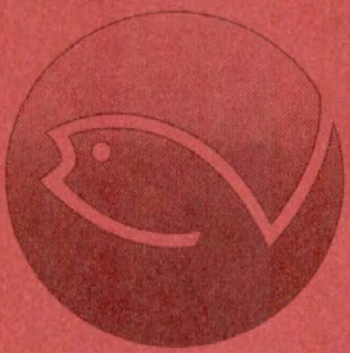
The Fishery Development Support Services of the International Center for Marine Resource Development



A Catalog of Services Available Under the U.S. AID-ICMRD Cooperative Agreement

University of Rhode Island

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Introduction

The International Center for Marine Resource Development (ICMRD) was founded at the University of Rhode Island (URI) in 1969 to provide a common base for international applications of research and training programs in a diversity of marine-related fields. ICMRD's existence enables URI faculty and staff to share their expertise in fisheries development and management with the world's developing countries. This link between URI and other countries can be of mutual benefit. It can have a favorable impact on a fishing economy by improving the quality or quantity of fisheries products, and it provides a way to use URI training and research abroad.

Under the auspices of ICMRD, URI specialists take a comprehensive approach to fisheries problems. They analyze not only the fishery resource, the fishing gear technology and distribution of the catch, but they are also concerned with the economic, social, political, and cultural environment in which the fisheries operate. The URI faculty is expert in all aspects of developing and managing coastal and marine capture fisheries as well as mariculture.

Funded primarly by the U.S. Agency for International Development (AID), ICMRD has in 14 years seen the successful completion of many projects, including a stock assessment and marketing evaluation of fisheries in Costa Rica, a study of the fisheries potential of coral reefs, and a two-year training program in fishing technology at URI for trainees from Guinea-Bissau.

In 1982, a new five-year Cooperative Agreement with US/AID for Fishery Development Support Services was approved. It enables ICMRD to continue offering such programs. This publication describes the services ICMRD can offer at present.

The services described here can be made available to AID Missions to assist the developing country with a fisheries development program.

Three areas may be of particular interest to developing countries with coastal resources. These are, first, the problems of coastal communities which depend on small-scale fisheries. These communities are among the poorest groups in coastal developing countries. Second is the problem of

post-harvest loss of fishery products, estimated to be as high as 50 percent in certain localized situations. Third, URI specialists can assist developing countries in establishing effective management control over living marine resources within their exclusive economic coastal zone.

The Cooperative Agreement is set up to share URI's information and staff resources with the fisheries sector of a developing country. These resources are:

- The ICMRD Fishery Information Service, an excellent data resource on fisheries management and development, which will provide information on request;
- In-country, short-term advisory and consultant services by URI personnel in all areas of fisheries development and management;
- Long- and short-term training of the country's personnel at URI in fisheries-related subjects.

These three means of assistance are explained in greater detail in the following pages.

Fishery Information Service

The ICMRD Fishery Information Service collects and disseminates literature on small-scale fisheries development. Information is acquired from international, national, and local sources around the world. At present, the collection consists of over 6,000 books, documents, conference proceedings, and serial publications. Some of the subjects covered include stock assessment, Extended Economic Zone management, fishermen's cooperatives, fisheries extension, marketing techniques, fishing-gear technology, processing and handling, small boat design and statistics. The Information Service actively collects materials on these and many other topics of interest to program planners, fisheries administrators, researchers, extension personnel, and others in developing countries.

The ICMRD Information Service cooperates with the AID Bureau of Science and Technology Information Service, providing resources to complement AID fisheries information. In addition to the traditional library services of reference, loan, and photo-reproduction, the Information Service is a distribution point for publications on small-scale fisheries published by ICMRD associates. A list of available publications is published twice yearly, and is sent to over 700 addresses world-wide. ICMRD publications are sent to those who request them. When supplies are exhausted, AID provides microfiche and photocopies of ICMRD publications in accordance with their distribution policy.

