Technical Fisheries in Puerto Rico	U.S. Destination: Philippines Papua New Guinea
Peace Corps	1983	22	Small Scale Technical Fisheries in Puerto Rico	U.S. Destination: Tunisia Sierra Leone
Peace Corps	1984	7	Small Scale Technical Fisheries in Puerto Rico	U.S. Destination: Morocco
Peace Corps	1985	18	Small Scale Technical Fisheries in Puerto Rico	U.S. Destination: Turks and Caicos Dominic Republic Jamaica Tonga Haiti Sierra Leone

Funding Source	Dates	Number of Trainees	Discipline	Origin of Participants
Peace Corps	1986	3	Large Scale Commercial Fisheries at URI	U.S. Destination: Tunisia
World Bank	1982-83	8	Project Monitoring and Evaluation at URI	Philippines
World Bank	1983-84	1	Commercial Fisheries at URI	Sri Lanka
World Bank	1984-85	8	Stock Assessment, Project Monitoring, and Project Development and Management at URI	Philippines
World Bank	1985	10	Preservation and Packaging at URI	Philippines
World Bank	1985	2	Electronics at URI	Philippines
World Bank	1985	1	Marine Sciences and Fisheries Information Services at URI	Philippines
World Bank	1986	1	Fishery Science and Oceanography at URI	Philippines

Fisheries Development Support Services
S&T/AGR/RNR Project No. 936-4024

Project Paper Amendment

Table of Contents

		Page
I.	Executive Summary	1
II.	Project Background and Detailed Project description	3
	A. Background	3
	1. Importance of Fisheries in the LDCs	3
	2. Project Evaluation	4
	3. Success Stories	5
III.	Project Goal, Purpose, S&T CPSS and Project Components	5
	A. Project Goal	5
	B. Project Purpose	5
	C. S&T CPSS	6
	D. Project Components	6
	1. S&T/AGR's contribution	6
	2. Contributions by URI/ICMRD	6
	3. Contributions from missions, regional bureaus and other AID/W offices	6
IV.	New Cooperative Agreement between S&T/AGR and URI/ICMRD	7
	A. Project Components	7
	1. Applied and Development Research	7
	2. Technology Transfer	8
	a. Problem Solving Activities	8
	b. Transfer of Information	9
	3. Training	9
	a. Non-degree and short-term training at URI and in LDCs	9
	b. Comprehensive training manuals	10
	c. Prepare audio/video cassettes for training	10
	d. International visiting scientists and others	10
	e. Seminars and workshops	10
	f. Peace Corps fisheries training	10
	4. Networking and Linkages	10
	a. International, national and regional centers	10
	b. Conferences and international study groups	10
	c. International workshops on fresh fish preservations	10
	d. Publications and scientific journal articles	11
	e. Formalized memoranda of understanding with LDC institutions and governments	11
	B. Relationship of the four project components	11
	C. Substantial Involvement Understanding	11
	D. Annual Work Plans	12

Table of Contents (continued)

		Page
E.	Reporting Requirements	13
1.	Quarterly Reports	14
2.	Technical and Research Reports	14
3.	Annual Activity Reports	14
4.	Training Activities	14
5.	Annual Expenditure Reports	14
6.	Impact Analysis Reports	15
7.	Trip Reports	15
F.	Cooperative Agreement - Terms and Management	16
1.	Terms	16
2.	Five-Year Budget	16
V.	Five-Year Companion Basic Ordering Agreement	16
A.	Purpose of the Basic Ordering Agreement	16
B.	Benefits to AID	17
C.	Relationship to Cooperative Agreement	18
D.	Terms of the Basic Ordering Agreement	18
1.	Basic Ordering Agreement Period	18
2.	Operating Mode	18
3.	Cost Reimbursable	19
4.	Statement of Work	19
5.	Special Orders	20
6.	Completion of Orders and Reports	21
VI.	Reviews and Evaluations	21
A.	Management Reviews	21
B.	In Depth Evaluation	21

Appendices:

Appendix I - Project Design Summary
Appendix II - Five-Year Budget

WANG:4966g:MMozynski:5/8/87

Project Paper Amendment
Fisheries Development Support Services
(S&T/AGR/RNR Project No. 936-4024)

I. Executive Summary

On May 27, 1982, the Agency Director for Food and Agriculture authorized a ten-year Fisheries Development Support Services project at a level $4.0 million. The project assistance completion date (PACD) and the final year of obligation were given as June 30, 1987 and FY 1991, respectively. The project design summary (logical framework) and budget covered only the first five years of the project. In addition, no provision was made for mission, regional bureau, and other AID/W funds to be obligated through contractual delivery orders under a companion basic ordering agreement (BOA) during the life of the project.

The project is now being implemented under a five-year cooperative agreement (CA) with the International Center for Marine Resource Development, University of Rhode Island (URI/ICMRD) at a level of $1,574,715 and covers a five-year period July 1, 1982 through June 30, 1987. To date only $1,313,000 has been obligated leaving a balance of $2,687,000 against the authorized level of $4,000,000.

The Office of Agriculture, Directorate for Food and Agriculture, Bureau for Science and Technology is now ready to proceed with the last five years of implementation and recommends that the project be amended as follows:
1) the authorized PACD be extended to September 30, 1992; 2) the final fiscal year of obligation be extended to FY 1992; 2) the project design summary (logical framework), a new scope of work and budget be added for the last five years of the project, and 3) provision be made for a $2.4 million BOA to cover special orders to be funded by missions, regional bureaus and other AID/W offices.

S&T/AGR has received a proposal from the URI/ICMRD which provides information on the impact of the first five years of the project, identifies problem areas to be addressed, and proposes a program for the next five years of the project. The proposal provides for applied and developmental research, technology transfer, training, and maintaining and establishing new networks and linkages with scientists and institutions in developed and developing countries.

The outputs contained in the proposal cover the following areas:

1. Socio-cultural factors, including the role of women in fishing societies; factors influencing success of fishermen's organizations; analysis of traditional behavior patterns in fishing communities; development of a model of interrelationships between sociocultural characteristics of fishing communities, fishing technologies and techniques, and aspects of the marine environment and coastal zone; and, response capabilities in sociocultural aspects of fishery development.

2. Fisheries management, including management policy analysis; market analysis covering research on domestic and international markets for mariculture; market analysis for the capture sector; mathematical modeling and programming; utilization of fish by-catch, especially of the trawl shrimp fishery; and, bioeconomic management models for tropical multispecies fisheries.

3. Use of mariculture in developing countries, including development of brine shrimp (Artemia) production and quality control; studies of brine shrimp quality and diet that they eat in their natural environments; and comparison of brine shrimp to microencapsulated fish diets that can be mass-produced in laboratory conditions; and, international brine shrimp workshops.

4. Post harvest fishery losses, including reduction of losses due to spoilage and contamination; processing methods for fishery products; products from underutilized species; and, development of human resources in post harvest fishery losses through training programs.

5. Resource development and utilization, including feasibility studies on developing swimming crab fishery industries and cultivating mangrove oysters; increased productivity of LDC fishermen; and, training fishermen through technical fisheries manuals (e.g., practical twinework for fishermen and gear technologists).

The above areas are those which S&T/AGR has identified as important during the next five years to achieve the goal and purpose of this project. The outputs and the magnitudes of the outputs and inputs are indicated in the project design summary (logical framework), attached. The exact periods of implementation will be covered in the annual work plans as mutually agreed by S&T/AGR and URI/ICMRD. The program will be implemented by a CA between S&T/AGR and URI/ICMRD and by a companion BOA which will provide for special orders to be funded by missions, regional bureaus and other AID/W offices.

URI/ICMRD proposed a CA budget at $3,166,000, of which S&T/AGR would be contributing $1,750,000 or 55 percent of the total, and URI/ICMRD - $1,416,000 or 45 percent. This represents a very large contribution for such an institution. It also provides an indication of the Center's dedication to helping AID promote its fisheries programs to: 1) increase employment and income opportunities of the poor majority; 2) obtain additional foreign exchange earnings from the sale of fishery products; 3) increase the availability of high protein foods by decreasing post harvest losses and increasing fish availability; and 4) to conserve and properly utilize natural resources available to LDCs.

Because of budgetary constraints, S&T/AGR will not have $1,750,000 to fund a new CA over the next five years. However, we are proposing a CA level of $2,292,000, of which S&T/AGR will be contributing $1,273,000 or 56 percent of the total and URI/ICMRD will be contributing $1,019,000 or 44 percent. In an informal inquiry, URI/ICMRD has indicated that this contribution will be made.

For the companion BOA, S&T/AGR is requesting a level of $2.4 million to accommodate expected mission, regional bureau and other AID/W "buy-ins. This request is based on mission responses to S&T/AGR's query regarding the need for services to be provided by URI/ICMRD. Of the 31 missions responding, 58 percent responded positively or indicated possible need for the services in the future.

The proposed amendment of the project paper will allow for a new five-year agreement at the levels proposed above. The contributions by missions, regional bureaus and other AID/W offices will be funded by the requesters under special orders issued against a companion BOA.

II. Project Background and Detailed Project Description

A. Background

1. Importance of Fisheries in the LDCs

The fisheries sector plays an important role in the economies of the LDCs, provides a productive means of employment, and a potential source of foreign exchange for many developing countries. Much of the harvest taken by developing countries is caught by millions of small-scale fishermen and increases in the catch and reductions in post harvest losses would benefit them directly.

FAO estimates that the world fishery provides employment for about 10 million fishermen with as many as 40 million more people engaged in associated activities such as processing and marketing. The greater part of this work force is associated with small-scale fisheries located in LDCs representing the poorest groups of the countries.

