



AQD Matters

Internal newsletter of the SEAFDEC Aquaculture Department

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The 10th Living Lakes Conference

Local and international participants flocked to Tagaytay City for the 10th Living Lakes Conference from 15 to 19 May 2005. The venue was the Taal Vista Hotel, with viewing deck overlooking scenic Taal Lake. This two-day Conference had for its theme “The lake and its people: responsible stewardship by lake communities and sustainable development of densely populated lake regions.” Dr. Maria Lourdes Cuvin-Aralar of the Binangonan Freshwater Station attended for SEAFDEC/AQD.

The Living Lakes Network is an international partnership whose mission is to enhance the protection, restoration and rehabilitation of lakes, wetlands and other freshwater bodies of the world. The Living Lakes Network promotes voluntary international collaboration among organizations that carry our projects benefiting lakes, wildlife, and people for sustainable development. The Network was created and is coordinated by the Global Nature Fund, an international, non-governmental, non-profit organization registered in Berlin, Germany.

In 2001, Laguna de Bay was accepted into the prestigious International Living Lakes Network as the 18th Partner (total now 24 Partners) through the efforts of a tripartite partnership known as CLEAR (Conservation of Laguna de Bay’s Environment and Resources), made up of the Laguna Lake Development Authority, the Society for the Conservation of Philippine Wetlands, Inc., and Unilever Philippines. CLEAR also coordinated the hosting of the 10th Living Lakes Conference in the Philippines.

The Conference topics centered on the interaction between the lake and its people and focused on how communities in densely populated lake regions could achieve a balance between complex resource uses. The keynote speakers at the conference were Prof. Dr. Manfred Niekisch, Vice President of the German League for Nature, and the Environment and Hon. Michael Defensor, Secretary of the Philippines’ Department of Environment and Natural Resources.

President Gloria Macapagal-Arroyo graced the occasion by having cocktails with the conference participants and a short meeting with the organizers. President Arroyo thanked both local and international participants for their involvement in the Living Lakes: “...Our nation thanks those who have been working diligently to make our Living Lakes Program a success. Without your commitment, and efforts our lakes will not be clean and productive. Your work benefits millions of people who rely on our lakes for both food and water. You deserve our thanks. I am working to end poverty in our nation and we cannot succeed if we loose sight of the need to protect our environment. Development which abuses our natural environment is not responsible development. Managing our environment is the key to sustainable development. Nasa pusod ng kaunlarang pangmatagalan ang wastong pamamahala ng kalikasan...”

After the conference, the foreign participants went on a boat tour around Laguna de Bay and got some idea of the size of the lake and the numerous issues arising from the many uses of the lake. Many participants also went to see the Pahiyas Festival in Lucban, Quezon.



President Gloria Macapagal-Arroyo, Guest of Honor at the 10th Living Lakes Conference, poses with the participants. During cocktails, Dr. Malou Aralar of BFS met President GMA with General Manager Edgardo Manda of the Laguna Lake Development Authority



What's going on at BFS?

Ruel Eguia on FAO assignment

Ruel Eguia, BFS Aquaculture Specialist and ABCDEF Inc. Extension and Marketing Coordinator, left for Zimbabwe on 14 May 2005 for a month-long assignment with the United Nations' Food and Agriculture Organization. Ruel will serve as FAO Specialist and help assess the feasibility of fish farming in cages in selected dams and other small communal water bodies in Zimbabwe.



On-the-job training for fisheries and aquaculture students

Every summer, students from various fisheries schools undergo on-the-job training at BFS. These undergraduate students assist in on-going research and fish production activities. The training is free and the students pay only a minimal fee to stay in the BFS dormitory. From 4 April to 13 May 2005, 15 students completed 240-300 hours of on-the-job training at BFS and ABCDEF Inc. Three students were from the Don Mariano Marcos Memorial State University, three from Pangasinan State University, and nine from Cavite State University.

BFS in Fishfarmers' Week

The Department of Agriculture celebrates Farmers' Month with a variety of activities throughout May. SEAFDEC/AQD participated as one of the exhibitors in the Fishfarmers' Week held 9 – 13 May 2005 at the DA grounds in Quezon City.

