



**SEAFDEC DEPARTMENTAL PROGRAMS OF ACTIVITY FOR THE YEAR 2019-2020:
AQUACULTURE DEPARTMENT**

Programs/Projects	Responsible Department
Project Activities Implemented in the year 2019	
1. Quality Seed for Sustainable Aquaculture	AQD
2. Healthy and Wholesome Aquaculture	AQD
3. Adapting to Climate Change	AQD
4. Maintaining Environmental Integrity through Responsible Aquaculture	AQD
5. Meeting Social and Economic Challenges in Aquaculture	AQD
6. Priority and Special Projects	
Proposed Project Activities for the Year 2020	
1. Quality Seed for Sustainable Aquaculture	AQD
2. Healthy and Wholesome Aquaculture	AQD
3. Maintaining Environmental Integrity through Responsible Aquaculture	AQD
4. Meeting Socio-economic Challenges in Aquaculture	AQD
5. Adapting to Climate Change	AQD
6. Collaborative Projects with the Philippine Government	AQD

**Overall Review
of the Departmental Program Implementation in the Year 2019**

AQUACULTURE DEPARTMENT(AQD)

1. Quality Seed for Sustainable Aquaculture

A sustainable supply of good quality seedstock is key to a successful aquaculture enterprise. Rearing quality seedstock to commercial sizes require efficient husbandry techniques and suitable farm conditions to achieve increased yield. With the intensification of aquaculture systems in several Southeast Asian countries and the environmental challenges such as those resulting from climate change, development and use of quality farmed broodstock and adoption of optimal culture management methods are equally important in ensuring a steady production of seeds and later, marketable aquaculture products

The program consists of 18 research studies that focus on broodstock development, refinement of hatchery and nursery protocols, increase awareness on available genetically selected/improved stocks to optimize its use for improved on-farm aquaculture production, and promotion of technically- and economically-viable breeding and seed production schemes.

To achieve the main objective of developing and managing quality broodstock for use in either commercial fish farming and/or stock repopulation, stock characterization using molecular markers were utilized in previous years to aid in determining genetic quality in wild and hatchery stocks. This year, information on the reproductive biology, mating/breeding behavior, and production traits in traditional and emerging aquaculture species (giant grouper) help formulate suitable broodstock management protocols. Nutritional intervention is being done as well to improve reproductive traits. Abalone, mangrove crab, tiger shrimp, Indian prawn, sandfish, tilapia, native catfish, silver perch, giant grouper, and Anguillid eels are the species being studied for the development of better breeding stocks.

To increase production and rearing of larval and juvenile stages of important aquaculture species, mechanisms that: (a) enhance laboratory production of natural food organisms, *e.g.* algal paste production, and alternative food items, *e.g.* polychaetes, which serve as early stage diets; as well as (b) improved rearing conditions and interventions that allow the aquatic organisms to adapt and survive well during larval development, are evaluated.

Genetic improvement research initiatives for two species (mangrove crab and abalone) was done. The mangrove crab project aimed to produce fast-growing and diseases-resistant lines while abalone project focused on improving breeding performance. AQD, through this program, is continuing the in-house production of good quality seeds for both mangrove crab and abalone.

2. Healthy and Wholesome Aquaculture

This program has two main components: fish health and nutrition and feed. Fish health concentrates on disease diagnosis, control, monitoring and surveillance of aquatic animals; and environmental integrity, certification, and food safety. While nutrition and feed component conducts studies to address some problem and need areas to sustain the production of aquaculture products in the region.

The following are the major accomplishment of the program under the fish health component: (a) tilapia samples for Tilapia Lake Virus (TiLV) detection were collected and were observed for mortalities; (b) the effective concentration of emamectin benzoate (EMB) on pompano was determined; (c) whiteleg shrimp was also culture using biofloc system with sludge removal facility; and (d) diseases in seaweeds in different sites across the country were monitored through sampling.

As for the nutrition and feed component, the research studies that were conducted are aligned to the objectives under the program. For the high-value species pompano (*Trachinotus blochii*), the effective level of spray dried hemoglobin as alternative protein source in the dietary formulation was determined as well as the requirement for some essential amino acids. Also, the response of tiger shrimp when fed different dietary levels of the algae *Chaetomorpha* as fermented, unfermented or as a fresh meal was determined. The culture of hatchery-bred *Penaeus indicus* in ponds would yield information on the effectivity of using a feed formulated for low-value fish species.

3. Maintaining Environmental Integrity through Responsible Aquaculture

SEAFDEC/AQD has been developing aquaculture techniques for various species of finfish, crustaceans, mollusks, and some new emerging species to boost production in the Philippines and other countries in Southeast Asian region and taking the lead in looking into the impacts of the aquaculture activities to the environment. There are six studies under this program which aims to develop environment-based aquaculture technology by integrating environmental factors.