It has been estimated by FAO that LDCs can increase their catches by approximately 25 million metric tons per year by harvesting resources near their shores at an optimal rate under proper management. Currently over 10 million metric tons of fish ($4.0 - $6.0 billion) are lost annually through spoilage or pest damage and this figure could be substantially reduced through the introduction of improved methods of post harvest storage, distribution and processing.

The importance of fish protein in the diets of A.I.D. target groups is significant, but the role varies from region to region. FAO estimates that on the average about 60 percent of the population in the LDCs derive more than 30 percent of their animal protein from fish. This projection underestimates the importance of fish in Asia, parts of West Africa, and many island countries where it is often an indispensable part of the diets in these areas. In addition, fish products are generally available at a lower cost than other animal products in LDCs.

Changes in the Law of the Sea related to extension of national jurisdiction to 200 miles has brought increased attention to the importance of fisheries and marine resources, particularly the role they can play in development. This emphasis is especially critical to small-scale fishermen who make up the bulk of the fisheries sector in LDCs. Small-scale fishermen can benefit from the introduction of fishery management measures designed to optimize production while protecting the resources.

2. Project Evaluation by Team of Scientists

This project was evaluated in November 1986 by a team of scientists, including representatives from a regional bureau and an LDC. The team fully supported the project and strongly recommended that it be continued with URI/ICMRD as the implementing agent.

The evaluation team reported that improved marine resource management and development techniques will increase: 1) incomes of LDC fishermen; 2) food availability, production, and security; and 3) the foreign exchange earnings of the LDC governments involved in the program. The team further stated that URI/ICMRD is the appropriate U.S. institution to implement programs in this area as it has a unique combination of highly trained marine scientists and the facilities to respond to the needs of the LDCs. In addition, the university is sensitive to: 1) human factors by virtue of its on-going research in socio-economics, and 2) the developmental methods needed for successful LDC programs by virtue of its background and years of experience working in the developing world. The facilities at the university are designed to support a program of basic and applied research, training, technology transfer, and networking. These activities are inter-disciplinary and tied to strong academic courses at the URI. In

addition, URI has agreed informally to provide $1,019,000 from its own resources to assure the success of the program during the next five years.

3. Success stories

Many success stories can be cited. For example in the Philippines, URI/ICMRD trained scientists are leading in-country programs for extension workers who are instrumental in reducing post harvest losses and improving the quality of fishery products. In Palawan and northern Luzon, fishermen using improved fishing techniques have decreased post harvest losses of fish substantially. This has increased the availability of fish, resulted in more disposable income, and increased the nutritional level of the fishermen's families.

In Ecuador, capture technology promoted by URI scientists has resulted in the previously unutilized "blue crab" species being harvested and exported. This new activity is bringing additional earnings and employment to the small-scale fishermen. Although just beginning, the crab project is a good example of S&T/AGR, mission and host country cooperation in utilizing natural resources to develop a lucrative fish industry. Foreign exchange is being generated from export of these species.

In Thailand, Philippines, and Ecuador, URI/ICMRD scientists have trained faculty members on methods for analyzing fatty acid profiles in brine shrimp. This analysis has resulted in the use of new methods which have greatly reduced mortality and increased growth rates of fish food organisms which are essential for successful mariculture programs.

III. Project Goal, Purpose, S&T CPSS, and Project Components

A. Project Goal - The goal statement of the project has been changed as follows to place more emphasize on the quality of life of poor LDC residents.

"To improve the quality of life of poor LDC residents, both economically and nutritionally through effective sustained use of living aquatic resources."

B. Project Purpose: In addition, the purpose statment has been revised as follows to emphasize the new A.I.D. mandate:

"To assist LDCs improve their capabilities to develop programs designed to: 1) increase employment and income in

the fisheries sector; 2) decrease post harvest losses and increase utilization of high quality animal protein by the poor majority; 3) use rational management strategies to conserve national resources and optimize sustained yields; and 4) increase foreign exchange earnings from fisheries products.

C. S&T CPSS

Additionally, this project conforms with the S&T CPSS, which outlines the role of S&T/AGR. Specifically, this project satisfies S&T/AGR's mandate to: 1) foster food security objectives and stimulate economic growth in LDCs; 2) increase income among the poor farmers; 3) increase food production without harming the natural resource base; 4) increase the consumption of high quality animal protein - thus improving nutrition and decreasing hunger; 5) make effective use of available natural resources; and 6) strengthen national institutional capabilities through education, policy dialogue, and human resources development.

D. Project Components:

1. S&T/AGR's contribution for the next five years will total $1,273,000 and cover: 1) applied and developmental research at a level of $637,000 or 50 percent of the total; 2) technology transfer, including problem solving and transfer of information at a level of $191,000 or 15 percent; 3) various training programs at a level of $254,000 or 20 percent; and 4) networking and linkages at a level of $191,000 or 15 percent.

2. Contributions by URI/ICMRD are expected to total $1,019,000 for: 1) basic and adapted research at a level of $611,000 or 60 percent of the total; 2) technology transfer at a level of $102,000 or 10 percent; 3) training programs at a level of $204,000 or 20 percent; and 4) networking and linkages at a level of $102,000 or 10 percent.

3. Contributions from missions, regional bureaus and other AID/W offices are expected to total $2,400,000 and cover: 1) applied and developmental research at a level of $360,000 or 15 percent of the total; 2) technology transfer at a level of $1,200,000 or 50 percent; training programs at a level of $480,000 or 20 percent; and networking and linkages at a level of $360,000 or 15 percent.

IV. New Cooperative Agreement between S&T/AGR and URI/ICMRD

The building blocks of the proposed CA are: applied and development research, training, technical assistance and networking which are interacting components including faculty, staff and facilities of the university. The training component will include formal degree programs at the under-graduate and graduate levels and an ability to provide specialized training programs for groups such as Peace Corps volunteers, fishermen, and fishery development specialists both at the university and within LDC country sites. The technical assistance portion will draw on the inter-disciplinary team from across the campus with a sensitivity to local LDC conditions and environment. In addition, assistance will be provided in a range of levels from analysis of fisheries to design or repair of fishing gear.

Technical assistance activities also include an excellent library facility for providing information from a wide-range of library sources available through a micro-computer data base, the products of which are made available upon request from LDCs. The applied research capabilities draws on the extremely broad basic research developed by URI covering fishery science, mariculture, anthropology, fishery resource economics, food tecnnology, fishery gear design and testing and others.

A. Project Components

1. Applied and Development Research

a. Improved methods for managing fisheries resources, including under utilized species in LDCs.

- At least two methods adapted for LDCs and used in at least one LDC.

b. Improved methods for reducing post harvest spoilage and contamination

- At least three methods adapted for LDCs and transferred to at least one LDC.

c. Improved methods for processing, distributing and marketing fish and fish products in LDCs.

- At least two techniques developed and used in selected target areas of LDCs

d. Improved methods for assisting LDC fishermen, processors and wholesalers to use innovative methods in the industry.

- At least two methods developed and successfully applied in one LDC.

e. Determine factors which influence success or failure of fishermen's cooperatives.

- Research will be conducted and findings applied in at least one LDC.

f. Role of women in fishing societies as related to change in the fishery industry

- Research will be conducted and findings applied in at least one LDC.

g. Determine interrelationships between the sociocultural characteristics of fishing communities, technologies and techniques and the aspects of marine environment and the coastal zone.

- Research will be conducted, and a model developed, and field tested in at least one LDC.

h. Develop models for mariculture systems in LDCs, including Artemia.

- Models will be applied in at least two LDCs.

i. Improved quality control for domestic and international markets.

- Methodology developed and demonstrated in at least one LDC.

j. Market analysis for captured fish

- Analysis will be completed in at least 4 LDCs.

k. Mathematical Programming Algorithms.

- One algorithm will be developed, distributed and demonstrated in 4 LDCs for economic analysis of fisheries development potential.

2. Technology Transfer

a. Problem Solving activities - Although most of the technical assistance provided under this category will be provided under the companion basic ordering agreement, there will be some activities funded under this cooperative agreement. The assistance will be provided in the following areas:

- Factors influencing project success
- Fisheries marketing and policies
- Planning in fisheries development
- Fishery sector studies.
- Factors influencing success or failure of fishermen's organizations.
- Utilization of fish by-catch
- Mariculture or Artemia or other marine species
- Development of quality control methods of Artemia
- Improved handling and processing techniques.
- Assistance to private sector.

b. Transfer of Information

One library information center will be maintained at URI which will contain approximately 14,000 documents and reports in 1987 and increased by 1,000 items annually. The documents will cover the following subjects: Artisanal fishing techniques, mariculture, basic seafood processing, fisheries economics, post harvest losses, socio-economics of small-scale fisheries, marketing of fishery products, and fisheries management techniques.

- At least 1,000 publications/research findings, and reprints prepared, collected, and disseminated annually.

- Newsletters distributed quarterly to 600 LDC scientists, extension workers, and other.

- Audio-visual cassettes prepared for mariculture training

3. Training

Although most of the training will be funded under the companion basic ordering agreement, there may be some training funded under this cooperative agreement.

a. Non-degree and short-term training at URI and in LDCs. Possible subject areas may include the following.

- Cooperative fisheries training
- Small-scale technical fisheries training in LDCs
- Project monitoring and evaluation
- Project development and management
- Instrumentation repair and maintenance

- Application of microcomputers
- Marine science information services
- Post harvest losses
- Bioeconomic management model for tropical multispecies fisheries

b. Comprehensive Training Manuals

- Three manuals developed and used in at least 20 LDCs

c. Audio/Video Cassettes for Training

- At least one cassette will be prepared annually and demonstrated in 2 countries.

d. Activities Related to International Visiting Scientists and Others

- Activities and programs given at URI, as required.

e. Seminars and Workshops

- Two workshops held at URI
- Seminars held t URI

f. Maintaining Capability at URI to assist Peace Corps Staff in Fisheries Training

4. Networking and Linkages

a. Existing networks and linkages will continue and new contacts will be made with international, national and regional research centers and institutions.

