

Unifying the Art, Science and Business of Aquaculture through the Information Resources and Services of SEAFDEC Aquaculture Department Library

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Established in 1973 in Tigbauan, Iloilo, Philippines, the Aquaculture Department (AQD) is one of four Departments of the Southeast Asian Fisheries Development Center (SEAFDEC). AQD is mandated to conduct scientific research to generate aquaculture technologies relevant and appropriate for the region; develop human resources; and produce, disseminate and exchange information on aquaculture. AQD is committed to sustainable development and the responsible stewardship of aquaculture resources through science-based research and the promotion of appropriate technologies and information relevant to the Southeast Asian region (SEAFDEC/AQD, 2009). The need to disseminate AQD's research results is as important as the conduct of research in fisheries and aquaculture as referred to in the Code of Conduct for Responsible Fisheries (Wilkinson and Collins, 2007). In cognizance of the role that AQD should play with respect to its function of disseminating and exchanging information on aquaculture, the AQD Library was established to support the information needs of AQD scientists and staff. In addition, the Library also provides

services to visiting researchers, local and international trainees and students, as well as the diverse users from AQD's partner institutions. During the strategic planning workshop conducted by AQD in 2009, one of the goals identified was for AQD to strengthen the capacities of the aquaculture sector. Matching with such goal, the Library and Data Banking Services Section of the Training and Information Division identified its information dissemination and services target for 2012. Primarily, AQD Library aims to improve accessibility to archived and updated information, and to create a digital library collection of AQD publications and documents. In keeping up its goal of providing quality, current and relevant information, the Library continues to avail of quality print and non-print information resources, to ensure that it keeps abreast of the advancements in aquaculture and fulfil the diverse information needs of users. The Library also introduces innovations in its services with the purpose of unifying the art, science and business of aquaculture, and strengthens its local and international linkages for efficient sharing of knowledge and resources.

The Art, Science and Business of Aquaculture

An old Chinese proverb which says: *Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime* could also be applied to aquaculture which is the rearing of aquatic organisms under artificial and controlled conditions. Aquaculture is often defined as the art, science and business of culturing aquatic organisms in marine and freshwater environments. As a built-in component of fisheries, aquaculture is also known as an appendage to fishing after production from the wild becomes insufficient to meet the increasing demand for food fish of the ever-growing population while aquaculture has been filling up the supply-demand gap that leads to its super grandiose advancement.

Aquaculture has been practiced in Asia for thousands of years although early on, the practice involved extensive production schemes. Later, intensive production systems have been adopted to produce yields that can routinely maximize the capacity of the culture areas with the use of top-of-the-line devices and facilities. This means that phenomenal production yields can only be achieved when all significant conditions for intensive culture systems are

met. Although the advantages of adopting the intensive culture systems could be numerous, aquafarmers should be able to access information on advances in aquaculture technology that could often be sourced outside the specific culture locations. Specifically, installation of specially designed aquaculture infrastructures is an art aimed at maximizing the yields that could be derived from aquaculture systems.

While fishing can be taken as harvesting and gathering the bounties of nature, aquaculture is often considered a form of agriculture. In this connection, FAO defined aquaculture as: *the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants, where farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, and also implies individual or corporate ownership of the stock being cultivated*. In order to be sustainable, aquaculture now emphasizes on improving the biological and technological aspects of farming commercially-important organisms and transferring the technologies developed. Thus, aquaculture advancements need to be disseminated as these have been the major main contributor to the scientific progress in fisheries. As aquaculture progresses rapidly, concerns on

its impact on the environment and habitats have been raised while adoption of the ecosystem approach to aquaculture management has become imperative.

Aquaculture is now a major industry and big business in many parts of the world. It has become an important source of revenue in many developing countries. Aquaculture production from the Southeast Asian region for example, contributed more than 22% to the world's total fish supply from aquaculture in 2009 (SEAFDEC, 2012). This came from the region's aquaculture production of more than 12 million metric tons which accounted for about 43% of the region's total fisheries production (SEAFDEC, 2011). Many developed countries are importing aquaculture products from developing countries including the Southeast Asian countries, to supply their protein requirements, a situation that led to several advancements in the farming systems for aquatic organisms with the main objective of increasing the contribution of aquaculture to the economies of producing countries. Now, aquaculture is not only practiced in ponds or submerged water areas but also in inland structures using water recirculation systems that optimize water use and minimize costs. Moreover, trading of aquaculture products is now guided by stringent requirements of importing countries which aquaculture operators and aquafarmers should comply with, although such compliance requires additional financial inputs.