Anyone may use the ICMRD Information Service. Requests are accepted by mail, telephone, or in person, There is no charge for the service. Libraries or institutions which regularly publish on fisheries topics are encouraged to set up a publications exchange agreement with ICMRD. Exchange agreements guarantee that one copy of every publication generated by each institution will automatically be sent to the other. ICMRD currently has over 130 exchange agreements with institutions around the world.

Fish harvest. URI specialists evaluate traditional gear and handling methods, such as those used on this Malaysian vessel, and recommend ways to increase the catch and reduce post-harvest losses.

Short-Term Advisory and Consultant Services

ICMRD maintains a core of URI faculty and staff able to respond, either individually or in teams, to requests for short-term in-country assistance in the areas of fisheries development and management. Specialists in sociocultural aspects and socioeconomic aspects of fisheries, fisheries stock assessment and management, fishery products, fishing technology, fisheries extension education, fisheries economics, fisheries information services, and other fields, can work on specific problems. These areas are explained in greater detail on the following pages.

Under the terms of the Cooperative Agreement, URI personnel may work in a host country for short periods of time, not to exceed thirty (30) days per AID Mission per year. Examples of the different sorts of advisory and consultant services which URI specialists can offer are:

- Feasibility, sector analysis, and other general fisheries development studies of potential small-scale fisheries development projects, including project design and evaluation;
- Specific recommendations on stock assessment, fisheries management, harvesting and processing, fisheries cooperatives, and fisheries extension programs;
- Socioeconomic impact evaluations of new methods and management measures implemented through small-scale fisheries development activities funded by the mission and host country.

Sociocultural and Socioeconomic Aspects of Fishery Development

Without an understanding of the human components of a fishery it is difficult for suggested changes to be effective and beneficial in the long term. Sociocultural studies supply this understanding.

To study sociocultural aspects of a fishery, a URI specialist evaluates the technology in use and its relationship to the social structure of the fishermen and others using it. For example, the specialist wants to know: How are the activities of fish production and distribution allocated among young and old people, among men and women, rich and poor,

relatives and other categories of people? If, for example, fishing boats are manned by family members, there may be reluctance to implement changes that would reduce the number of fishermen and so put family members out of work.

Socioeconomic aspects of a fishery are equally important. The data types that are often used include information about the distribution of wealth, the availability and types of marketing services, the cost of labor, gear, supplies, and processing and market prices of fishery products.

Fishermen's attitudes, beliefs, and values toward existing fishery systems as well as attitudes toward potential changes (e.g., increases in fish consumption, changes in techniques, new varieties of fish) are a third important type of information.

How will such information be used? The specialist can prepare project-specific sociocultural impact assessments of proposed changes in:

- Fishery technology such as gear, vessels, processing technology;
- Institutional fishery arrangements such as the introduction of new marketing arrangements, gear ownership

Collecting cultural information. A URI sociologist interviews Costa Rican fishermen.

arrangements, ways of organizing, fishery extension training, and cooperatives.

In addition, the specialist can advise on the developing and implementing of sociocultural data information systems for the fishery, including monitoring and evaluation studies.

Other possible contributions to a developing country by a sociocultural specialist include:

- Developing and implementing sociocultural data information systems for the fishery;
- Consulting and analyzing previously collected sociocultural data to evaluate fishery products before and after implementation;
- Establishing programs to obtain a sociocultural assessment of the development and use of fishery cooperatives or fishery extension training services.

The sociocultural specialist reports his findings in working papers which are sent to concerned agencies and individuals in the host country and the funding agency.

Gear. A URI fisheries technology specialist assists in pulling in seine nets in Costa Rica.

Fishing Technology

URI specialists can advise on small-scale fisheries development, especially small-boat fishing operations, maintenance and repairs, and fishing-gear efficiency.