- URI will continue to expand its collaboration with U.S., other developed countries,national, and international scientists and institutions.

b. Conferences and International Study Groups

- One conference or international study group meeting will be held annually.

c. International Workshops on Fresh Fish Preservation, Minimizing Post Harvest Fishery Losses

- One workshop will be held annually

d. Publications and Scientific Journal Articles will be produced, selectively collected and disseminated to LDCs and international organizations.

- 1,000 publications and journal articles will be produced, collected and disseminated annually.

e. Formalized Memoranda of Understanding with LDC Institutions and Governments.

- Continued contacts with the eight institutions which have signed the current memoranda of understanding and negotiate five more MOUs over the next five years with other interested LDC institutions and governments.

B. Relationship of the Four Project Components

The four project components form an integrated approach for optimizing the impact of fisheries technology in the LDCs. Developing countries require assistance in all facets of fisheries development and management. Basic and applied research and technology transfer in improved methods for fishery resource management, methods for using underutilized species, and methods for determining the social and cultural soundness of projects including impacts on women in fishing communities will assist in improving the quality of life in LDC fishing communities. Improved gear and boat designs will upgrade the fishing capabilities of the small-scale fishermen and improve his income through increased catches. Better methods of post harvest utilization can help to reduce currently estimated losses of 10 million metric tons of fish and improve the final product. Finally greater attention to social and economic aspects of fisheries development can enhance the likelihood of project success.

C. Substantial Involvement Understanding

Substantial involvement of the Agency for International Development (A.I.D.) in the management of this Cooperative Agreement is anticipated. Participation and collaboration by AID is expected, in particular, as follows:

1. A.I.D. will be consulted during the development of the URI/ICMRD annual work plan and have the right of final approval of all areas of the work plan where AID resources are included.

2. A.I.D. will be consulted and will have right of approval to revisions of the annual work plan which involves the use of A.I.D. resources.

3. A.I.D. will be involved in the selection of sites, methodologies and strategies to be used in field activities funded under this Agreement.

4. A.I.D. will be involved in clearance of field visits to LDCs funded by S&T/AGR, other A.I.D./W offices, and USAID overseas field missions.

5. A.I.D. will be involved in the selection of key personnel if the following scientists leave URI/ICMRD.

Scientists	Area of Specialization
Donald McCreight	Planning and Programming, Socio-cultural Factors
George Aelion	Planning and Programming Socio-cultural Factors
Mary Jane Beardsley	Information Services
Michael Morrissey	Post Harvest Fishery Losses
Richard Pollnac	Socio-cultural Factors, Planning and Programming

6. A.I.D. will be involved in the selection of consultants hired by URI/ICMRD to be funded under this agreement.

7. A.I.D. will be involved in the selection of the trainees for the annual short courses and seminars, in-country courses, workshops and seminars, and on-the-job training courses.

8. A.I.D. will be involved in the selection of the LDC graduate students for long-term training.

The specific involvement by A.I.D. stated above is in addition to the normal program monitoring by A.I.D. project personnel of the Recipient's program and the other administrative requirements established by the standard terms and conditions of the Cooperative Agreement.

D. Annual Work Plans

URI/ICMRD will develop the annual work plan as a working document to guide the operations and achievements expected from the project. It will be forwarded to S&T/AGR for approval each year. The first plan will be submitted to S&T/AGR no later than 30 days after the cooperative agreement is signed and will cover the period July 1, 1987 to June 30, 1988. Thereafter, the annual work will be due 60 days prior to the anniversary date of the cooperative agreement.

S&T/AGR will review the contents of the proposed work plan, ask for points of clarification, if required, and grant final approval of the contents as proposed or modified by agreement between the URI/ICMRD and S&T/AGR. This process of review and approval will be completed not later than 30 days after receipt of the original work plan from URI/ICMRD.

The annual work plan shall include, but not be limited to, the following:

- A list of activities to be undertaken during the year, categorized by project components; i.e., research, technology transfer, training and networking.
- A statement of how the activities relate to the outputs and research priorities.
- A projected beginning time frame for initiating the activities.
- A projected ending time frame for completion of the activities.
- The project expenditure of person-months of input for each activity.
- The projected stage of the activities at the end of the work plan or the projected outputs at the end of the work plan.
- Specific qualifications which may be required for certain activities given that many of the activities within the project are predicated on the amount of mission funding to be obligated under the basic ordering agreement for the project activities.
- Baseline data on pricing, policy, marketing, and agricultural inputs to the extent necessary to update the economic analysis to determine the yield benefit resulting from inoculation of local trials.
- Attachments to the work plan may include, but, not be limited to, the following: critical performance indicators, specific activity reports, and time qualification conditions.
- Methods to collect economic data on the relative costs of using improved marine fishing technologies.

E. Reporting Requirements

In addition to the Annual Work Plans described above, URI/ICMRD will submit the following reports within the specified time frame. These reports will provide pertinent data for S&T/AGR to monitor project activities.

1. Quarterly Reports

Quarterly reports are required which briefly describe any program and budgetary deviation from the annual work plan, the current status and planned future activities to be undertaken during the next quarter.

2. Technical and Research Reports

Technical and research activities of the project will be summarized in reports and distributed to the appropriate missions, LDCs and international organizations to encourage use of the technology developed. Normally such reports will be completed 60 days after the specific activity has been completed. Journal articles and other external publications are encouraged. Manuscripts should be submitted to the S&T/AGR project manager prior to submission to a publisher as well as ten copies of the resulting publications.

3. Annual Activity Reports

An Annual Report of the URI/ICMRD's international marine fisheries activities will be prepared. Although principally a technical document, it nevertheless must include pertinent statistics on quantitative information regarding the project and its activities described in Section III, A., B, C, and D above. An Impact Analysis Report (as defined in Section VII, F below) will be appended to this report which will be considered an instrument for technology transfer. A minimum of five copies should be submitted to the S&T/AGR Project Manager within 90 days of the end of each project year.

4. Training Activities

Summary of training activities undertaken under and in conjunction with this project is required annually, including the number of trainees by gender, nationality, training site, type of training activities, duration, and purpose.

5. Annual Expenditure Reports

URI/ICMRD will submit annual expenditure reports by: project line item; and 2) estimated distribution by project components, i.e., research, training, technology transfer and networking. The format will be collaboratively developed by S&T/AGR project manager and the Principal Investigator at URI/ICMRD.

6. Impact Analysis Reports

An annual report will be submitted as an annex to the annual activity report (Section VII, C. above) which summarized the impact of URI activities in the public and private sector in terms of increased employment and income of the poor fishermen and others working in the fishing industry; decreased post harvest losses and increase utilization of high quality animal protein by the poor majority; use of rational management strategies to conserve national resources and optimize sustained yields; and increase foreign exchange earnings from fisheries products. This will provide a feed-back system for measurement and evaluation of the impact of services and training provided.

The impact analysis is defined as a measurement of results generated by activities undertaken by URI/ICMRD in accordance with the project description in revised Logical Framework and the scope of work in the Cooperative Agreement. For the most part, the impact analysis will be qualitative in nature, and quantified only as appropriate and will cover activities funded under this project and/or the companion basic ordering agreement.

7. Trip Reports

Trip reports will be prepared for each TDY assignment or trip to an LDC. The report will contain, but not be limited to, the following information: 1) logistical information, i.e., type of activity, geographical area of activity, dates of TDY, and team composition; 2) objective of TDY, including scope of work, as appropriate; 3) activities performed while on TDY; 4) summary of any technical reports resulting from TDY; 5) summary of identifiable techniques or information which could be transferred to other LDCs; and 6) summary of future potential needs of, or opportunities for, assistance to LDCs or missions, including possible networking potential. One copy of this report will be forwarded to S&T/AGR not later than 30 days after the staff member returns to URI/ICMRD. The trip report generally will not exceed 4 pages.

F. Cooperative Agreement - Terms and Management

1. Terms

The term of the Cooperative Agreement will be from July 1, 1987 through June 30, 1992, or in accordance with the terms agreed to by the recipient and the Grants Officer, but not to exceed five years.

2. Five-Year Budget

The proposed budget for the five-year period under the Cooperative Agreement is $2,292,000, of which $1,273,000 is provided by S&T/AGR to strengthen the capabilities of URI/ICMRD to: a) utilize and enhance its resource base in international marine and fresh water fisheries programs developed since 1969 in cooperation with AID and other donors; b) expand the level and range of its collaboration with U.S., LDC, and regional public and private organizations, and international institutions; c) increase its applied and development research activities in the area of marine science technology; and d) provide facilities for training at the under graduate and graduate levels. The URI/ICMRD will provide $1,019,000 or 45 percent of the budget as its contribution to achieve the purpose of this cooperative agreement.

The five-year budget covering the annual budget projections is attached as Attachment .

V. Five-Year Companion Basic Ordering Agreement

A. Purpose of the Basic Ordering Agreement

A companion instrument (basic ordering agreement) is to be negotiated with the International Center for Marine Resource Development, University of Rhode Island (ICMRD/URI) to provide AID with short, medium, and long-term technical advisory services relating to planning, designing, and evaluating programs and projects concerned with research and development of improved marine fisheries which are included, but not limited to, the following areas:

- Biological oceanography, including estuarine, coastal and reef ecology;
- Physical, chemical and geological oceanography;
- Fisheries and marine technology;
- Fisheries biology and aquaculture;
- Food science and nutrition;

- Geography, marine affairs, community planning and administration;
- Marine resource economics;
- Ocean engineering and allied engineering fields; and
- Anthropology and extension.