Experiments on strategic feeding for milkfish was conducted to reduce feed input for effective marine cage culture. Production technologies for oysters were also verified by comparing growth and survival in pond culture system and open river system. An environment-friendly culture method for abalone was also conducted by using perforated PVC and fed with seaweeds. Disease-free polychaete culture in raceway ponds was conducted with results showing its bioremediation potential. Technical skills in community-based production of sea cucumber were improved starting from effectively testing the best microalgae feed. This was followed by running nursery-rearing experiments to produce sandfish early juveniles.

4. Meeting Socio-economic Challenges in Aquaculture

This program generally aims to develop and implement social and economic strategies in aquaculture and resource management to secure food and income through stakeholder collaboration.

For 2019, the program successfully operational the abalone and sandfish hatchery component of the Community-Based Resource Enhancement (CBRE) project in Brgy Molocaboc in Sagay Marine Reserve in Negros Occidental, Philippines. With the success of the CBRE in Sagay Marine Reserve, its replication is ongoing in Lahuy Island in Caramoan, Camarines Sur, Philippines. Site assessment, baseline sampling of wild abalone and sandfish, consultation with fisherfolks, traders and local government stakeholders had been conducted. Since the project is nearing its conclusion, capacity-building activities were conducted for the local sea ranchers through demo-training and actual operation exercises. Preliminary consultation for turn-over of the CBRE release site and hatchery for abalone and sandfish has been initiated.

Seven Integrated Multi-Trophic Aquaculture (IMTA) milkfish mariculture runs implemented through community-based approach have been completed since 2015 and on its final run it harvest a total of 92.8% of harvest. Through the sustainable livelihood assets (SLA) analysis, it showed that the community improved from four (human, environmental, financial, and social assets) out of five categories.

5. Adapting to Climate Change

The program generated scientific information on the effects of high water temperature on reproductive performance and recruitment of economically important aquaculture commodities. Information on the impact of climate change were also incorporated in all SEAFDEC/AQD training courses and extension efforts.

6. Collaborative Projects with the Philippine Government

SEAFDEC/AQD aims to streamline its research and development program to focus more on enhanced technology-transfer of mature technologies for food security and poverty alleviation.

Projects with the Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR) are on its way to accelerate fish production and export revenues in aquaculture sector. Through the projects, the industry and stakeholders can lessen the dependence on imported milkfish fry and increase its seed production. Through the program “*Oplan Balik Sugpo*,” the shrimp industry is on its way for revival as AQD’s shrimp hatchery produced disease-free fry already.

AQD also partnered with National Fisheries Research and Development Institute (NFRDI) to develop sustainable and low-cost feeds. Low-cost feeds successfully formulated feeds costing Php 19-22/kg (with Php 4-6 kg production costs) which is relatively lower compared to the average cost of commercial feed which is around Php 34-36/kg. Field testing was conducted with promising results.

**SEAFDEC Departmental Programs of Activity
For The Year 2019-2020**

AQUACULTURE DEPARTMENT

1. Overall Review

Research and development (R&D) that helps address the national and regional agenda (ASEAN) on food security while at the same time protects the environment has remained to be our priority at the Aquaculture Department of Southeast Asian Fisheries Development Center (SEAFDEC/AQD). With over four decades of R&D, AQD has generated and transferred a number of viable and science-based aquaculture technologies which are now being applied for the farming of several commercially important commodities (marine and freshwater fishes, shrimps, crabs, shellfishes, seaweeds) in the Philippines and elsewhere in the region.

For 2018, SEAFDEC/AQD has implemented 37 studies under five thematic Programs which focus on: (i) Quality Seed for Sustainable Aquaculture, (ii) Healthy and Wholesome Aquaculture, (iii) Maintaining Environmental Integrity through Responsible Aquaculture, (iv) Meeting Social and Economic Challenges in Aquaculture, (v) Adapting to Climate Change Impact, (vi) Collaborative Projects with the Philippine Government.

Activities in these programs involve research, verification and demonstration of aquaculture technologies in the priority areas of broodstock development and seed production, farming systems and ecology, nutrition and feed development, fish health management, and socio-economics. Apart from research and verification studies, significant efforts were made to facilitate the transfer of viable technologies to various stakeholders through training and information dissemination. Activities comprised the conduct of international/local training and other institutional capacity building programs, participation of researchers in scientific conferences, various technology fora and exhibitions, and publication of information materials.

2. List of Projects

1. Quality Seed for Sustainable Aquaculture
2. Healthy and Wholesome Aquaculture
3. Maintaining Environmental Integrity through Responsible Aquaculture
4. Meeting Socio-economic Challenges in Aquaculture
5. Adapting to Climate Change
6. Collaborative Projects with the Philippine Government