The aim of this service is to evaluate the current state of a fishery and recommend ways to improve its production and efficiency. The specialist will work with fishermen to assess their needs.

Evaluation of a fishery and its management consists of:

- Analysis of historical catch and production rates;
- Exploratory fishing and investigation of underutilized species;
- Economics of labor, capital, and costs associated with fisheries;
- Information on catch per unit of effort and sustainable yields;
- Analysis of quotas, size limits, vessel and gear restrictions.

In addition, a URI specialist can advise fishermen on fisheries gear, including new technology. Such advice includes recommendations for appropriate gear for particular fish species, assembling of imported gear in the country, and construction of gear. Types of gear may include: gill nets, fish traps and weirs, all types of fish pots, trawl nets for both inshore and offshore fisheries, and deck arrangements for hydraulics and fishing equipment.

URI specialists have experience in teaching these subjects to American fishermen, American fishing technology students, and to students from developing countries, e.g., Guinea-Bissau.

Fisheries Stock Assessment and Management

A URI fisheries biologist will conduct in-country fisheries biology studies yielding the sorts of information described below.

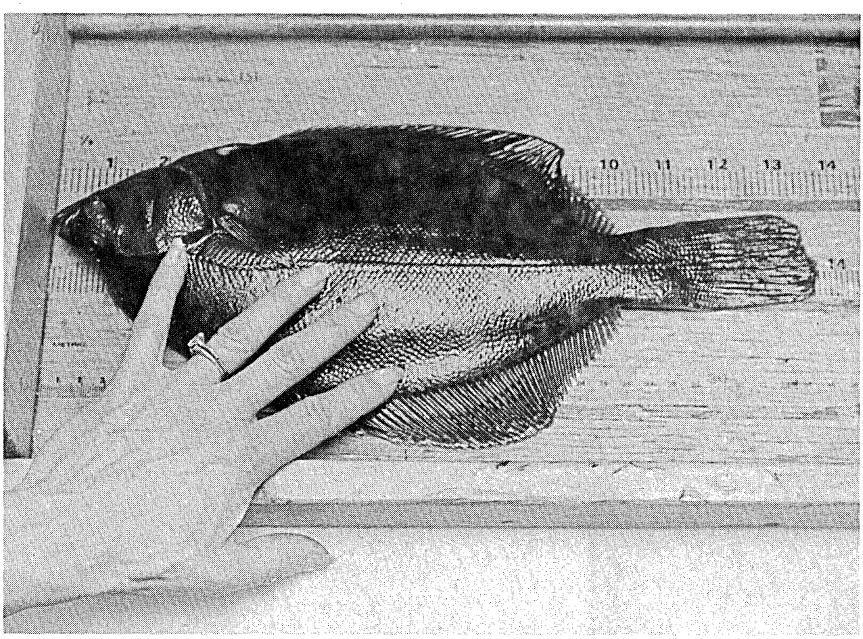
Initial steps in the study of fisheries involve estimates of exploitable biomass and identification of stock. There are several ways to estimate biomass, including acoustic surveys, exploratory fishing, and productivity estimates. In addition to estimating biomass, it is important to know if the fished stock can be considered as a single management unit. Individual stocks of a fish or shellfish species can be

distinguished using body measurements and counts, including length, weight, fin-ray counts, scale counts, and others. Other methods that can be used to differentiate among stocks include biochemical analyses and physiological tolerances. Various statistical methods, including univariate, bivariate, and multivariate techniques, are used to evaluate the measurements.

Age and growth studies of fish populations can give important information about the relative sizes of various year classes and their rates of growth. Data from these analyses are treated mathematically to obtain growth curves, which are applied to models for estimating sustainable yields.

Other important parameters for stock assessment are fishing mortality and natural mortality rates. Mortality rates can be estimated by several different methods. These rates are also important components of yield models.

Fisheries forecasting, yield projection, and population estimation are other services which the fisheries biologist can provide, given an adequate data base. Survey procedures useful for estimating population size will be reviewed and evaluated.