The practical experience gained through the basic ordering agreement will be fed directly back into the institution's design, curricula, teaching materials and the research agenda which are developed by URI/ICMRD and directly related to the cooperative agreement. It is also intended that the occasion for delivery orders under the cooperative agreement shall arise from work financed under the cooperative agreement. Delivery orders, which are identified by the recipient, must be approved and funded by USAID missions, regional bureaus, and/or other AID/W offices. Special orders identified and requested by the regional bureaus, missions and LDCs must be funded by the requesting office or mission.

Much of the field work under this basic ordering agreement will be for project design evaluation; field testing the results of research developed under the cooperative agreement; collecting environmental data; training LDC nationals in-country and demonstrating new approached to increasing fish production and utilization; assisting LDC institutions; training at the under graduate and graduate levels at URI, and encouraging developing country entrepreneurs to establish and/or strengthen businesses in the LDCs.

B. Benefits to AID

The recipient's program will benefit the Agency directly through its guidance, demonstration and technical interventions. The Agency will benefit indirectly from the recipient's: 1) basic and developmental research on mathematical programming algorithms, reducing post harvest losses, managing fisheries resources, determining the role of women, and the interrelationships between the various socio-cultural groups of fishing communities; 2) cadre of world renowned scientists and experts in fisheries production and utilization; and 3) facilities and equipment necessary to carry out basic and applied research; and to support technology transfer, training and networking activities.

C. Relationship to Cooperative Agreement

This basic ordering agreement will be related directly to the cooperative agreement with URI/ICMRD and is intended to develop and stimulate the recipient's program in various marine fisheries technologies in the LDCs. Upon S&T/AGR and mission approval of the recipient's proposal and the necessary funding, the recipient may provide missions and/or AID/W with specified reimbursable services that directly address project and program needs related to marine fisheries.

D. Terms of the Basic Ordering Agreement

1. Basic Ordering Agreement Period

The basic ordering agreement will function concurrently with the Cooperative Agreement. Therefore, the basic ordering agreement takes effect on July 1, 1987 and terminates on June 30, 1992.

2. Operating Mode

a.Technical assistance special orders to be performed under this basic ordering agreement will be identified by: a) the grantee in the course of its work under the Cooperative Agreement; b) S&T/AGR and the Directorate for Food and Agriculture; and c) missions, LDCs, regional bureaus, and other AID/W offices. These special orders will be congruent with the program activities under the cooperative agreement, but in addition, will require Agency oversight. They usually will be funded by AID missions and/or other AID offices. However, delivery orders may also be funded by S&T/AGR and other Government agencies such as the USDA and the Peace Corps.

b.The contract will be implemented by the recipient with oversight by AID's Office of Agriculture, Bureau for Science and Technology and the mission or office requesting and funding the technical assistance, applied research, training, and networking. Each delivery order will require AID concurrence on: a) the appropriateness of the field service requested to the cooperative agreement's scope of work; b) the technical assistance proposed to meet the request; and c) criteria for satisfactory completion of the services.

c.AID will use the following additional criteria in assessing the appropriateness of the proposed work under the delivery orders:

- Potential of the field service to contribute to knowledge generation and program development by furnishing an opportunity to produce new insights, or knowledge consolidation by allowing the testing or refinement of existing concepts, methods of approaches; and

- Extent to which the field services will further expand the networking and collaboration among institutions working on common problems.

3. Cost Reimbursable

a. The recipient shall be reimbursed the allowable cost of performance in accordance with the deliver order provisions included herein. The cooperating parties have established the following estimated budget for the technical delivery orders issued hereunder. It is agreed that the total estimates cost to the Government is $2,400,000. The line item budget for the five-year period is attached to the PIO/T, Attachment 2.

b. The parties agree to use their best efforts to maintain the level of resources identified for the period indicated; however, it is understood that the budget levels for each period are approximations, and acquisition of services is not obligatory hereunder.

c. The recipient shall furnish to the Government, when and as ordered, services up to and including the level-of-effort provided in Section IV. D. below, and the Government shall order from the recipient at least one Task Order and the minimum services to be ordered hereunder will be $25,000.

4. Statement of Work

This basic ordering agreement only provides for URI/ICMRD's performance of technical and professional services which shall be performed only as authorized by delivery orders issued in accordance with the "Ordering" provisions hereof. The level-of-effort and budgetary resources identified in this basic ordering agreement are estimates only and are not purchased hereby.

Short, medium, and long-term technical and advisory services

a. Project design, assessment, feasibility studies an evaluations in areas of:

-Fisheries marketing and policies.
-Factors influencing project success.
-Planning in fisheries development.
- Fishery sector studies.
-Factors influencing success or failure of fishermen's organizations.
-Utilization of fish by-catch.
-Aquaculture of salt water species of fish and shellfish.
-Development of quality control methods of Artemia
-Improved handling and processing techniques.

b. Plan, organize, reorganize and implement marine fisheries production and supply programs or projects and their integration into the overall LDC strategy for agricultural development, including extension services, farmers and parastatal and private organizations.1

c. Conduct workshops and training programs in the LDCs and at URI based on marine fisheries technologies developed at the University.

d. Field test the following research results:

- Improved methods for managing fisheries resources, including under utilized species.
- Improved methods for reducing post harvest spoilage and contamination.
- Improved methods for assisting LDC fishermen, processors and wholesalers to use innovative methods in the industry.
- Functional demonstrations of models for mariculture systems
- Role of women in fishing societies.

5. Special Orders

Within ten (10) working days after receipt of the information provided by the Government in its request for proposal, the recipient will provide to the Contracting Officer a proposal for accomplishing the scope of work. The proposal shall be accompanied by such documentation as may be requested by the

Government, including, but not limited to, biographical data for individuals to be furnished under the special order, budgetary estimates, and a technical proposal to include a time-phased schedule for completing the work.

6. Completion of Orders and Reports

a. The recipient shall complete all of the activities specified in the special order within the total obligated amount. Each order shall request the recipient to perform all of the services in the delivery order on the level-of-effort and budget established pursuant to the order and this basic ordering agreement.

b. Within 30 days after completion of the delivery order, the recipient will submit the appropriate number of reports required to the requesting mission or office and five copies to the S&T/AGR project manager.

VI. Reviews and Evaluations

A. Management Reviews

Management reviews will be conducted annually by the S&T/AGR project manager in consultation with the recipient of the cooperative agreement; the missions, regional bureaus and other AID/W offices involved; and other interested participants of the activity, as appropriate. The reports required under Section E. above will become an integral part of the review process.

B. In Depth Evaluation

An in depth evaluation will be performed during December 1988 and June 1991 to review the progress made in achieving the established goal and purpose of the project and to determine the future direction. The evaluation will be performed by an external panel of experts in marine fisheries.

The evaluation factors will include project achievement in assisting the LDCs to develop viable fisheries industries. These evaluations will be based on monitoring reports, inspection of physical facilities, the recipient's progress reports, technical publications, and trip reports.

In addition, the evaluation team will be required to review the following:

- Validity of the assumptions in the logframe.

- Methodologies used to achieve the outputs and whether the outputs are being achieved as planned.

- Examination of alternative methods of achieving outputs with savings to the project.

- Examination of URI/ICMRD's management effectiveness.

- Review of expenditures to determine whether they correspond to the scope of work in the annual work plans.

- Review of unforeseen internal or external factors that have had specific adverse or beneficial impact on the project.

- Determine whether technology is being transferred effectively to LDC national, regional, and/or international organizations and institutions.

The evaluation team will recommend to S&T/AGR the future direction and funding of the project; and/or the appropriate changes in the project design and/or work plans to maximize the use of S&T/AGR's limited funds.

WANG:4960g:MMozynski:5/8/87

Appendix I
Logframe

FISHERIES DEVELOPMENT SUPPORT SERVICES

Project Paper Amendment

Project Design Summary (Logical Framework)

S&T/AGR:MMozynski:5/4/87

AID 1030-25 (1-79)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1982 to FY 1992
Total U.S. Funding $4,000,000
Date Prepared: April 16, 1982
Revised March 25, 1987

Project Title: Fisheries Development Support Services (936-4024)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To improve the quality of life of poor LDC residents, both economically and nutritionally through effective sustained use of living aquatic resources.	**Measures of Goal Achievement:** --Increased supply of animal protein in selected target areas in LDCs. - Increased sustainable utilization of living aquatic resources. - Improved conservation techniques of living aquatic resources. - Increased employment in fisheries sector. - Increased foreign exchange earnings from fisheries sector.	Target area baseline and evaluation statistics on: - Fish availability in the market place - Strategies for management of living aquatic resources. - House-hold budget surveys	**Assumptions for achieving goal targets:** - AID and LDCs willing to fund fisheries development activities - Marine resources receive high priority in LDC development budgets and activities - URI is able to provide required services within available budget - LDC fishermen will use improved techniques recommended by URI to increase fish production and utilization.
Project Purpose: To assist LDCs improve their capabilities to develop programs designed to: 1) Increase employment and income in the fisheries sector; 2) Decrease post harvest losses and increase utilization of high quality animal protein by the poor majority; 3) Use rational management strategies to conserve national resources and optimize sustained yields. 4) Increase foreign exchange earnings from fisheries products.	**Conditions that will indicate purpose has been achieved: End of project status.** 1) Fisheries employment and income generation have increased in LDCs 2) Availability of edible fishery products has increased by 10 percent or more in selected target LDC areas. 3) Conservation of national resources is being promoted by URI trained LDC scientists who are holding key positions in fisheries sector 4) Increased foreign exchange earnings from fisheries products in LDCs.	1), 2), 3) and 4) --Comparison of post project evaluation with baseline statistics. - In depth and impact evaluations. - Trip reports - On-site visits and reports - LDC statistics and reports - Market reports. -FAO reports - Annual and other progress reports prepared by URI under the CA and BOA. - Training reports and degrees given - Specific project reports covering foreign exchange data	**Assumptions for achieving purpose:** 1), 2), 3) and 4) - Adequate LDC personnel and scientists are available to serve the project. - LDC policies and strategies promote the use of proper methods of management and utilization of living aquatic resources. - LDCs will promote programs designed to decrease their post harvest fish losses. - LDC fishermen will use modern techniques developed by URI for fishing. - Missions and LDCs will continue to finance LDC scientists who will be attending URI for under graduate and graduate degrees and URI and LDC institutions for technical certificates.

