

SEAFDEC/AQD experience in mangrove-friendly aquaculture training and extension

RENATO F. AGBAYANI

and

KAYLIN G. CORRE

Southeast Asian Fisheries Development Center

Aquaculture Department

5021 Tigbauan, Iloilo, Philippines

<training@aqd.seafdec.org.ph>

Abstract

SEAFDEC Aquaculture Department (SEAFDEC/AQD) is mandated to develop human resources and disseminate and exchange information in aquaculture. Towards this direction, AQD's recent thrusts are focused on the verification, packaging, and commercialization of the technologies developed through research. AQD disseminates and exchanges information on aquaculture research and technology through training, extension services, community-based projects and mass media. Through these strategies, AQD aims to reach out to more clientele which include among other sectors the private industry, research and academic institutions, regional and international organizations, policy-makers, non-government organizations, resource managers, SEAFDEC member-countries, local and national government and the fisherfolk.

For the past two years, the scope of training courses and extension services of AQD have been expanded from technological viability to sustainability i.e., technological feasibility, economic viability, environmental sustainability and social equity. To attain sustainable aquaculture the following elements were considered: status of technology, conditions of the coastal resources, socio-economic attributes of the community and other stakeholders and institutional arrangements on sustainable aquaculture.

Starting 1997, subjects on mangrove-friendly aquaculture and coastal resource management were incorporated into the curriculum of training courses. These courses are the following:

- Third Country Training Program on Coastal Aquaculture and Resource Management for trainees from Asian countries
- On-site Training on Sustainable Aquaculture and Coastal Resource Management in Vietnam
- Sustainable Aquaculture and Coastal Resource Management for extension workers and fishery school teachers

In terms of technology verification and extension, the culture of mudcrab (*Scylla* sp.) was tested in mangroves or tidal flats with existing mangroves in two different sites (Puerto Princesa, Palawan and Kalibo, Aldan) in collaboration with local government units and the fisherfolk. These activities started in 1997 and will be replicated in other areas of the country. Also in 1997, AQD published and distributed an issue on integrated farming with aquasilviculture in its SEAFDEC *Asian Aquaculture* newsletter. In 1998, AQD produced a 12-minute video on *Conserving Mangrove Resources*.

Introduction

The Southeast Asian Fisheries Development Center/Aquaculture Department (SEAFDEC/AQD) is mandated to: (1) promote, undertake and coordinate aquaculture research relevant to the region; (2) develop human resources for aquaculture development; and (3) disseminate and exchange information in aquaculture. The first mandate is the primary function of AQD's Research Division which undertakes research on commercially important species of fish, crustaceans, seaweeds, molluscs, and other aquatic organisms. The succeeding mandates are the major responsibility of the Training and Information Division whose functions are focused on the verification, packaging, and commercialization of the technologies developed through research. In carrying out these mandates, AQD is guided with its shared vision which states that "SEAFDEC/AQD shall be a dynamic, relevant regional R & D organization for sustainable aquaculture responsive to the needs of the industry and society."

Framework for sustainable mangrove-friendly aquaculture

For the past two years, the scope of training courses and extension services of AQD have been expanded from technological viability to sustainability. Sustainability is viewed in terms of different interrelated aspects, namely, technological feasibility, economic viability, environmental sustainability and social equity. In the expansion process, different elements were also considered to ensure that sustainable aquaculture systems are promoted on a wide scale. These are the status of technology, conditions of the coastal resources, socio-economic attributes of the community and other stakeholders and institutional arrangements on sustainable aquaculture. Sustainable aquaculture systems that are environmentally sound and appropriate for low-level producers and consumers are given emphasis to address the major issue of the needs of the small fisherfolk who make up the bulk of the population of the Asian region.