Stock assessment. Fish body-measurements, along with other measurements, may identify year classes and stocks of fish.

Fisheries Extension Education

A URI specialist will advise on setting up of fisheries extension programs in developing countries. The technical assistance will cover such areas as: organization of programs, and ways to develop, implement, and evaluate new programs. The specialist will suggest appropriate curricula and methods of teaching and will offer instruction in audiovisual aids adaptable to an extension program in a developing country.

Fisheries extension assistance can be provided during the several phases of a US/AID fisheries development project, including feasibility studies, project design and proposal writing, and evaluation of on-going projects.

Fishery Products and Post-Harvest Loss

URI probably has the largest concentration of specialists in fishery product technology in the U.S. The specialists have developed many new methods to increase the quality of fishery products. They can make contributions in areas of

Extension education. A Peace Corps trainee in URI's Fisheries and Marine Technology Program demonstrates the construction of a cast net.

energy use, water use, nutritional value, processing, the avoidance of post-harvest loss through better preservation methods, packaging, distribution, and waste treatment in the fishery area.

In developing countries, URI specialists can study the current status and potential of local industries, develop ways to decrease losses, and develop technologies to increase the quality and thus the availability of fishery products. A study can be vertically integrated from fish harvest to consumption and is usually carried out with the cooperation of other ICMRD specialists in sociology, economics, and fisheries technology.

The ICMRD stock assessment group can identify both the predominant fish species in a region and the underutilized species. With this information, food scientists can address the problems of processing different fish species. Fish with different fat, protein, moisture, and non-protein nitrogen content require different processing and preservation technologies. Also, different species have different processing yields and may differ widely in storage stability. Thus, specific

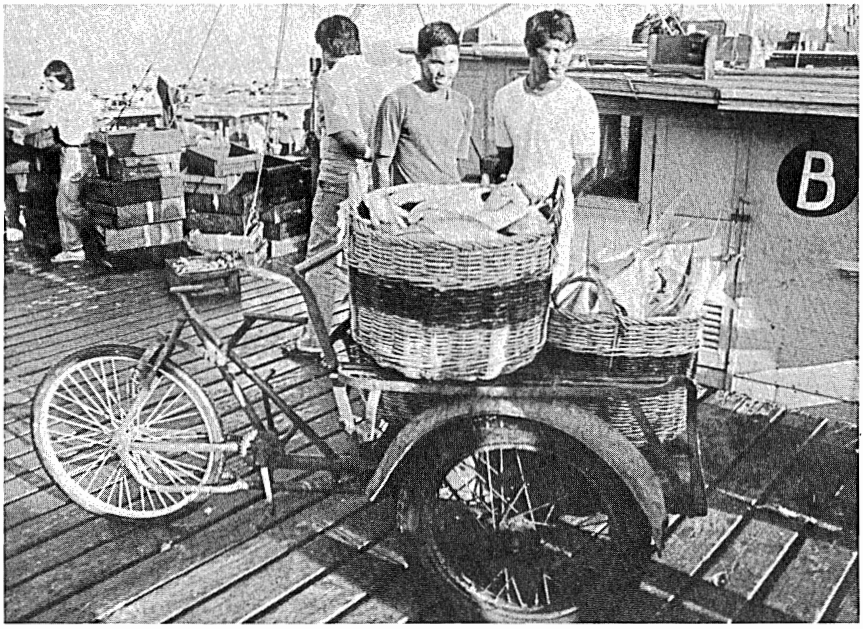
Processing. Women in Ghana spread fish on trays for smoking. Food scientists from URI have modified the traditional smoking process to improve the nutritional quality of fish.

technologies must be developed to minimize post-harvest losses.