Note: This revision covers only the period July 1, 1987 through June 30, 1992.

Page 1 of 7
Tab 4

AID 1040-25 (1-79)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1982 to FY 1992
Total U.S. Funding $4,000,000
Date Prepared: April 16, 1987
Revised: May 1, , 1987

Project Title & Number: Fisheries Development Support Service 936-4024

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs: Applied and Development Research	Magnitude of Outputs	1), 2), 3), 4), 5), 6), 7), 8), 9), 10), 11)	Assumptions for achieving outputs: 1),2),3),4),5),6),7),8),9),10),11)
1) Improved methods for managing fisheries resources, including under utilized species in LDCs.	1) At least two methods adapted for LDCs and used in at least one LDC	- Research reports and publications. - ICHRD/URI's technical and research publications and reports. - Annual progress and activity reports. - Trip reports. - Site visits. - Mission and LDC reports. - In depth and impact evaluations.	- Key LDC scientists and staff will participate in the activities. - Missions will request and fund adaptative research in LDCs. - Local cost of projects and activities will be funded by missions and/or LDCs. - Small scale marine fishery sector will use the innovative and improved technologies developed by the URI under this project. - Missions and LDC have equipment and facilities to collaborate with URI on the research.
2) Improved methods for reducing post harvest spoilage and contamination	2) At least three methods adapted for LDCs and transferred to at least one LDC.		
3) Improved methods for processing, distributing and marketing fish and fish products in LDCs.	3) At least two techniques developed and used in selected target areas of LDCs, e.g., West Africa.		
4) Improved methods for assisting LDC fishermen, processors and wholesalers to use innovative methods in the industry.	4) At least two methods developed and successfully applied in one LDC.		
5) Major factors which determine success or failure of fishermen's cooperatives.	5) Research will be conducted and findings applied in at least one LDC.		
6) Definition of the role of women in fishing societies as related to changes in the fishery.	6) Research will be conducted and findings applied in at least one LDC.		
7) Description of the interrelationships between the sociocultural characteristics of fishing communities, technologies, and techniques, and the aspects of marine environment and the coastal zone.	7) Research will be conducted, and a model developed, and field tested in at least one LDC.		
8) New models for mariculture systems in LDCs, including brine shrimp.	8) Models will be applied in at least two LDCs.		
9) Improvement of quality control for domestic and international markets.	9) Methodology developed and demonstrated in at least one LDC.		
10) Market analyses for capture fishery products under several sets of LDC conditions.	10) Analysis will be completed in at least 4 LDCs.		
11) Mathematical programming models (algorithms) developed for LDC economic analyses.	11) 1 algorithm will be developed, distributed and demonstrated in 4 LDCs.		

AID 1030-5 (11-79)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1982 to FY 1992
Total U.S. Funding $4,000,000
Date Prepared: April 16, 1982

Project Title & Number: Fisheries Development Support Service 936-4024

Revised: February 5, 1987

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs: echnology Transfer	Magnitude of Outputs:	1) and 2)	Assumptions for achieving outputs: 1) and 2)
1) Problem Solving Short-, Medium-, and Long-term assistance for project design, assessment, feasibility studies and evaluations in areas of: - Factors influencing project success. - Fisheries marketing and policies. - Planning in fisheries development. -. Fishery sector studies. - Factors influencing success or failure of fishermen's organizations. - Utilization of fish by-catch. - Mariculture or Artemia or other marine species. - Development of quality control methods of Artemia. - Improved handling and processing techniques. - Assistance to private sector.	1) Responds to over 100 requests (over the five-year period) for short- and medium-term assistance providing pertinent information in a timely manner.	- Reports from ICMRD/URI - Site Visits - Mission reports - Trip reports - Impact and in depth evaluations - Expanded awareness of fishery problems and solutions. - Communications with knowledgeable fishery international and national scientists and centers.	- Missions, LDCs and other donors will request assistance and provide the necessary funding, as required. - Technologies developed at URI can be adapted to LDC environments and LDC fishermen will use these technologies. - Expanded awareness of problems in fishery industry will result in increased production efficiencies, employment and proper utilization.
:) Transfer of Information - Library/information services maintained covering Artisanal fishing techniques, mariculture, basic seafood processing, fisheries economics, post harvest losses, socioeconomics of small-scale fisheries, marketing of fishery products, and fisheries management techniques. - Assistance to LDCs to maintain informational services. - ICMRD publications and research findings disseminated to LDCs and national and international institutions which cover recent research, publicized events and new technologies. - Completion of audiovisual cassette for mariculture training.	2) - One library information center maintained at URI containing approximately 14,000 documents and reports which will be increased by 1,000 items annually. - Assistance and information provided upon requests - At least 1,000 publications/research findings, and reprint requests prepared and distributed annually. - Newsletter distributed quarterly to 600 LDC scientists, extension workers, and others.		

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1982 to FY 1992
Total U.S. Funding $4,000,000
Date Prepared: April 16, 1982

Project Title & Number: Fisheries Development Support Service 936-4024

Revised: February 5, 1987

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs:	Magnitude of Outputs:		Assumptions for achieving outputs:
Training			1),2),3), 4), and 5)
1) Long-term training at the under graduate and graduate degree level for LDC scientists.	1) At least 30 LDC graduate and under-graduate scientists will study at URI annually.	1) copies of training courses and reports from URI and copies of transcripts.	- Missions and LDCs will fund the training costs, as required.
2) Non-degree and short-term training at URI and in LDCs. Possible subject areas are: - Cooperative fisheries training. - Small-scale technical fisheries training in LDCs. - Project monitoring and evaluation. - Project development and management. - Instrumentation repair & maintenance. - Application of microcomputers. - Marine science information services.. - Post harvest losses. - Bioeconomic Management Model for Tropical Multispecies Fisheries. - Use of Mariculture - Practical Twinework for Fishermen and Gear Technologists	2)-At least five training courses will be given at URI. -One training course will be given annually in at least one LDC LOP.	2) Copies of in-service and on-the-job training activities.	- URI will provide the training opportunities for LDC scientists. - URI will provide the proper activities for international visitors. - LDCs, IARCs and Missions will provide facilities for in country training.
3) Comprehensive training manuals.	3) Three manuals developed and used in at least 20 LDCs.	3) Copies of training manuals, and reports from missions on the use of the manuals.	
4) Prepare audio/video cassettes for training.	4) At least one cassette will be prepared annually and demonstrated in 2 countries.	4) Copies of cassettes and training reports.	
5) Seminars and workshops.	5) -Two workshops held at URI -Seminars scheduled at URI -Workshops held in 5 LDCs LOP.	5)	
6) Maintaining capability at URI to assist Peace Corps staff in fisheries training.	6) Peace Corp volunteers trained by URI staff.	6) Copies of reports and attendance at seminars and workshops.	
		7) Copies of Peace Corp training reports.	7) Peace Corp volunteers will continue to be trained at URI for programs in LDCs.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Tab 4

Life of Project: Page 5 of 7
From FY ~~1982~~ to FY ~~1992~~
Total U.S. Funding $4,000,000
Date Prepared: April 16, 1982

Project Title & Number: Fisheries Development Support Service 936-4024

Revised: February 5, 1987

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs:	Magnitude of Outputs:		Assumptions for achieving outputs:
Networking and Linkages		1), 2), 3), and 4)	1), 2), 3), and 4)
1) Existing networks and linkages will continue and new contacts will be made with international, national and regional research centers and institutions.	1) Collaboration with U.S., national and international institutions will continue with current members and new members will be added.	- Reports from URI and national and international institutions. - Reports from institutions and governments from the developed world.	- International networks and linkages can be maintained with the limited funding available.
2) Conferences and international study groups with be held on artemia.	2) One conference or international study group will be held annually.	- Minutes of formal meetings, conferences, and seminars.	- Continued availability of funding from multilateral sources.
3) International workshops on fresh fish preservation, minimizing post harvest fishery losses.	3) One workshop will be held annually.	- Copies of reports generated from the formal meetings, conferences, and seminars.	
4) Publications and scientific journal articles will be produced, selectively collected and disseminated to LDCs and international organizations.	4) 1,000 publications and journal articles will be produced, collected and disseminated annually.		

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1982 to FY 1992
Total U.S. Funding $4,000,000
Date Prepared: April 16, 1982

Project Title & Number: Fisheries Development Support Services (936-4024)

May 1, 1987

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
INPUTS	Magnitude of INPUTS	- Project Management Information System - Project Records - Mission Records - Project Evaluations - Project Audits.	Assumptions for achieving INPUTS - S&T/Agr's will be forthcoming - Missions will buy-in the project through the BOA - URI/ICMRD will be able to contribute the needed funds from the University's budget. - Networking and technology transfer mechanisms are available - LDC institutions will contribute staff and facilities for the successful completion of activities in LDCs.