Farmers' Training Seminars

These are training seminars on Freshwater Aquaculture and Integrated Fish Farming designed for fish farmers and agriculture workers who have little or no basic knowledge of freshwater aquaculture principles. These courses are conducted for 1-2 days and include introductory lectures on farming of tilapia, catfish, carp, and freshwater prawn, as well as integrated farming systems and project financing schemes. Since August 2004, already 10 of these training seminars have been conducted under the Rural Aquaculture Program of the Aquaculture-Based Countryside Development Enterprises Foundation, Inc. (ABCDEF Inc.) with funds from Senator Ramon Magsaysay, Jr. administered through the Department of Science and Technology.

A total of 220 farmers and 62 local government representatives attended the six Farmers' Training Seminars this year: in Siniloan, Laguna on 27–28 January; in Jalajala, Rizal on 31 January – 1 February; in Sta. Cruz, Laguna on 10–11 February; in Angono, Rizal on 24–25 February; in Morong, Rizal on 31 March – 1 April; and in Cabuyao, Laguna on 26–27 April. A special session will be held in June for beneficiaries of the Gawad Kabuhayan Project in Binangonan, funded by the NGO-supported Gawad Kalinga.



Participants of the Farmers' Training Seminars in Siniloan (above), Morong (left), Cabuyao (below), and Santa Cruz (below left)



Binangonan is ever active.

Aquaculture Training Modules

These are 5-day long training courses designed to suit the needs of fish farm technicians, operators, and managers (and other industry practitioners) who do not have time to attend long-term training courses. The hands-on skills training are on specific topics, as follows:

- ATM1 Tilapia hatchery and grow-out
- ATM2 Induced spawning of bighead carp *Aristichthys nobilis*
- ATM3 Induced spawning of the native catfish *Clarias macrocephalus*
- ATM4 Breeding and grow-out of the freshwater prawn *Macrobrachium rosenbergii*
- ATM5 Feeds and feeding management
- ATM6 Propagation of natural food
- ATM7 Water quality management

These modules are ideal for aquabusiness neophytes who wish to learn the rudiments of freshwater fish farming and plan to operate and manage their own farms. The modules are conducted for individuals or groups any time of the year, except ATM2 and ATM3 which depend on the availability of mature carp and catfish. Instruction may be in Filipino as required. Trainees pay a fee of P5,000 to cover materials, honoraria for resource persons, and housing (but not meals).

In May, Romiel Baladad of Pagadian City took ATM3 with BFS Aquaculture Specialist Antonieta Evangelista as lead Instructor. In March, ATM1 and ATM2 were conducted simultaneously for three clients (photos below).



ATM1 Father and son Fortunato and Rodel Eusebio of Pasig City examine plankton under the microscope and learn propagation of natural food for tilapia hatchery and grow-out. BFS Aquaculture Specialist Tonette Evangelista serves as Instructor.

ATM2 Trainee Mar Aragonés from Navotas, Rizal tries his hand at injecting hormones into a mature bighead carp. BFS Aquaculture Specialist Manny Laron instructs, while BFS Aquaculture Technician Federico Reyes assists.

Industry Immersion Training on Freshwater Aquaculture for TESDA Trainers

This course is for technical and vocational education trainers, particularly fisheries instructors, at schools accredited by the Technical Education and Skills Development Authority. The training is sponsored by TESDA and is held during the summer school break. The course is conducted usually for four weeks at BFS and a week at the ABCDEF Inc. multi-species hatchery and farm in Jalajala, Rizal.

A shorter session of the Industry Immersion Training on Freshwater Aquaculture will be held from 18 May to 4 June for eight fisheries instructors from Pangasinan, La Union, and Camarines Sur.

Visitors to BFS

27 April 2005

Participants of the 10-day UNESCO-MAB-SeaBRnet training course on Responsible Aquaculture as a Component of Integrated Ecosystems Management visited BFS and ABCDEF Inc. for lectures and tours. Participants of the Farmers' Training Course on Freshwater Aquaculture held in Cabuyao, Laguna visited BFS as part of their two-day training.

6 May 2005

Faculty and students from the Sorsogon State College led by Campus Director Erwin Malto and accompanied by Prof. Isabelita Bacud of the University of Rizal System toured BFS.