To sum it up, aquaculture could be the last frontier that would answer the growing demand for food fish, especially because fish stocks from the wild have been overexploited and would need quite some time for restoration or replenishment through conservation and protection of remaining fish stocks. As research and development on aquaculture continues, the AQD Library vows to continue to amass the necessary information that would unify the art, science and business of aquaculture in order that the present and future generations could get the maximum benefits from the bounties of aquaculture systems. In this way, the Library would sustain its efforts in assisting the various information-deprived stakeholders by providing them the much needed information for progress. Specifically, the Library would continue to fulfil the information requirements of users and stakeholders, especially on the advances in aquaculture including among others, the importance of good management, improved water quality, genetic improvements, as well as fish disease and nutrition management through the use proper feeding techniques. These services are meant to respond to the instructions stipulated in the ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 which was adopted in June 2011 (SEAFDEC, 2011a).

The SEAFDEC/AQD Library Information Resources and Services

In order to address the above-mentioned requirements, the AQD Library has been enhancing its information resources and services. Currently, bibliographic access to the AQD Library collection has been made easy as this can now be made through its online public access catalog (OPAC) at *opac.seafdec.org.ph*, while access to the physical collection and resources in Iloilo, Philippines is free for walk-in clientele.

The AQD Library maintains a comprehensive collection of books, pamphlets, serials and other periodicals on aquaculture, fisheries, marine, aquatic sciences and allied disciplines, and as of September 2012, the Library collection stands at 41,092 titles and 62,347 volumes. It also houses various theses and dissertations, maps, posters, and microfiches and CD-ROMs (Pacino, 2009). With the integration of traditional library services and the current ICT trends and social media, the Library has taken advantage of other possible options to promote its resources and services. Document delivery and interlibrary loan services are available for remote users, while reference queries can be made through phone, chat and email (*library@seafdec.org.ph*; *seafdecaqdlibrary@gmail.com* and *seafdecaqdlibrary@yahoo.com*), Facebook page (*facebook.com/seafdecaqdlib*) or Twitter account (*twitter.com/seafdecaqdlib*). It regularly sends out Topic Alert, a bibliographic list of its current journal articles and book chapters acquisition related to fisheries and aquaculture; Books and Serials on Display, a list of its currently processed books and journals that are available for circulation; and Publication Alert, a quarterly bibliographic list of publications by AQD scientists and researchers in peer-reviewed scientific journals, book chapters or conference proceedings (Alayon, 2013). It also conducts library instruction and information literacy programs not only for AQD researchers but also to students and visiting researchers.

SEAFDEC/AQD Institutional Repository (SAIR): Responding to the Needs of Users

In order to disseminate technologies developed by AQD, the Library launched the SEAFDEC/AQD Institutional Repository (SAIR) <http://repository.seafdec.org.ph> in July 2011. SAIR is the official digital repository of scholarly and research information of AQD. The library supports the Open Access movement since it believes that information generated from publicly funded researches should be shared to the public and that the public's right to access these publications should be upheld. SAIR also enables the



Fig. 1. SEAFDEC/AQD Institutional Repository (SAIR)

effective dissemination of AQD researchers' in-house and external publications for free and online. The repository uses DSpace, an open source software, developed at Massachusetts Institute of Technology (MIT) Libraries, which is an Open Archives Initiative (OAI)-compliant.