Inputs by Project Components
(In thousands)

	A.I.D. S&T/AGR		A.I.D. Missions		A.I.D. Total AID		URI/ICMRD		Grand Total	
	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount
Basic & Adapted Research	50	$ 637	15	$ 360	27	$ 997	60	$ 611	34	$1,608
Technical Transfer	15	191	50	1,200	38	1,391	10	102	32	1,493
Training	20	254	20	480	20	734	20	204	20	938
Networking & Linkages	15	191	15	360	15	551	10	102	14	653
Total	100	$1,273	100	$2,400	100	$3,673	100	$1,019	100	$4,692

Inputs by Line Item
(In thousands)

	A.I.D. S&T/AGR		A.I.D. Missions		A.I.D. Total AID		URI/ICMRD		Grand Total	
	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount
Salaries, Wages & Benefits	78	$1,000	-	$ -	27	$1,000	37	$ 376	29	$1,376
Consultants	-	-	57	1,360	37	1,360	-	-	29	1,360
Operating Expenses	5	$ 62	5	121	5	183	2	24	4	207
Travel	8	99	29	702	22	801	2	16	18	817
Indirect Costs(10%)	9	112	9	217	9	329	59	603	20	932
Total	100	$1,273	100	$2,400	100	$3,673	100	$1,019	100	$4,692

WANG:4898g:MMozynski:3/26/87:Revised 4/30/87

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1982 to FY 1992
Total U.S. Funding $4,000,000
Date Prepared April 16, 1982

Project Title & Number: Fisheries Development Support Services (936-4024)

May 1, 1987

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
INPUTS	Magnitude of INPUTS	- Project Management Information System - Project Records - Mission Records - Project Evaluations - Project Audits.	Assumptions for achieving INPUTS - S&T/Agr's will be forthcoming - Missions will buy-in the project through the BOA - URI/ICMRD will be able to contribute the needed funds from the University's budget. - Networking and technology transfer mechanisms are available - LDC institutions will contribute staff and facilities for the successful completion of activities in LDCs.

Average Annual Person-Months

	S&T/AGR		URI/ICMRD		Total	
	%	Months	%	Months	%	Months
Staff Support						
Director, PDSS		-		6.0		6.0
Research Associate/Training		8.0		-		8.0
Clerical/Word Processing		7.0*		-		7.0*
Fiscal		5.0		3.0		8.0
Total Staff Support	29	20.0	35	9.0	31	29.0
Library Services						
Librarian/Information Service		13.0		1.5		14.5
Clerical/Word Processing		7.0*		1.5*		8.5*
Publication Specialist		2.5		-		2.5
Total Library Services	33	22.5	12	3.0	27	25.5
Socio Cultural Factors						
Professor of Anthropology		4.0		2.2		6.2
Professor of Anthropology		-		1.8		1.8
Total Socio Cultural Factors	6	4.0	15	4.0	9	8.0
Fisheries Management						
Graduate Research Assistant		4.5		-		4.5
Ass't Professor of Resource Economics		-		2.0		2.0
Total Fisheries Management	7	4.5	8	2.0	7	6.5
Use of Mariculture						
Graduate Research Assistant		4.5		-		4.5
Professor of Food Science and Tech.		-		2.0		2.0
Total Use of Mariculure	7	4.5	8	2.0	7	6.5
Post Harvest Fishery Losses						
Research Associate		7.5		2.0		9.5
Professor of Food Science		-		2.0		2.0
Total Post Harvest Fishery Losses	11	7.5	15	4.0	12	11.5
Resource Development & Utilization						
Graduate Research Assistant		5.0		-		5.0
Assistant Professor of Fisheries Tech.		-		2.0		2.0
Total Resource Develop & Utilization	7	5.0	7	2.0	7	7.0
Total Annual Person-Months	100	68.0	100	26.0	100	94.0

* Includes clerical/word processing support provided to the scientists shown in the following programs.

WANG:4898g:MMbzynski:3/26/87:Revised 4/30/87

Appendix II
Five-Year Budget

FISHERIES DEVELOPMENT SUPPORT SERVICES

Project Paper Amendment

Five-Year Budget - July 1, 1987 through June 30, 1992

S&T/AGR:MMozynski:5/4/87

Fishery Development Support Services
Proposed Budget - July 1, 1987 - June 30, 1992
(In thousands)
Summary

	July 1, 1987 - June 30, 1992				
	Total AID			ICMRD/	
Salaries & Wages	S&T/AGR	Missions	Total	URI	Total
	$	$	$	$	$
Director, URI					
Research Assoc.					
URI/Center Assoc.					
Graduate Students					
Total URI Experts	$ 717	$ -	$ 717	$ 307	$1,024
Support Staff	106	-	106	-	106
Total Salaries	$ 823	$ -	$ 823	$ 307	$1,130
Benefits					
Non Classified-22%	$ 151	$ -	$ 151	$ 69	$ 220
Classified-32%	26	-	26	-	26
Total Benefits	$ 177	$ -	$ 177	$ 69	$ 246
Consultants	$ -	$1,360	$1,360	$ -	$1,360
Operating Expenses					
Communications	$ 14	$ 29	$ 43	$ 6	$ 49
Office Supplies	16	28	44	6	50
Equipment	16	28	44	6	$ 50
Printing & other Office Expenses	16	36	52	6	58
Total Oper. Exp.	$ 62	$ 121	$ 183	$ 24	$ 207
Travel					
Domestic	$ 16	$ -	$ 16	$ 6	$ 22
International	83	702	785	10	795
Total Travel	$ 99	$ 702	$ 801	$ 16	$ 817
Indirect Costs(10%) excluding tuition & capital items over $500.	$ 112	$ 217	$ 329	$ 603	$ 932
Total	$1,273	$2,400	$3,673	$1,019	$4,692

WANG 4951g:MMozynski:Revised 4/29/87:Revised 5/1/87

Fishery Development Support Services
Proposed Budget - July 1, 1987 - December 19, 1989
(In thousands)

	FY 1987 July 1, 1987 - December 19, 1987					FY 1988 December 20, 1987 - December 19, 1988					FY 1989 December 20, 1989 - December 19, 1989				
	Total AID			ICMRD/		Total AID			ICMRD/		Total AID			ICMRD/	
Salaries & Wages	S&T/AGR	Missions	Total	URI	Total	S&T/AGR	Missions	Total	URI	Total	S&T/AGR	Missions	Total	URI	Total
Director, URI	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Research Assoc															
URI Center Assoc.															
Graduate Students															
Total URI Experts	$ 60	-	$ 60	$ 28	$ 88	$ 146	$ -	$ 146	$ 62	$ 208	$ 146	$ -	$ 146	$ 62	$ 208
Support Staff	10	-	10	-	10	21	-	21	-	21	21	-	21	-	21
Total Salaries	$ 70	$ -	$ 70	$ 28	$ 98	167	$ -	167	$ 62	$ 229	$ 167	$ -	$ 167	$ 62	$ 229
Benefits															
Non Classified-22%	$ 13	$ -	$ 13	$ 6	19	$ 31	$ -	$ 31	$ 14	$ 45	$ 31	$ -	$ 31	$ 14	$ 45
Classified-32%	3	-	3	-	3	5	-	5	-	5	5	-	5	-	5
Total Benefits	$ 16	$ -	$ 16	$ 6	$ 22	$ 36	$ -	$ 36	$ 14	$ 50	$ 36	$ -	$ 36	$ 14	$ 50
Consultants	$ -	$ 77	$ 77	$ -	$ 77	$ -	$ 300	$ 300	$ -	$ 300	$ -	$ 300	$ 300	$ -	$ 300
Operating Expense															
Communications	$ 1	$ 3	$ 4	$ 1	$ 5	$ 3	$ 6	$ 9	$ 1	$ 10	$ 3	$ 6	$ 9	$ 1	$ 10
Office Supplies	2	2	4	1	5	3	6	9	1	10	3	6	9	1	10
Equipment	2	2	4	1	5	3	6	9	1	10	3	6	9	1	10
Printing & other Office Expenses	3	5	8	1	9	3	7	10	1	11	3	7	10	1	11
Total Oper. Exp.	$ 8	$ 12	$ 20	$ 4	$ 24	$ 12	$ 25	$ 37	$ 4	$ 41	$ 12	$ 25	$ 37	$ 4	$ 41
Travel															
Domestic	$ 2	$ -	$ 2	$ 1	$ 3	$ 3	$ -	$ 3	$ 1	$ 4	$ 3	$ -	$ 3	$ 1	$ 4
International	10	70	80	-	80	15	139	154	2	156	15	139	154	2	156
Total Travel	$ 12	70	$ 82	$ 1	$ 83	$ 18	$ 139	$ 157	$ 3	$ 160	$ 18	$ 139	$ 157	$ 3	$ 160
Indirect Costs(10%) excluding tuition & Capital Items over $500.	$ 11	$ 16	$ 27	$ 55	$ 82	$ 22	$ 46	$ 68	$ 121	$ 189	$ 22	$ 46	$ 68	$ 121	$ 189
Total	$ 117	$ 175	$ 292	$ 94	$ 386	$ 255	$ 510	$ 765	$ 204	$ 969	$ 255	$ 510	$ 765	$ 204	$ 969

WANG 495Ig:HMozynskI:Revised 4/29/87:Revised 5/1/87

Appendix II
Page 2 of 3

Fishery Development Support Services
Proposed Budget - December 20, 1989 - June 30, 1992
(In thousands)