10 May 2005

Vigan Mayor Ferdinand Medina and some of his farmer constituents visited BFS. Mayor Medina is requesting SEAFDEC/AQD to conduct on-site training on freshwater aquaculture for the fish farmers in Vigan. The proposed training will be funded by the municipality of Vigan and a Spanish non-government organization.

17 May 2005

Faculty and students of the Eastern Samar State University visited BFS as part of their study tour.



BFS prepares manuals

- Propagation of Natural Food for Freshwater Aquaculture
- Breeding and Farming of Native Catfish *Clarias macrocephalus*
- Breeding and Farming of the Giant Freshwater Prawn *Macrobrachium rosenbergii*

AQD technology for mud crab farming in Zamboanga Sibugay

JH Primavera, FP Estepa, ET Quintitio, CL Torres

On 14-15 March of this year, the AQD team of researchers and technical assistants made a two-day observation and consultation trip to the mudcrab pen project in Alicia, Zamboanga Sibugay (formerly part of Zamboanga del Sur). A courtesy call on Alicia Mayor Remberto Sotto and other officials and an after-dinner consultation with local officials and aquaculturists preceded the visit to the mangrove pens. At the pen sites, we talked to the crab growers, classified crabs, examined crabs for diseases, and sampled crab tissues for DNA analysis.

Alicia and Cristituto

Alicia is a coastal municipality along the 4,500 ha Tantanang Bay, which is shared by 16 villages, 75% of whose population depends on the bay (fish, shells, seaweeds) for livelihood. The federation NAGMMATABA (Nagkahiusang Mangingisda ug Mag-uuma sa Tantanang Bay) was organized in 1998 by the Alicia municipal government to curb illegal fishing and protect the environment. At present, NAGMMATABA has 10 community-based organizations or cooperatives, two with Muslim members; half of 385 members are fishers.

Alicia Fishery Technician Cristituto Batonghinog was among the Mindanao participants during the 1999 training course on Marine Fish Cage Culture at SEAFDEC/AQD. The same year, Cristituto was awarded an AQD fellowship to join the training course on Sustainable Aquaculture and Coastal Resource Management. He had the chance to observe the SEAFDEC/AQD's experimental crab pens in the mangroves of Ibajay, Aklan. His training provided the inputs for a project proposal on mud crab farming in mangrove pens that was submitted to various funding agencies. In 2003, the provincial government obtained a grant from the Department of Science and Technology and the pens were operational the next year.

Alicia has also been able to tap other funding sources: the DA Bureau of Fisheries and Aquatic Resources, the DENR Community Environment and Natural Resources Office, and the United Nations Development Program, which provided a loan of P2.5 million through the Conservation of Aquatic Resources for Ecological Development Program.

Mud crab pens in the mangroves

At present, there are pens in four barangays in Alicia and they occupy about 4-5 ha or no more than 25% of the total mangrove area in each village. Crab farmers belong to cooperatives and each is allotted a 2,000 m² pen. Unlike the SEAFDEC/AQD prototype, which uses nylon net dividers, the Alicia pens are separated by low dikes with open gates that allow free tidal exchange. The dikes also hold the electricity lines. Pens are adjacent to each other to share the labor during construction and to secure the pens from poachers more easily. The pen areas are covered by a Community-Based Forest Management Agreement with the government, which gives the farmer tenure over his pen, renewable every 25 years.



The AQD Team with Alicia government officials and Cristituto Batonghinog (extreme right)

Wild juvenile crab (70-100 grams in body weight) are sourced locally and stocked at 8 kg per pen. Water quality is very good because of the high flushing rate. Pen maintenance consists of clearing debris from the pen bottom, checking the nets for holes and the dikes for any damage. Feed consists of low-value raw ('trash') fish and *bagongon* snails. In 2004, the farmers selectively harvested crabs 300 grams or bigger, every two months, for sale through the marketing arm of the cooperative to a buying center in Kabasalan town.

NAGMMATABA records show the following harvest data from 21 farmers (extreme values have been excluded in calculating production per farmer):

Month 2004	Total harvest		Harvest/farmer		#Farmers
	(kg)	Sales (P)	(kg)	Sales (P)	
Jun	490	59,400	29.5	P3,560	16
Aug	566	65,916	32	P3,750	17
Oct	63	71,961	36	P4,084	17

A portion of the sales goes into repayment of the UNDP loan. Overall, the crab farmers' incomes increased by about 40%, and one farmer has been able to send his son to college.

