AQUACULTURE TRAINING OPPORTUNITIES
IN HAWAII
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By
Megan Dwyer

Pacific Islands Development Program
East-West Center
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INTRODUCTION

The Pacific Islands Development Program (PIDP) of the East-West Center was established in 1980 to address specific research needs of the Pacific Islands region. These needs were identified by the Pacific Islands Conference that was held in Honolulu in 1980. One topic of research identified was aquaculture.

As a result of a mandate from the Pacific Islands Conference and its Standing Committee, PIDP initiated an aquaculture assessment project. As a side activity to the main thrust of PIDP's aquaculture project, a survey was initiated on aquaculture training potential in the State of Hawaii. The objective of this activity was to provide Pacific Island governments with current information on the various aquaculture training opportunities available in Hawaii.

Hawaii is a center of aquaculture activities in the United States. Research, training, consulting, and commercial aquaculture ventures are all found in Hawaii. These factors make Hawaii a site to be considered when investigating aquaculture training opportunities are being investigated.

This paper considers the opportunities in Hawaii for training in aquaculture in general, as well as on specific topics within the umbrella of aquaculture. It is divided into three sections based on the type of training offered. Sections are formal classroom courses, practical on-the-job training, and special courses. Some training organizations have
a capacity in more than one form of training; thus they are double listed in this paper.

The information compiled here was derived from college catalogs and by telephone and mail surveys of aquaculture farms, research organizations, and consulting firms in Hawaii, as well as from interviews with various people in the Hawaii aquaculture community.

Addresses of training organizations are provided (see Appendix) so that, if interested, individual governments can pursue this topic directly.
To be successful, any training program requires careful planning and preparation. If this is not done, scarce resources of time and money can be wasted on an inefficient or inappropriate training program.

The first step in planning a training program is to identify training objectives. When defining objectives some questions to consider include:

. Why is training desired?
. What technical skills and skill levels are desired?
. What is the end-use of the training?
. Are there jobs for those that receive training?

Additional considerations include time constraints of (1) the training period duration that is acceptable and (2) the timeliness of the training (when is the trained person needed?). Monetary constraints include (1) funds available for training and (2) sources of funds to pay for the training. Personnel constraints include (1) identification of person or persons for training, (2) the current knowledge or skill level of the individual(s) selected for training, and (3) availability of individuals for training.

Once these initial items are addressed, inquiries can be made to educational or training organizations about their ability to provide courses and their experience in meeting defined objectives. The more
specific the initial request or inquiry, the more useful the response. This is especially true if a "tailor made" program is desired.

During selection of an appropriate training program, the following items can be considered:

- Can the agency meet the training objectives?
- Does the agency have experience in training?
- How do past trainees rate the training received?
- Are costs competitive for training received?
- Does the agency have the personnel to provide training?
- Is the facility adequate and appropriate for training?
- Are support facilities (e.g., housing, medical, transport) available and reasonable?

Once responses are received from initial inquiries, a program can be selected that best suits the training objectives within limiting constraints. Once selection is made, contract negotiations can be initiated.

Within the training contract, specific items may be considered such as:

- What are the specific objectives of the training program?
- How the objectives will be met?
- Who (the specific persons) will give the training?
. Who will provide trainee support?
. What are the payment schedules?

It usually takes time to prepare for a training program and it is advantageous to start planning well in advance. Adequate time should be allowed to obtain appropriate visas, especially if communication between the individual government and its U.S. Embassy is slow.

Many training facilities will only provide training at certain times of the year. For example, universities and colleges have semester starting dates twice or three times a year, and many courses are offered only once a year. Training using these courses must be scheduled according to the specific institution.

On-the-job training usually must fit into the workload of the host organization. In addition, a special training course may take some time to prepare. An individual training organization may require months between the initial inquiry and the beginning of the training program.

If the program is well planned, the trainee can devote full attention to training activities and distractions can be minimized. The trainee can be provided with a program ideally suited to meet training objectives and his/her particular capacities. This will enable him/her to gain maximum benefit from the training experience.
CLASSROOM COURSES

A number of classroom courses in aquaculture are available at educational institutions in Hawaii. Courses typically run for one semester (approximately 15 weeks), beginning in either January (Spring) or September (Fall). Each course involves approximately three hours a week of lecture-style teaching. In addition, some courses include laboratory or field visits. Many courses have prerequisites (courses that must be taken prior to the specific course).

Community Colleges

Community Colleges in Hawaii provide technical and adult education for any members of the community who wish to take part. There are generally no specific educational requirements for entry beyond an acceptable level of English language proficiency.

Two community colleges in Hawaii offer courses in aquaculture. They are the Honolulu Community College and the Windward Community College.

Honolulu Community College

WORLD AQUACULTURE (Ocean 190) provides a general background in aquaculture methods and systems, as practiced in different parts of the world. The course examines old and new systems of cultivation on a country-by-country basis. The course provides information on scientific and economic aspects of aquaculture. A discussion on biology life history and nutrition of cultivated species is also provided.
AQUACULTURE (Ocean 180) provides basic knowledge in aquaculture. It covers various aspects of pond preparation and maintenance, hatchery and nursery management, and water quality monitoring methods applicable to aquaculture operators. Emphasis is on marine and freshwater species pertinent to Hawaii.