	FY 1990 December 20, 1989 - December 19, 1990					FY 1991 December 20, 1990 - December 19, 1991					FY 1992 December 20, 1991 - June 30, 1992				
	Total AID			ICHRD/		Total AID			ICHRD/		Total AID			ICHRD/	
Salaries & Wages	S&T/AGR	Missions	Total	URI	Total	S&T/AGR	Missions	Total	URI	Total	S&T/AGR	Missions	Total	URI	Total
Director, URI	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Research Assoc															
URI Center Assoc.															
Graduate Students															
Total URI Experts	$ 146	$ -	$ 146	$ 62	$ 208	$ 146	$ -	$ 146	$ 62	$ 208	$ 73	$ -	$ 73	$ 31	$ 104
Support Staff	21	-	21	-	21	21	-	21	-	21	12	-	12	-	12
Total Salaries	$ 167	$ -	$ 167	$ 62	$ 229	$ 167	-	$ 167	$ 62	$ 229	$ 85	$ -	$ 85	$ 31	$ 116
Benefits															
Non Classified-22%	$ 31	-	$ 31	$ 14	$ 45	$ 31	$ -	$ 31	$ 14	$ 45	$ 14	$ -	$ 14	$ 7	$ 21
Classified-32%	5	-	5	-	5	5	-	5	-	5	3	-	3	-	3
Total Benefits	$ 36	$ -	$ 36	$ 14	$ 50	$ 36	-	$ 36	$ 14	$ 50	$ 17	$ -	$ 17	$ 7	$ 24
Consultants	$ -	$ 300	$ 300	$ -	$ 300	$ -	$ 300	$ 300	-	$ 300	$ -	$ 83	$ 83	$ -	$ 83
Operating Expense															
Communications	$ 3	$ 6	$ 9	$ 1	$ 10	$ 3	$ 6	$ 9	$ 1	$ 10	$ 1	$ 2	$ 3	$ 1	$ 4
Office Supplies	3	6	9	1	10	3	6	9	1	10	2	2	4	1	5
Equipment	3	6	9	1	10	3	6	9	1	10	2	2	4	1	5
Printing & other Office Expenses	3	7	10	1	11	3	7	10	1	11	1	3	4	1	5
Total Oper. Exp.	$ 12	$ 25	$ 37	$ 4	$ 41	$ 12	$ 25	$ 37	$ 4	$ 41	$ 6	$ 9	$ 15	$ 4	$ 19
Travel															
Domestic	$ 3	$ -$	3	$ 1	$ 4	$ 3	$ -	$ 3	$ 1	$ 4	$ 2	$ -	$ 2	$ 1	$ 3
International	15	139	154	2	156	15	139	154	2	156	13	76	89	2	91
Total Travel	$ 18	$ 139	$ 157	$ 3	$ 160	$ 18	$ 139	$ 157	$ 3	$ 160	$ 15	$ 76	$ 91	$ 3	$ 94
Indirect Costs(10%) excluding tuition & Capital items over $500.	$ 22	$ 46	$ 68	$ 121	$ 189	$ 22	$ 46	$ 68	$ 121	$ 189	$ 13	$ 17	$ 30	$ 64	$ 94
Grand Total	$ 255	$ 510	$ 765	$ 204	$ 969	$ 255	$ 510	$ 765	$ 204	$ 969	$ 136	$ 185	$ 321	$ 109	$ 430

WANG:4951g:MMozynski:Revised:4/29/87:Revised 5/1/87

Appendix II
Page 3 of 3

MEMORANDUM

TO: M/SER/OP/ST, Mr. Jay Bergman

FROM: S&T/FA, Duane Acker

SUBJECT: Award of cooperative agreement -
Fishery Development Support Services (936-4024)

I request that you consider only the International Center for Marine Resource Development at the University of Rhode Island (URI/ICMRD) for the subject cooperative agreement (CA) to: 1) utilize and enhance its resource base in international marine and fresh water fisheries programs developed since 1969 in cooperation with AID and other donors; 2) expand the level and range of its collaboration with U.S., LDC, and regional public and private organizations, and international institutions; and 3) increase its applied and development research activities in the area of marine science technology.

Many people of the world have diets that lack the protein essential for proper growth and development. Without adequate protein, people can suffer serious health problems and children, in particular, are subject to impaired mental development. The situation is most critical in the developing countries whose growing populations exert increased pressure on the available food supplies. The URI/ICMRD addresses the problem of inadequate protein supplies by working to increase the availability of marine fisheries products. Fish and shellfish are known to be excellent sources of high quality protein.

In addition, fisheries programs will lead to increased employment and more income for the fishermen and other workers in the fisheries sector.

The purpose of the project is to: 1) increase employment and income in the fisheries sector, 2) decrease post harvest losses and increase utilization of high quality animal protein by the poor majority; 3) use rational management strategies to conserve national resources and optimize sustained yields; and 4) increase foreign exchange earnings from fisheries products. URI/ICMRD will achieve this purpose through a four-pronged approach to applied and development research; technology transfer, including short, medium, and long-term assistance and transfer of information; training, including long-term training at the under graduate and graduate degree levels and non-degree and short-term training at URI and in LDCs; and networking and linkages with scientists and institutions in the developed and developing world.

There is an existing CA with URI/ICMRD which was signed September 20, 1982 and covers the period July 1, 1982 through June 30, 1987. This CA was negotiated on the basis of a ten-year project authorization and the unique and outstanding qualifications of the Center. Under the existing CA, URI/ICMRD expanded its resource base and enlarged its multi-disciplinary staff to over 60 Center associate scientists, most of whom have long-term LDC experience with small-scale fisheries development, management, and application in LDC environments. The Center has strengthened and expanded its international network of scientists and institutions from developed and developing countries.

The building blocks of the proposed CA are: applied and development research, training, technical assistance and networking which are interacting components including faculty, staff and facilities of the university. The training component will include formal degree programs at the under-graduate and graduate levels and an ability to provide specialized training programs for groups such as Peace Corps volunteers, fishermen, and fishery development specialists both at the university and within LDC country sites. The technical assistance portion will draw on the inter-disciplinary team from across the campus with a sensitivity to local LDC conditions and environment. In addition, assistance will be provided in a range of levels from analysis of fisheries to design or repair of fishing gear.

Technical assistance activities also include an excellent library facility for providing information from a wide-range of library sources available through a micro-computer data base, the products of which are made available upon request from LDCs. The applied research capabilities draws on the extremely broad basic research developed by URI covering fishery science, mariculture, anthropology, fishery resource economics, food technology, fishery gear design and testing and others.

The organizational structure and qualifications of URI/ICMRD scientists are listed below:

Organizational Structure

The URI supports ICMRD by providing facilities, equipment, utilities and the salaries of several faculty members and staff involved on a full or part-time basis in the Center's program. Its research and educational programs include:

- Biological oceanography, including estuarine, coastal and reef ecology;
- Physical, chemical and geological oceanography;
- Fisheries and marine technology;
- Fisheries biology and aquaculture;
- Food science and nutrition;
- Geography, marine affairs, community planning and administration;
- Marine resource economics;
- Ocean engineering and allied engineering fields; and
- Anthropology and extension education.

The URI campus has specialized facilities for marine resources, including:

- The Department of Fisheries and Marine Technology's laboratories, classrooms, dock facilities and fishing vessels at Wickford Harbor; and

- The facilities at the Narragansett Bay Campus which serves the following; Graduate School of Oceanography, URI Marine Advisory Service, R.I. Coastal Resources Center, and the URI Ocean Engineering field station. In addition, it provides facilities for research vessels, space for the Pell Marine Science Library, the R.I. Nuclear Science Center and the Remote Sensing Center.

The ICMRD Fishery Information Service is the only library/information service in the United States devoted to the problems of artisanal fisheries development. It collects and disseminates literature on small-scale fisheries development. Its collection includes books, documents, conference proceedings, and serial publications from U.S. and international sources on the following; stock assessment, extended economic zone management, artisanal fishing techniques, fisherman's cooperatives, fisheries extension, mariculture, basic seafood processing, fisheries economics, post harvest loss, socio-economics of small-scale fishing, marketing techniques of fishery products, fisheries management issues, fishing-gear technology, processing and handling, small boat design and fishery statistics covering many countries.

Qualifications of key personnel

URI/ICMRD's staff is composed of highly skilled marine scientists, fishery biologists, economists, anthropologists, and food technologists. This staff of administrators, scientists, experts, and other senior and junior staff members all have an essential grasp of the project purpose and objectives, and understanding of how their roles mesh into the larger picture to provide assistance to the LDCs. They view their activities and relationships as being important to achieve the purpose of the project. The Center successfully draws talent from a number of university departments to construct its program of research, training, technical assistance, and its network of marine scientists and institutions in both the developing and developed world.

URI/ICMRD has developed and manages a network of scientists, policy makers, extension workers and farmers who are interested in marine and fresh water development. This network includes 25 URI/ICMRD scientists who are actively involved in the project activities on a regular basis, 60 URI/ICMRD center associates who represent an available pool of related expertise, 75 LDC and international counterparts who are working directly with URI staff, and approximately 600 LDC scientists and collaborators stationed in national and international institutions.

Memoranda of Understanding

URI/ICMRD has established effective communications with institutions in the developed and developing world, and has formalized "memoranda of understanding" with six LDC institutions (Ecuador, Morocco, Portugal, Sierra Leone, Thailand, and Philippines), the University of Puerto Rico, and the Peoples Republic of China. Such agreements constitute an important step in the promotion and development of programs in potential recipient countries and institutions concerned with marine fisheries. They have strengthened the marine fisheries network of assistance and cooperation. The basic aim of these MOUs is to foster collaborative endeavors which will permit each institution to seek joint funding, exchange staff, and strengthen the capabilities of each institution to support mutually agreed upon programs. This assistance and cooperation will lead to increased fish production, the utilization of high quality animal protein by the poor majority, and increase employment opportunities in fisheries and related industries which are among the poorest majority in the LDCs.