Good performance has encouraged funding and such funding has allowed NAGMMATABA to expand to other livelihood projects such as seaweed farming, oyster farming, and mangrove planting. Future plans include a freshwater pipeline and the extension of power lines to other barangays to enable farmers to live closer to the pen sites.

Right now, Alicia's farmers have a problem getting enough crab seed. We made the trip also to identify suitable sites for a crab hatchery. If the Alicia government succeeds in obtaining funds for a crab hatchery, it can count on SEAFDEC/AQD for continued technical support and the European Commission Mud Crab Project for some operating funds.

JHP-Pew Seminar-Workshop in Mangrove Education

AQD Senior Scientist Jurgenne Primavera, a 2005 Pew's Fellow in Marine Conservation, organized a Mangrove Education Seminar Workshop on 1-5 May 2005 for 28 teachers from secondary and tertiary schools in Panay and Guimaras, in collaboration with the regional offices of the Department of Education and the Commission on Higher Education. The aim of the seminar-workshop was to incorporate mangrove awareness and conservation in the formal education system in the Philippines.

The teachers had lectures, several films, workshops, and a field trip to the mangroves in Aklan. The lectures given were: *Importance of mangroves and marine ecosystems to our history, culture, economy, and well-being* (JHP), *Introduction to the mangroves* (RB Sadaba), *Status of mangrove education at the elementary and secondary level* (L Morano), *Developing a scientific culture through science research* (J Biyo), *The new general education curriculum* (V Navarra), and *Teaching about mangroves* (L Catedrilla). The films viewed were: *Amazing Mangroves*, *Hongkong Mangroves*, *Mangroves and Seagrasses*, and *A Day of Adventure in the Forest*. The Workshop Coordinator, AF Bautista, guided the teachers in integrating mangrove lessons in the curriculum, and in planning and developing instructional materials and strategies.

All participants were given complimentary copies of the book *Handbook of Mangroves of the Philippines – Panay* written by Primavera, Sadaba, Lebata, and Altamirano.



The AQD Team with Cristituto and members of NAGMMATABA



Mangrove stewards: Cristituto with the CBFMA beneficiaries



The AQD Team at one of the mud crab pens in the mangroves of Alicia



Dr. Josette Biyo lectures (above); the teachers visit the Aklan mangroves with former Congressman Allen Quimpo (below)



Officials from the Embassy of Japan visit AQD

SEAFDEC/AQD welcomed two officials from the Embassy of Japan on 5 May 2005. First Secretary Katsuyoshi Ishii and Economic Affairs Minister Tetsuya Ishii were met by AQD Deputy Chief Koichi Okuzawa, JIRCAS Expert Ikunari Kiryu, and AQD researchers and officials.

Dr. Okuzawa presented a briefing about AQD programs and operations, and particularly about the use of the Laboratory for Advanced Aquaculture Technologies (or the Biotech Labs). Mr. K. Ishii and Mr. T. Ishii were given a tour of the laboratories and shown the special equipment and facilities by Dr. Okuzawa and Dr. Leobert dela Peña.

Mr. K. Ishii and Mr. T. Ishii then met with the AQD staff. They announced that a Japanese audit team will be in the Philippines next year to assess Japanese-funded projects, and that most likely the AQD Biotech Labs will be visited. They urged the AQD staff to maximize the use of the Biotech Labs for the benefit of the aquaculture industry, and to make such uses known to the Japanese government and the Japanese people. Mr. Tetsuya Ishii appreciated AQD's initiatives in offering the Biotech Labs for use by scientists and students in universities and by researchers in government agencies.

Dr. de la Peña reported that several studies are being conducted at the Biotech Labs and several others have already been completed. Dr. Celia Lavilla-Pitogo reported that the three training courses conducted by the Regional Fish Diseases Project for participants from the ASEAN Member-Countries do use of the equipment and facilities in the Microbiology and Diagnostics Laboratory, one of the six Biotech Labs. The hands-on training of staff from DA-BFAR and local government units, as well as students from local schools, also makes use of the Biotech Lab facilities.



Officials of the Embassy of Japan visit the AQD Biotech Labs and meet some AQD officials and researchers.