Windward Community College

SMALL-SCALE AQUACULTURE (AQUA 106) surveys possibilities of small-scale aquaculture. The course examines the application of biological and ecological concepts and theories in the selection, planning, and design of small-scale aquaculture systems.

Universities

The universities in Hawaii offer courses leading to both Bachelor degrees and higher degrees (M.S.s, M.A.s, and Ph.D.s) to students who successfully complete their programs. Students may also be admitted as unclassified students and take selected courses not leading to the award of a degree.

Of the universities in the State of Hawaii, only the University of Hawaii (UH) at Manoa offers aquaculture courses. It does not, however, have a standard undergraduate or graduate program in aquaculture. Aquaculture training programs (leading to academic degrees) are available at the U.H. but must be set up on an individual basis within a specific department such as the Department of Agricultural and Resource Economics or the Department of Animal Science. For details on specific programs,
inquiries can be sent directly to the specific department at the U.H. (see Appendix for address). For general information on admissions, inquiries can be sent to the Admissions Office (see Appendix for address).

University of Hawaii at Manoa

Department of Agricultural and Resource Economics

ECONOMICS OF FISHERIES AND AQUACULTURE (AREC 331) covers the management of aquaculture and fishing businesses (production, financing, marketing) and industrial development (potentials, constraints, government policies). Topics in aquaculture and fisheries are taught on alternate basis. Prerequisite: university-level economics or agricultural economics.

Department of Animal Science

AQUACULTURE PRODUCTION (ANSC 498) is a laboratory and lecture course covering theory and practice of biological, ecological, and energetic aspects of aquaculture: nutrient dynamics, microbiology food chains, energy budgets, reproduction. Species covered include salmonids, carp, tilapia, crustaceans, and molluscs. (Offered jointly with Department of Oceanography). Prerequisites: university-level chemistry, biology, and animal science.

BIOLOGY AND CULTURE OF FRESHWATER PRAWN (ANSC 460) covers aspects of the biology of the freshwater prawn Macrobrachium rosenbergii and its culture system. Specific research results and case studies are presented and analyzed. Prerequisites: university-level biology including genetics.
GENETICS OF AQUACULTURED SPECIES (ANSC 620)
covers the theory and practice of
genetic analyses and aquabreeding in the
study of, and production optimization
in, aquacultured species and capture
fisheries such as carp, salmonids,
tilapia, crustaceans, molluscs, and
algae. Prerequisite: university-level
biology, preferably including genetics.

TECHNIQUES IN AQUACULTURE SCIENCE (ANSC 362)
is a laboratory and field course of
biological, physical, chemical, and
statistical methods in aquaculture
including water quality analysis,
experimental design/analysis, controlled
spawning in fish and crustacea; biomass
assessment; farm pond management.
Prerequisite: university-level biology
or animal science.

TOPICS IN AQUACULTURE SCIENCE (ANSC 360)
surveys specific areas in aquaculture
including biological, physical, economic
aspects of intensive/extensive
crustacean, fish, mollusc, aquatic plant
culture; terrestrial system integration.
Prerequisite: university-level biology.
PRACTICAL TRAINING

A number of commercial aquaculture farms and research institutions in Hawaii provide opportunities for on-the-job training, primarily through hands-on work on the farm. Terms and conditions for this "practical training" differ widely and should be negotiated with farm managers on an individual case basis.

Anuenue Fisheries Research Center

The Anuenue Fisheries Research Center is a state government-run hatchery and research center. It provides Macrobrachiun rosenbergii post-larvae to prawn farms in Hawaii. In addition, a channel catfish fry operation is ongoing. Some research is also conducted on-site. Volunteer work is possible but no residential facilities are available on site.

Aquaculture Associates, Inc.

Aquaculture Associates, Inc. is a private commercial operation involved in both consulting service and aquaculture farming operations. It is not currently involved in training but can provide both on-the-job training and special courses.

Aquatic Farms, Ltd.

Aquatic Farms, Ltd. is a private commercial operation engaged in commercial aquaculture production, research, training, and consulting.
Facilities include a 12 hectare aquaculture farm. The farm currently produces the Malaysian prawns (*Macrobrachium rosenbergii*), tilapia, and penaeid shrimp.

On-the-job training for 2 to 6 month periods can be provided. Details and costs are arranged on a case-by-case basis.

**Hawaii Institute of Marine Biology**

The Hawaii Institute of Marine Biology is the marine laboratory for the University of Hawaii. Assistance is periodically required for ongoing aquaculture research projects. Volunteer work may be negotiated on a case specific basis.

**Oceanic Institute**

Oceanic Institute (OI) is a private, non-profit research organization. Its facilities include ponds, tanks, raceways, hatchery, water quality laboratory, and feed mixing facilities. OI has been involved in research on all aspects of aquaculture. It is currently involved in the culture of catfish, mullets, milkfish, penaeid shrimp, algae and some mollusc species.