URI's food scientists have developed simple, rapid methods for assessing the quality of fish and can quickly measure the onset of deterioration. They have worked in areas of small-scale technology, such as smoking, and have tested engineering systems adaptable to small fishing communities. They have assisted in Africa, Central America, and South America in designing and constructing low-cost and efficient processing, packaging, storage, and transportation facilities. All these facets of food technology contribute to avoiding losses and increasing the amount and quality of fish available to the general population.

Fisheries Economics

A URI fisheries economist will provide assistance through the phases of AID fisheries development projects: pre-project assessment, design, request for proposals, and project evaluation.



Distribution. These fish are on their way to market in southeast Asia. URI food scientists and economists can suggest new handling methods to reduce post-harvest losses.

The specialist will provide leadership for evaluation and feasibility study teams and can design fisheries data-collection systems and consult on their implementation.

In other applications, the fisheries economist will conduct research on problems related to the economics of small-scale and commercial fisheries, including mariculture systems. The specialist can advise on the development of teaching and research institutions appropriate for fisheries development.

Fisheries Information Service

The URI fisheries information specialist can advise on a number of matters relating to the setting up of marine fisheries information centers, including:

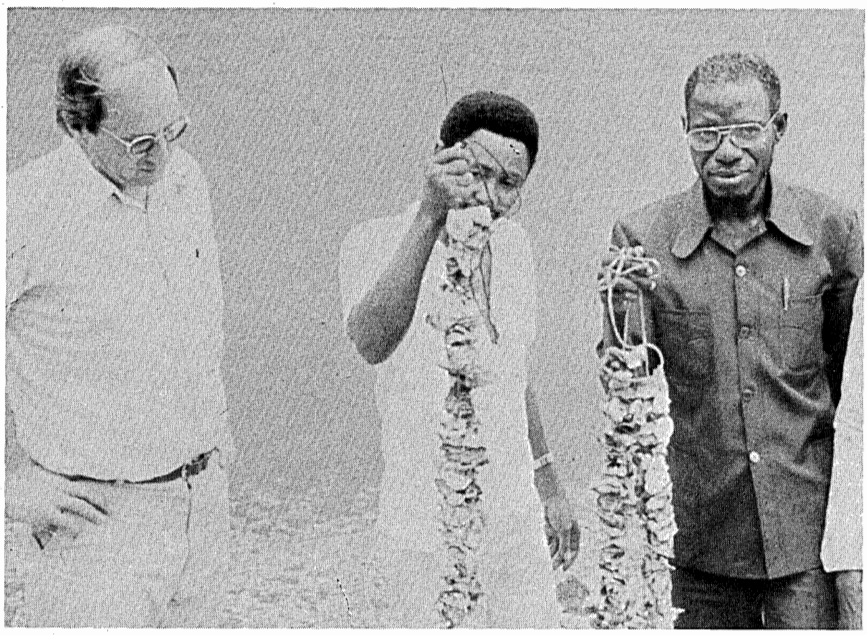
- Organization and planning;
- Use of microcomputers for information management and international networking;
- Development of fisheries and marine information networks, including both national and international contacts;

Information. An ICMRD information specialist shows a visiting Nigerian fisheries school principal some of the fisheries literature available in the ICMRD library.

- Development and utilization of on-line bibliographic information services and searching strategies for fisheries and marine sciences;
- Development of public relations programs for fisheries information services.

Mariculture

A URI specialist can assist in the development of intensive shellfish, finfish, and crustacean mariculture farms. The aspects of culture that can be included are: natural-growth bottom culture, three-dimensional off-bottom culture, shellfish management and predator control. Tropical mariculture information and technical assistance, ranging from hatchery techniques to production and including marketing and processing plants, may be requested. Specialists' experience includes design and economic assessment of a prawn hatchery in West Java, Indonesia, and penaeid shrimp production in Panama.



Mariculture. A URI economist evaluates an oyster culture project in Sierra Leone.