AQD disseminates and exchanges information on aquaculture research and technology through training, extension services, community-based projects and mass media. Verification projects in selected aquaculture farms and other sites to field test various technologies with consideration to site-specific conditions (i.e., socioeconomic, environmental factors, among others) are undertaken to hasten technology transfer. An important feature of this program is the active participation of the fisherfolk, the private sector and local government units. Dissemination and exchange of information of aquaculture research and technology are also done through symposia, conferences, seminars, workshops, demonstrations, and publications. Likewise, AQD makes use of media strategies such as print, television, internet, and radio in an effort to disseminate widely the aquaculture information. Through these strategies, AQD aims to reach out to more clientele which include among other sec-

tors, the private industry, research and academic institutions, regional and international organizations, policy makers, non-government organizations, resource managers, SEAFDEC Member Countries (Malaysia, Singapore, Vietnam, Thailand, Brunei Darussalam, and the Philippines) and non-member countries, local and national government and most especially the fisherfolk.

Training design and curriculum

The training programs of AQD may be classified into three: regular short-term courses, collaborative or special courses, and individual training programs. The regular short-term courses are offered yearly with a duration of 4-7 weeks and with funding from the Government of Japan through fellowship grants which are made available to SEAFDEC Member Countries. Non-member countries are also given limited slots depending on availability of funds.

Collaborative or special courses are offered upon request. The course content and the duration of training may depend on the field of interest of requesting parties.

Individual training programs are classified into two: the internship and student practicum. In the internship training, individuals are assigned in areas of interest such as fish hatchery, feed development, fish health or disease diagnosis, natural food production, abalone hatchery and other laboratory work. Student practicum is designed for graduating students in fisheries or related fields to satisfy the 400 hours requirement. It aims to provide students practical knowledge in aquaculture to supplement their theoretical orientation in school by assisting in ongoing research and verification studies at AQD.

The training courses curriculum are designed to consist of 10-20% lectures and 80-90% laboratory and field activities. Field trips to selected aquaculture facilities such as fishponds, hatcheries, fisheries institutions and laboratories, feed mills, fish cages, mangrove areas, etc. are undertaken to provide participants the opportunity to observe and interact personally with aquaculturists and practitioners in the industry.

AQD training courses with mangrove-friendly components

Six regular training courses are being implemented annually, namely: Aquaculture Management, Fish Health Management, Marine Fish Hatchery, Freshwater Aquaculture, Shrimp Hatchery Operations alternate with Culture of Natural Food Organisms, and Fish Nutrition. Of the six, none had so far contain topics on mangrove-friendly aquaculture. However, starting 1997, subjects on mangrove-friendly aquaculture and coastal resource management were eventually incorporated into the course curriculum. The training courses implemented with mangrove-friendly aquaculture components in its curriculum are the following:

- *Third-Country Training Program on Coastal Aquaculture and Resource Management*
First conducted in 1995, this two-month course is a five-year collaborative effort of SEAFDEC/AQD and the Japan International Cooperation Agency (JICA). The course aims to provide the participants from Asian countries with the opportunity to upgrade their knowledge and skills on coastal aquaculture and resource management. Two sessions were implemented in 1995 and one each for the succeeding years with a total of 68 participants (12-14 per session). The participants

are from Bangladesh, Cambodia, People's Republic of China, India, Indonesia, Myanmar, Sri Lanka, Thailand, Vietnam, and the Philippines. For the 1997 and 1998 sessions, the course content has been expanded to include more topics on coastal resource management anchored on sustainable aquaculture. Under the resource management subject, topics on Mangrove Ecosystems, Management and Conservation, and Aquasilviculture has been dealt with

- *On-site Training on Sustainable Aquaculture and Coastal Resource Management in Vietnam*

In cooperation with Can Tho University in Can Tho Province, Vietnam, this two-week course was conducted by AQD in October 1997. Twenty-two (22) Vietnamese participants coming from academic, research and other government institutions nationwide attended the course. The course was designed to introduce local government officials to the concept, methods, practices of coastal resource management (CRM) and acquaint them with participatory and gender-sensitive aquaculture activities in their respective areas with the context and concerns of CRM and biodiversity conservation and management