On-the-job training in conjunction with any ongoing research projects can be arranged. This must be negotiated with the training manager.
SPECIAL COURSES

Some of the organizations previously listed have the capacity to provide special courses tailored to the specific needs of a client. These special courses are arranged on a case-by-case basis.

Aquaculture Associates, Inc.

Aquaculture Associates, Inc., a private commercial operation, has experience in commercial aquaculture and in consulting. The firm has indicated that it could provide special training courses upon request.

Aquatic Farms, Ltd.

Aquatic Farms, Ltd., a private commercial operation, can provide special one-time course. Costs vary according to type of course and number of trainees. Costs are in the order of US$500 to $1,000 per person. In some cases, labor provided by the participant to the farm may be substituted for part of the costs.

Oceanic Institute

Oceanic Institute, a private, non-profit research organization, does not have ongoing education programs. It can, however, provide special training programs for individuals or groups. It has particular expertise in production, hatchery, water quality, feed culture, and feed formulation. In addition to the aquaculture facilities previously mentioned, on-site
facilities include a classroom and a dormitory for 10 people. Cooking facilities are available to people in training programs.
APPENDIX

A List of Aquaculture Training Organizations in Hawaii and their Addresses

ANUENUE FISHERIES RESEARCH CENTER
Area 4 Sand Island
Honolulu, Hawaii 96819 USA

telephone: (808) 845-9561

AQUACULTURE ASSOCIATES, INC.
1110 Richards Street Room 207
Honolulu, Hawaii 96813 USA

telephone: (808) 538-1230

AQUATIC FARMS
49-139 Kamehameha Highway
Kaneohe, Hawaii 96744 USA

telephone: (808) 237-8515

HAWAII INSTITUTE OF MARINE BIOLOGY
P.O. Box 1346
Kaneohe, Hawaii 96744 USA

telephone: (808) 247-6631

Admissions Office
HONOLULU COMMUNITY COLLEGE
874 Dillingham Boulevard
Honolulu, Hawaii 96817 USA

telephone: (808) 845-9211

OCEANIC INSTITUTE
Makapuu Point
Waimānalo, Hawaii 96795 USA

telephone: (808) 259-7951
Office of Admissions and Records  
UNIVERSITY OF HAWAI'I AT MANOA  
Sakamaki Hall D200  
2530 Dole Street  
Honolulu, Hawaii 96822 USA  

telephone: (808) 948-8975

Department of Animal Science  
UNIVERSITY OF HAWAI'I AT MANOA  
Henke Hall Room 106  
1800 East-West Road  
Honolulu, Hawaii 96822 USA  

telephone: (808) 948-8356

Department of Agricultural and Resource Economics  
UNIVERSITY OF HAWAI'I AT MANOA  
Bilger Hall Room 210  
2545 The Mall  
Honolulu, Hawaii 96822 USA  

telephone: (808) 948-7039

WINDWARD COMMUNITY COLLEGE  
45-720 Keaahala Road  
Kaneohe, Hawaii 96744 USA  

telephone: (808) 235-0077
THE EAST-WEST CENTER is an educational institution established in Hawaii in 1960 by the United States Congress. The Center's mandate is "to promote better relations and understanding among the nations of Asia, the Pacific, and the United States through cooperative study, training, and research.

Each year nearly 2,000 graduate students, scholars, professionals in business and government, and visiting specialists engage in research with the Center's international staff on major issues and problems facing the Asian and Pacific region. Since 1960, more than 30,000 men and women from the region have participated in the Center's cooperative programs.

The Center's research and educational activities are conducted in five institutes—Communication, Culture Learning, Environment and Policy, Population, and Resource Systems—and in its Pacific Islands Development Program, Open Grants, and Centerwide Programs.

Although principal funding continues to come from the U.S. Congress, more than 20 Asian and Pacific governments, as well as private agencies and corporations, have provided contributions for program support. The East-West Center is a public, nonprofit corporation with an international board of governors.
PACIFIC ISLANDS DEVELOPMENT PROGRAM

The purpose of the Pacific Islands Development Program (PIDP) is to help meet the special development needs of the Pacific Islands region through cooperative research, education, and training. PIDP also serves as the Secretariat for the 1980 Pacific Islands Conference, a heads of government meeting involving leaders from throughout the Pacific region, and for the Pacific Islands Conference Standing Committee, which was established to ensure follow-up on development problems discussed at the Conference.

PIDP’s research, education, and training activities are developed as a direct response to requests from the Standing Committee. PIDP’s projects are planned in close cooperation with the Committee to ensure that the focus and the organization of each project address the needs identified by the heads of government on the Committee, a process which is unique within the East-West Center and in other research and educational organizations serving the Pacific.

A major objective of the program has been to provide quality in-depth analytical studies on specific priority issues as identified by the Pacific Island leaders and people. The aim is to provide leaders with detailed information and alternative strategies on policy issues. Each Island country will make its own decision based on national goals and objectives. Since 1980, PIDP has been given the task of research in six project areas: energy, disaster preparedness, aquaculture, government and administrative systems, roles of multinational corporations, and business ventures development and management.