Identification of recipient of CA

To identify the proper source to implement the next five-year cooperative agreement under this approved ten-year project, S&T/AGR considered the following universities, which were rejected for the reasons cited; Universities of Washington and Delaware, Texas A&M University, and Oregon State University. The programs at each of these institutions, while addressing certain specific aspects of small-scale fisheries, lack broad knowledge and experience concerning the range of conditions existing in LDCs. In addition, none of these universities has a micro-computer data base for providing operational fisheries information service concentrating on small-scale fisheries nor an educational program specifically designed for training LDC students.

The most compelling reason for the selection of the University of Rhode Island over the other institutions is the fact that it has made a major and concerted effort entirely devoted to marine science applicable to conditions in LDCs. It has had a strong international focus for more than eighteen years beginning with a series of 211(d) strengthening grants from one of AID's predecessor agencies. These grants were established for the purpose of developing expertise in international marine science within the faculty of URI.

In addition, the recent Evaluation Team pointed out that URI/ICMRD is recognized world-wide for its organizational structure and ability to provide assistance to develop, implement, and manage programs of small-scale marine fisheries specifically tailored to LDC environments. It has the ability to respond quickly to LDC needs in the area of marine fisheries by drawing on an inter-disciplinary program which incorporates resource economics, fishery biology, anthropology, food and marine science, microbiology, biochemistry, and environmental concerns; and an integrated training program designed specifically to meet the needs of LDC scientists, planners, extension workers, and farmers.

Although each of the above four institutions has programs and a number of faculty members working in marine science, none has a program of comparable size, as complete, nor with the strong orientation towards the LDCs as does URI. URI's critical mass of scientists and experienced staff, strong curriculum, excellent facilities, and orientation towards small-scale fisheries development in the LDCs, all make URI uniquely qualified to be selected as the recipient of the proposed cooperative agreement.

Recommendation:

It is for the above reasons that the Office of Agriculture, the Directorate for Food and Agriculture, and the Bureau for Science and Technology recommend that the Office of Procurement award a new five-year cooperative agreement to the International Center for Marine Resource Development, University of Rhode Island without consideration of other sources.

Clearances: S&T/AGR, Richard Neal _____ date 5-11-87
Tejpal Gill _____ date 5-11-87
Elizabeth Roche _____ date _____
David Bathrick _____ date _____
S&T/PO, Gerald Gower _____ date _____

WANG 4727g:MMozynski:1/20/87:Revised 3/31/87

MEMORANDUM

TO: M/SER/OP/ST, Mr. Jay Bergman

FROM: S&T/FA, Duane Acker

SUBJECT: Non-competitive award of Companion Basic Ordering Agreement
Fishery Development Support Service

I request that you negotiate only with the International Center for Marine Resource Development, University of Rhode Island (URI/ICMRD) for a companion basic ordering agreement (BOA) to the cooperative agreement (CA) also being processed at this time for the subject project. This request is based on Section 6.302-3 of the Federal Acquisition Regulations (FAR) for the exemption of a non-competitive agreement which states: "full and open competition need not be provided for when it is necessary to award the contract to a particular source or sources in order (i) to maintain a facility, producer, manufacturer, or other supplier available for furnishing supplies or services in case of a national emergency or to achieve industrial mobilization, or (ii) to establish or maintain an essential engineering, research, or development capability to be provided by an educational or other nonprofit institution or a federally funded research development center". This request is justified on the basis of the latter category.

Justification for other than full and open competition

This companion (BOA) will help URI/ICMRD maintain an essential research and development capability in marine fisheries to provide assistance to AID and LDCs. It has a long and well established collaboration with AID and the LDCs under its research and educational activities which include the following areas:

- Biological oceanography, including estuarine, coastal and reef ecology;
- Physical, chemical and geological oceanography;
- Fisheries and marine technology;
- Fisheries biology and aquaculture;
- Food science and nutrition;
- Geography, marine affairs, community planning and administration;
- Marine resource economics;
- Ocean engineering and allied engineering fields; and
- Anthropology and extension education.

The URI supports ICMRD by providing facilities, equipment, utilities and salaries of several faculty members and staff who are involved on a full or part-time basis in the programs implemented by the Center.

The URI campus has specialized facilities for marine resources, including:

- The Department of Fisheries and Marine Technology's laboratories, classrooms, dock facilities and fishing vessels at Wickford Harbor; and

- The facilities at the Narragansett Bay Campus which serves the following; Graduate School of Oceanography, URI Marine Advisory Service, R.I. Coastal Resources Center, and the URI Ocean Engineering field station. In addition, it provides facilities for research vessels, space for the Pell Marine Science Library, the R.I. Nuclear Science Center and the Remote Sensing Center.

The ICMRD Fishery Information Service is the only library/information service in the United States devoted to the problems of artisanal fisheries development. It collects and disseminates literature on small-scale fisheries development. Its collection includes books, documents, conference proceedings, and serial publications from U.S. and international sources on the following; stock assessment, extended economic zone management, artisanal fishing techniques, fishermen's cooperatives, fisheries extension, mariculture, basic seafood processing, fisheries economics, post harvest loss, socio-economics of small-scale fishing, marketing techniques of fishery products, fisheries management issues, fishing-gear technology, processing and handling, small boat design and fishery statistics covering many countries.

URI/ICMRD's staff is composed of highly skilled marine scientists, fishery biologists, economists, anthropologists, and food technologists. This staff of administrators, scientists, experts, and other senior and junior staff members all have an essential grasp of the project purpose and objectives, and understanding of how their roles mesh into the larger picture to provide assistance to the LDCs. They view their activities and relationships as being important to achieve the purpose of the project. The Center successfully draws talent from several areas of the university to strengthen its various programs.

URI/ICMRD has developed and manages a network of scientists, policy makers, extension workers and farmers who are interested in marine and fresh water development. This network includes 25 URI/ICMRD scientists who are actively involved in the project activities on a regular basis, 60 URI/ICMRD center associates who represent an available pool of related expertise, 75 LDC and international counterparts who are working directly with URI staff, and approximately 600 LDC scientists and collaborators stationed in national and international institutions.

URI/ICMRD has established effective communications with institutions in the developed and developing world, and has formalized "memoranda of understanding" with six LDC institutions (Ecuador, Morocco, Portugal, Sierra Leone, Thailand, and Philippines), the University of Puerto Rico, and the Peoples Republic of China. Such agreements constitute an important step in the promotion and development of programs in potential recipient countries and institutions concerned with marine fisheries. They have strengthened the

marine fisheries network of assistance and cooperation. The basic aim of these MOUs is to foster collaborative endeavors which will permit each institution to seek joint funding, exchange staff, and strengthen the capabilities of each institution to support mutually agreed upon programs. This assistance and cooperation will lead to increased fish production, the utilization of high quality animal protein by the poor majority, and increase employment opportunities in fisheries and related industries among the poorest majority in the LDCs.

The cooperative agreement will fund a four-pronged approach to applied and development research; technology transfer, including problem solving short, medium, and long-term assistance and transfer of information; training, including long-term training at the under graduate and graduate degree levels and non-degree and short-term training at URI and in LDCs; and networking and linkages with scientists and institutions in the developed and developing world. It will provide a critical mass of multidisciplinary scientists who will be available to backstop the marine science requirements of the missions. In addition, the core funding under the CA will provide the necessary administrative support for the delivery orders under companion basic ordering agreement.

The delivery orders under the companion Basic Ordering agreement to be funded by missions, regional bureaus and other AID/W offices will provide for the following:

Short, medium, and long-term technical and advisory services

1. Project design, assessment, feasibility studies and evaluations in areas of:

   - Fisheries marketing and policies.
   - Factors influencing project success.
   - Planning in fisheries development.
   - Fishery sector studies.
   - Factors influencing success or failure of fishermen's organizations.
   - Utilization of fish by-catch.
   - Aquaculture of salt water species of fish and shellfish.
   - Development of quality control methods of Artemia.
   - Improved handling and processing techniques.

2. Plan, organize, reorganize and implement marine fisheries production and supply programs or projects and their integration into the overall LDC strategy for agricultural development, including extension services, farmers and parastatal and private organizations.l

3. Conduct workshops and training programs in the LDCs and at URI based on marine fisheries technologies developed at the University.

4. Field test the following research results:

- Improved methods for managing fisheries resources, including under utilized species.
- Improved methods for reducing post harvest spoilage and contamination.
- Improved methods for assisting LDC fishermen, processors and wholesalers to use innovative methods in the industry.
- Functional demonstrations of models for mariculture systems
- Role of women in fishing societies.

The experience gained from the activities funded under delivery orders agains the companion BOA will be fed directly back into the activities funded under the cooperative agreement; i.e., URI's research agenda, training curricula, research network linkages, and technical transfer and informational services. It is also intended that the occasion for mission funded activities shall arise from work financed under the cooperative agreement. Mission funded delivery orders may be identified by the cooperator and approved by missions and the Office of Agriculture, Bureau for Science and Technology in the cours of the cooperator's engagement in institutional strengthening activities. Alternatively, URI may receive requests for assistance directly from the Office of Agriculture, regional bureaus, missions and LDC public and private organizations.

Recommendation:

It is for the above reasons and in accordance with Section 6.302-3 of the FAR that the Directorate for Food and Agriculture, Bureau for Science and Technology recommends that the companion basic ordering agreement be awarded to the University of Rhode Island, International Center for Marine Resource Development without consideration of other sources, and that the resultant delivery orders need not be competed.

Clearances: S&T/AGR, Richard Neal _____ date 5-11-87
Tejpal Gill _____ date 5-11-87
David Bathrich _____ date _____
Elizabeth Roche _____ date _____
S&T/PO, Gerald Gower _____ date _____

WANG:4736g:MMozynski:1/21/87:Revised 4/1/87