

SEAFDEC/AQD at 40: Improving lives through sustainable aquaculture



Photo by
Joesyl Marie dela Cruz

For nearly 40 years, SEAFDEC/AQD has mustered its strength and the support of stakeholders to work on sustainable aquaculture development. AQD has developed the breeding and culture technologies for tiger shrimp, milkfish, tilapia, carps, catfish, mussels, oysters, giant freshwater prawn, high value marine fishes (seabass, groupers, red snapper, rabbitfish, pompano), seaweeds, abalone, mud crab and sandfish. Due to such efforts, aquaculture today is not anymore dependent on wild seed stocks since technologies for full-cycle aquaculture has been developed for most of the commodities.

AQD has also embarked on research on mangroves, stock enhancement and community-based fishery resource management to better protect aquatic resources while ensuring that resource users continue to benefit and profit from resource use. With more innovations in fish farming technologies through research-and-development to which AQD plays an important role, fish farms can be both profitable and environment-friendly.

Giant tiger shrimp

The giant tiger shrimp or *Penaeus monodon*, initially produced in the Philippines as an incidental crop in milkfish pond culture, became the country's top dollar earner in the late '70s. This was largely attributed AQD's pioneering work on the biology, broodstock management, and maturation through eyestalk ablation that led to the development of fry production in the hatchery. AQD's studies on tiger shrimp nutrition, health management, and grow-out culture have been very relevant to the shrimp industry's needs.

Milkfish

The pioneering research at AQD on the reproductive and larval biology as well as nutritional requirements of milkfish in the 1970s and the 1980s paved the way for breeding of milkfish in captivity and production of high quality fry. Hatcheries now supply most of the fry and fingerling requirements of the milkfish industry which has seen dramatic expansion from traditional culture in brackishwater ponds to pens and cages in freshwater bodies and coastal waters.

Mud crab

Farming of mud crabs "alimango" has a long history in the Philippines. The use of wild crablets in farming has led to their scarcity. To address this problem, AQD developed the hatchery and nursery technologies in the late 1990s. The development of formulated diet for farming of crabs in 2002 has reduced the use of fish as aquafeed. The completion of the life cycle of *Scylla* species in 1998, the commercial production of crablets in the early 2000s and the improvement in the farming systems made possible the domestication of *Scylla serrata*, an undertaking which AQD pioneered in 2010.

Tropical abalone

AQD has worked on the tropical abalone *Haliotis asinina* since 1994 when stocks from the wild spontaneously spawned. From 1997 to 2006, AQD completed the abalone's life cycle in captivity, developed techniques for mass seed production, developed formulated diets for juveniles, tested grow-out culture in floating sea cages and feeding different types of seaweeds, developed shell-marking for stock enhancement, initiated sea ranching and pilot-tested abalone hatchery with the private sector. In 2005, AQD started the abalone hatchery and grow-out training course and has offered it yearly since then.

Tilapia, carp and catfish

Since its freshwater station was established in 1976, AQD has been at the forefront of freshwater aquaculture R&D, focusing on the breeding and farming of Nile/red tilapia, bighead carp, and the native *clariid* catfish. Feed formulations, farm-based genetic selection schemes and methods for the application of DNA markers in stock management have been developed at AQD. At present, AQD is actively pursuing research on indigenous freshwater fishes like silver therapon and climbing perch both for aquaculture and biodiversity conservation.

Mangroves

Mangrove research at AQD started in 1993. These are on aquasilviculture of different aquaculture commodities (milkfish, prawns, mud crabs) inside the mangroves; capability of mangroves to absorb nutrients; population, biological & ecological studies on mangrove-associated fauna; and impacts of aquaculture on mangroves & fisheries. These led to funding support from international donors and more research work on mangroves by both local and foreign researchers.

Marine fish

The demand for live reef food fish like groupers continues to rise as people realize the health benefits of eating fish. Production of seeds from captive breeding programs for a variety of high value marine fish species like sea bass, red snapper, rabbitfish and pompano for full cycle aquaculture will help ease the pressure on the wild fisheries.



Photo by Jacques Zarate

Seaweeds

Seaweeds are the Philippines' top export commodity, and to help maintain the seaweed industry's competitiveness, AQD created a seaweed R&D team in 1991. The team was tasked to improve the farming technology of *Kappaphycus* and *Gracilaria*, and to develop new strains of *Kappaphycus*. R&D milestones at AQD included: 1) producing *Kappaphycus* plantlets from spores and successfully testing their viability in grow-out culture in the open sea; 2) tissue culture of *Kappaphycus* and extending this technology through training; 3) the use of *Gracilaria* as biofilter; 4) optimizing grow-out techniques to improve production and introducing these techniques in major farming areas in the country like Tawi-tawi and Zamboanga; and 5) publication of a monograph on the Seaweeds of Panay.



Photo by Ma. Rovilla Luhan

Sandfish

The *Holothuria scabra* or sandfish is considered as one of the most commercially-important tropical sea cucumbers threatened by overfishing. In response, AQD has started to improve techniques on sandfish hatchery and nursery production to increase growth and survival. Technologies for grow-out systems are also being evaluated for future industry adoption. With various collaborations among national and international research centers and private institutions, SEAFDEC/AQD is continuing to provide updated science-based awareness to accelerate aquaculture development for sea cucumbers. To meet the high demand for dried *tre pang*, and at the same time, safeguard and enhance sea cucumber populations in the wild.

Giant freshwater prawn

AQD initiated the genetic improvement of the giant freshwater prawn *Macrobrachium rosenbergii* in early 2000 in collaboration with BFAR, NFRDI and MSU-Naawan. The 3-year project was funded by the Government of Japan Trust Fund and involved researchers from AQD, Thailand and Indonesia. As a result, seed production studies improved survival in the hatchery from less than 10% to 70%. Subsequently, AQD was able to successfully develop lake-based cage culture and this technology has been transferred to stakeholders in yearly training courses and disseminated through extension manuals; net cage culture of prawn and tilapia is also undertaken. AQD has also characterized the genetics of the Philippine prawn populations, and used the best breeders to develop effective broodstock management schemes for improved growth and reproductive performance.



Photo by Frolan Aya

Community-based fishery resource management

Responding to the declining fish catches, AQD embarked on an eight-year community-based fishery resource management (CFRM) project at Malalison Island, Culasi, Antique in 1991 with funding support from the International Development Research Centre of Canada. Engaging the community in the CFRM project changed the scenario of resource use in the island, from illegal fishing practices to resource users' co-managing fishery resources. Based on Malalison experience, multi-disciplinary, community-based and participatory R&D are now the hallmarks of AQD's approach to development-oriented projects like the uptake of small fishers/farmers on aquaculture technologies through Institutional capacity development for sustainable aquaculture mechanism, stock enhancement, and coastal resource management.

Stock enhancement

The stock enhancement program at AQD started in 2002 as part of a big project funded by the European Commission on the Culture and management of *Scylla* spp. (EC-CAMS). In 2005, the Government of Japan Trust Fund (GOJ-TF) initiated a five-year Resource enhancement program for the giant clam *Tridacna gigas*, abalone *Haliotis* spp. and seahorses *Hippocampus* spp. The GOJ-TF support has been extended until 2014 to include mud crabs *Scylla* spp. and Napoleon wrasse *Cheilinus undulatus*.