The 2nd Bangus Congress

SEAFDEC/AQD joined the 2nd Bangus Congress and Exhibition on 28-29 April 2005 at the Leisure Coast Resort, Bonuan Binloc, Dagupan City. The aim was to unify the bangus industry towards global competitiveness. Major sponsors were the Department of Agriculture Bureau of Fisheries and Aquatic Resources, the Bangus Council of the Philippines, the Dagupan City Government, and the Department of Trade and Industry Board of Investments Marine Products Team. In attendance were the stakeholders from the government, farming sector, support industries, academic and research institutions, and banks.

The Congress was one of the highlights of the Bangus Festival in celebration of the fiesta of Dagupan City. Mayor Benjamin Lim is actively promoting Dagupan as the Fish City, producing the best bangus in the country, and holding the world record for the longest barbecue grill (for bangus, of course!) — two kilometers long.

The bangus production in the Philippines rose from 209,994 mt in 2000 to 269,930 mt in 2004, more of it from sea and lake cages. The industry has also grown in terms of the volumes and variety of exported value-added bangus products and the numbers of players in the processing industry. However, the industry has many economic problems particularly production costs, marketing of new products, and global competitiveness.

Aquaculture experts spoke during the technical sessions and led the discussion of issues and concerns, both local and global. At the end of the Congress, a resolution was formulated that highlighted the problems of the bangus industry and proposed the solutions — for government and industry to act on.

The Exhibition showcased technologies, services, seeds, and feeds for bangus farms; processing equipments; and a variety of value-added products. SEAFDEC/AQD sold P24,000 worth of manuals and books.



Bangus value-added forms from San Fu



The central Japanese garden has been maintained.

PRICES OF FISH SEEDS	
Bangus Fry	- P1.00 each
Bangus Eggs	- P10,000/1M good eggs
Ulang (Microbrachium rosabergii)	PL 10 - P1.00 each PL 20 - P2.00 each PL 40 - P5.00 each
Saline Tilapia (Molobocus Hybr 01) <i>nananana</i>	Size 24 - P1.40 each Size 22 - P0.55 each Size 17 - P0.60 each Size 14 - P0.70 each
Red Tilapia	Size 24 - P0.45 each Size 22 - P0.50 each Size 17 - P0.60 each Size 14 - P0.70 each
Carpsich	1kg to 5 cm 1.5 - 5 cm 1.1 - 7.00 Molobocus parvifolius 1.50 1.50 1.50 Molobocus macrocephalus 1.50 1.50 1.50 Hybrid Molobocus 1.50 1.50 1.50
Silver Perch	- P3.00 each (Size 54) <i>caudata</i>
Seabass	- P2.00 each
Loach (Dajo)	- P1.00 each

NIFTDC sells a variety of aquatic seedstock for grow-out; the price lists are posted at the building entrance.



Project Molobicus produces saline tilapia (above). The wet lab has neat plumbing and stays dry (below).

NIFTDC

After the Bangus Congress, the participants visited the Bureau of Fisheries and Aquatic Resources' National Integrated Fisheries Technology Development Center, located at the former Philippine Human Resources Development Center in Bonuan-Binloc, Dagupan City. BFAR Director Wesley Rosario is lord and master there now, but it was not too long ago that AQD's Dr. Shiro Hara bred and reared groupers there, among other aquaculture activities. The Japan International Development Agency invested handsomely in PHRDC and NIFTDC retains the impressive broodstock and hatchery facilities, plus new ones made possible by Speaker Jose de Venecia (who lives nearby). AQD's facilities look so 'third-world' in comparison.



Magical, Mystical Agusan Marsh

JH Primavera and BT Lasam

Our country is an archipelago of 7,150 islands whose coastlines span some 36,000 kilometers, so we are quite familiar with marine habitats such as beaches, tidal flats, and coral reefs. In contrast, we have only three major freshwater wetlands — the Candaba Swamp in Pampanga which has mostly been drained and converted to fishponds and agriculture; the 400,000-hectare Liguasan Marsh in southern Mindanao whose insurmountable peace-and-order problems preclude initiatives for protection, scientific research, and sustainable development; and the magical, mystical Agusan Marsh.