Education and Training at URI and Abroad

In-Country Short Courses

During each year of the Cooperative Agreement, the University of Rhode Island will conduct a one- or two-week workshop in a selected developing country. The selection will be based upon U.S. AID Mission (in-country representative) and host government requests. The topics can be selected from those described in the technical assistance and participants training possibilities listed in this publication.

Training at URI

The University of Rhode Island will provide to qualified participants from developing countries either degree or non-degree training related to marine fisheries. The participants' costs will be met by the AID Missions and/or other agency funding sources.

Degree Programs (2-year Associate, B.S., M.S. or Ph.D.)

Selected qualified students from developing countries may enroll at URI for a major or minor in the following subjects and degree programs.

Fisheries Biology — M.S. in Fisheries Science and Technology (under development) or M.S. or Ph.D. in Oceanography

Fisheries Technology — A.S. in Fisheries Technology, or B.S. in Fisheries Technology, or M.M.A. with Certificate in Fisheries (Master of Marine Affairs)

Aquaculture and Mariculture — B.S. in Aquaculture Technology, or M.S. in Aquaculture, or M.S. or Ph.D. in Zoology, or M.S. or Ph.D. in Botany, or M.S. or Ph.D. in Ocean Engineering

Management — M.M.A. in Marine Affairs (one year) or M.A. in Marine Affairs (two years) or M.M.A. with Certificate in Fisheries

Training at URI. A fisheries technology instructor at URI teaches a student from Guinea-Bissau to construct a fyke net.

Fisheries Economics — B.S. in Resource Economics or M.S. or Ph.D. in Resource Economics
Sociocultural — M.M.A. with Certificate in Extension or M.S. in Fisheries Science with Certificate in Extension
Fisheries Extension — M.M.A. with Certificate in Extension or M.S. in Fisheries Science and Technology with Certificate in Extension
Food Technology and Fisheries Products — M.S. or Ph.D. in Food Science and Technology or B.S. in Food Technology

Non-Degree Training at URI

At the request of developing countries and/or AID Missions or Regional Bureaus, the University can develop and conduct various short courses (1-10 weeks in length). The short courses will include any area of expertise described under the technical assistance and degree components of the Cooperative Agreement. The following workshops are being planned.

Sociocultural Aspects. A workshop or training session on sociocultural aspects of monitoring and evaluation, including establishment of information systems, analysis of data, and making operationally relevant recommendations.

A workshop or training session on sociocultural aspects of the development and use of fishermen's organizations (including cooperatives), which would include establishment of appropriate information systems, and analysis of data and its use in decision-making concerning fishermen's organizations.

Fisheries Economics. Fisheries economics training programs for researchers, administrators, and industry personnel of developing countries.

Fishery Products. Workshops for fisheries personnel of developing countries, including fish handling and processing, nutrition, fish preparation, sanitation, and fish quality evaluation.

Fishing Technology. Workshops and training programs for fisheries officers of developing countries in inshore gear technology including gill nets, fish traps and weirs, all types of fish pots, trawl nets for inshore and offshore fisheries, small boat construction, and deck arrangements for hydraulics and fishing equipment.

Fisheries Stock Assessment and Management. Training programs for fisheries personnel in fish stock identification, fisheries forecasting and yield projection, and fisheries population estimation and survey procedures.

Fisheries Extension Education. Training programs for fisheries extension personnel to include any or all of the following topics:

Organization and management of fisheries extension programs
Philosophy of extension education
Human relations
Public relations
Communication techniques
Principles of adult education
Extension methodology
Audiovisual aids and other media
Process of change and diffusion in extension programs of developing countries
Decision-making process in extension programs of developing countries.

Fisheries Information. Training programs for fisheries information personnel including basic library skills, on-line searching, microcomputer applications, and marine library internships.

How to Apply for ICMRD Assistance

Requests for ICMRD/Cooperative Agreement assistance from persons in developing countries should be directed by way of the country's appropriate government channels to the AID Mission in the country.

For more information, please write or call:

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