SAIR aims to provide a reliable means for AQD researchers to store, preserve, share their research outputs, enable easy access to and increase the visibility of AQD scientific publications. It primarily aims to promote AQD publications especially those published in international peer-reviewed journals and generate more citations through increased visibility. SAIR will also provide users free access to all in-house publications of the Department. Full-text digitized copies of fish farmer-friendly materials like books, handbooks, policy guidebooks, conference proceedings, extension manuals, institutional reports, annual reports, and newsletters (e.g. SEAFDEC Asian Aquaculture and Aqua Farm News) will be available and downloadable. SAIR will serve as the digital archive of the Department as the deposits of electronic documents become cumulative and perpetual. Initially, the repository shall contain preprints, full-texts or abstracts of journal articles, books and conference proceedings written by AQD scientists and researchers. SAIR is envisioned to expand its collection to include images, presentations, audios, and videos, among others. The lessons learned and experiences of the AQD Library staff in digitizing institutional publications and in developing an institutional repository of value could be shared to other institutions considering similar endeavours, as described by Alayon *et al.* (in press).

The Rewards and Way Forward

The AQD Library is a member of the International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC) and has been actively participating in its resource sharing activities. IAMSLIC is an association of individuals and organizations interested in library and information science, especially as these are applied to the recording, retrieval and dissemination of knowledge and information in all aspects of aquatic and marine sciences and their allied disciplines (www.iamslic.org). The AQD Library has also an existing exchange program, donation of AQD publications (in print) and resource sharing agreements with various universities and institutions in the Philippines, Japan, Southeast Asia and other countries. The Library aims to build and expand its network to institutions and universities, especially in the SEAFDEC Member Countries, thus, it is open for collaboration and exchange of resources.

The Library's collection, particularly serials, is being augmented by gifts and exchanges with network libraries mostly from IAMSLIC-member institutions, considering that the Library has established agreements for gifts and exchanges with various international, regional and local institutions, such as the Food and Agricultural Organization (FAO) of the United Nations, Institut Français de Recherche pour l'exploitation de la Mer (IFREMER or French Research Institute for Exploitation of the Sea), Japan International Research Center for Agricultural Sciences (JIRCAS), National Shellfisheries Association (USA), the Marine Biological Association of the United Kingdom, National Oceanic and Atmospheric Administration of USA (NOAA), Commonwealth Scientific and Industrial Research Organisation of Australia (CSIRO), WorldFish Center (Malaysia), Network of Aquaculture Centres in Asia-Pacific (NACA), International Development Research Center of Canada (IDRC), University of the Philippines in the Visayas (UPV), University of San Carlos (Cebu City, Philippines), and Silliman University (Dumaguete City, Philippines) among others.

The AQD Library is also a member of Association of Special Libraries in the Philippines (ASLP) and its librarians are members of Philippine Librarians Association Inc. (PLAI) and Philippine Association of Academic and Research Librarians (PAARL), International Association of Agricultural Information Specialists (IAALD) and Special Libraries Association (SLA). The Library also facilitates the dissemination and distribution of SEAFDEC publications (in print and digital) to more than 200 fisheries schools as well as selected colleges and universities in the Philippines and to its international exchange partners. The

Library is privileged to have access to the Aquatic Sciences and Fisheries Abstracts (ASFA), an initiative of the FAO, through DVD-ROM and online by Proquest. The database provides extensive coverage of research on aquatic organisms for scientists researching the world's living aquatic resources. Currently, the Library is a collaborating partner and provides input for the ASFA databases.

The Library also subscribes to the Essential Electronic Agricultural Library (TEEAL), a digital collection of research journals for agriculture and related sciences. In 2012, the AQD Library integrated library system (ILS) migrated to the Destiny Library Manager, the ILS is Z39.50 compliant that enabled AQD Library to join the IAMSLIC Z39.50 Distributed Library (library.csumb.edu/iamslic/ill/search.php), which aims to facilitate international resource sharing of marine and aquatic information resources among marine and aquatic science libraries, and hosted by the California State University (CSU) Monterey Bay Library. Currently, the AQD Library is the first and only Asian institutional library to participate in the IAMSLIC Distributed Library through Z39.50 Broadcast Search of Catalogs. Through its participation, the AQD Library has made its collection visible to more than two hundred member institutions worldwide, which means greater visibility for SEAFDEC and AQD as well as the AQD Library, its collection and SEAFDEC publications. While SAIR was awarded the 2012 Outstanding Library Program, its proponent Mr. Stephen B. Alayon received the 2012 Outstanding Academic/Research Librarian Award by the Philippine Association of Academic and Research Librarians, Inc. (PAARL).

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