An extensive flood plain of many small shallow lakes and ponds, the Agusan Marsh serves as catch basin for rivers, creeks, and streams from the mountains and watersheds in Surigao, Davao, and Bukidnon. The Marsh acts like a giant sponge which absorbs water at times of high flood (it stores more than 15% of the fresh water in the country) and releases it during dry periods, with drainage northward via the Agusan River into Butuan Bay. Because of its hydrological and ecological importance, Agusan Marsh was declared a protected site under the National Integrated Protected Areas System in 1994, a Wildlife Sanctuary by Presidential Proclamation 913 in 1996, and a Wetland of International Importance by the Ramsar Convention in 1999. The Agusan Marsh Wildlife Sanctuary covers some 111,540 hectares in eight municipalities (Veruela, Loreto, Bunawan, La Paz, Rosario, San Francisco, Sta. Josefa and Talacogon) of Agusan del Sur.

The main habitats of the Marsh include the freshwater swamp forest (49%), secondary scrub (14%), herbaceous swamp (7%), lakes, pools and rivers (10%), rice paddies and other agricultural land (6%), and small settlements (6%). There are also reports of pygmy peat forest and sago forest. These habitats host many endemic plant and animal species, most of them endangered. The Marsh supports the largest remaining populations of the endemic Philippine freshwater crocodile, the threatened saltwater crocodile, the sailfin lizard locally known as *ibid*, the python, the soft-shelled turtle, and Philippine deer.

The Marsh is a valuable habitat for water birds such as ducks, herons and egrets that build nests as the water rises during the rainy season. It is also the refuge of the rare oriental darter, the purple swamp hen, the threatened Philippine hawk eagle, the spotted imperial pigeon, and the rufous kingfisher. From October to March, thousands of birds migrate from Japan, China, and Russia to escape the winter. Over 200 bird species spend at least part of the year in the Marsh, making it one of Asia's most important habitats for both resident and migratory birds.

A 2000 survey in the Marsh by Xavier University recorded a total of 17 fish species, including the much-loved native pigok *Mesopristes cancellatus*, and three introduced exotics - the African catfish, Nile tilapia, and common carp. The rapid proliferation of these introduced exotics is considered to be the primary factor in the decline of the populations of native fishes in the Marsh.



Agusan Marsh, May 2005
Photo by JHP

The variety of birds, wild animals, and endemic plants offers great potential for ecotourism in the Marsh. Other ecotourism activities might be lake-hopping, marsh trekking, and visiting the indigenous people.

Due to the harsh conditions imposed by the annual flooding of Agusan River, the Marsh is sparsely populated, primarily by ethnic Manobos. The few tribal residents live on floating houses that rise and fall with the water in harmony with the Marsh. Their rights to ancestral domain are fully recognized and respected. As of 2002, eleven ancestral domain claims covering 61% of the Marsh area have been filed— two have been approved, and the others await validation. The Marsh residents have a subsistence fishery, small fish ponds, and plots for rice and cash crops.

Any proposed large-scale drainage of the Marsh for agriculture, dams and reservoirs for hydroelectricity, or flood control and irrigation constitutes potential loss of habitats. More serious, however, is logging in the catchment area, including Mt. Diwata in Surigao del Sur to the east, and the mountains of Bukidnon and Davao del Norte to the south. Logging has resulted in severe flooding and increased siltation in the Marsh. In 1993, a Taiwanese firm was granted an Integrated Forest Management Agreement (IFMA) for a commercial bamboo plantation inside 5,000 hectares of Marsh area misclassified by forestry officials as having 'inadequate forest cover.' An environmental group alerted then DENR Secretary Angel Alcala to the ongoing construction of bunkhouses, roads and bridges within the Marsh, and the IFMA area was reduced to only 2,300 ha. Eventually, the operations stopped and the Marsh now enjoys national protection.

We need to study the hydrology of the Marsh, discover the many yet undescribed and unnamed species of plants and animals before they are displaced by exotic species, and document the social structure and coping mechanisms of the ethnic Manobo residents. Universities and research institutions in Mindanao can spearhead such research, and local and national agencies can provide grants and scholarships for such research. Tourism authorities are slowly opening up the Marsh to visitors, mindful to put infrastructure and guidelines in place for sustainable development. Meanwhile, the hardier souls among us are ready to visit the Marsh, never mind the lack of amenities, ready to be enchanted by these mystical, magical wetlands.