- *Sustainable Aquaculture and Coastal Resource Management*

Sponsored by the Philippines' Technical Education and Skill Development Authority (TESDA), this three-week course has been conducted for two consecutive years, in November-December 1997 and May-June 1998. Nineteen (19) fishery teachers from different schools of fisheries in Region VIII attended the first session, while 20 fishery teachers and TESDA staff from Region V attended the second. The course aimed to upgrade the knowledge and skills of the teachers on sustainable aquaculture technology and coastal resource management

Aside from the special training courses, a 3-day seminar-workshop on *Mangrove Friendly Aquaculture and Coastal Resource Management* was conducted on 19-21 August 1998 at Tangalan, Aklan, Philippines with twenty seven (27) participants comprising of local government Units (LGUs) and peoples organizations (POs) from the municipalities of Ibajay and Tangalan in Aklan and nearby coastal barangays. The activity aimed to familiarize the participants on the concepts, principles, and potentials of mangrove-friendly aquaculture and coastal resource management; and update them on the fishery laws so that they could formulate policies related to the management and conservation of resources.

The major subjects that are included in the courses mentioned above are as follows:

- Resource assessment and management (mangroves, corals, and seagrasses)
- Coastal ecosystems and biodiversity
- Mangrove management and aquasilviculture (mangrove ecosystem, management, conservation, utilization and valuation)
- Fish sanctuary and marine resources
- Socio-economic considerations in sustainable aquaculture
- Community organizations and institutional building of fisherfolk cooperatives
- Management of cooperatives
- Property rights in fisheries
- Institutional and policy analysis of coastal resource management
- Economic resource valuation (with emphasis on mangroves)
- Farming systems
- Seed production
- Feed and nutrition
- Fish health management

Of the total number of 129 participants who attended the AQD training courses with mangrove-friendly aquaculture and resource management components, 52% came from the academe, 33% extension workers, 9% researchers, and 6% policy makers.

Mangrove-friendly technology and verification projects

In terms of technology verification and extension, AQD has conducted a verification study on “Mudcrab Production in Mangrove or Tidal Zone Using Nylon Net.” This study was conducted at Brgy. Manalo, Puerto Princesa, Philippines in collaboration with local government units and barangay fisherfolk. Results of this study showed that after a 6 month culture period and with a stocking density of 2/m², crabs attained an average body weight of 275 g; yield of 485 kg; feed conversion ratio of 5.1; return-on-investment of 59%; and payback period of 1.6 years.

Another verification study on “Aqua-mangrove integrated farming: Mudcrab, *Scylla serrata*, Culture in Tidal Flats With Existing Mangroves” was conducted in Buswang, Aklan, Philippines in collaboration with local government units (LGUs), the Philippines' Department of Environment and Natural Resources, and a people's organization (the KASAMA) in Kalibo, Aklan. (See Triño & Rodriguez, this volume.)

A verification study on “Semi-intensive production of mudcrab in natural mangrove stands” is an on-going activity and is conducted at Bo. Bugtong Bato, Ibajay, Aklan, Philippines in collaboration with LGUs in Ibajay, Aklan and the community of the said barangay.

Mangrove-friendly aquaculture information materials

AQD publishes *SEAFDEC Asian Aquaculture*, a quarterly newsletter containing updates on aquaculture research and development of the Department. In November-December 1997 issue, the newsletter contained articles which focused on integrated farming and aquasilviculture. The newsletter are sent to AQD's subscribers, composing of fisheries institutions, government agencies, extensionists, aquaculturists and other interested parties. In 1998, AQD made available a 12-minute video on *Conserving Mangrove Resources* for the general public.

Future plans

AQD will continue to implement and conduct its regular short-term training courses but the course curriculum will be expanded to include more topics anchored on responsible and sustainable aquaculture. More collaborative training courses, extension services and information dissemination will be undertaken with LGUs and the national government, non-government agencies, regional and international organizations.

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