



The library of the Indonesian Institute of Oceanology, Jakarta.

The aquaculture industry in the U.S.A. has grown rapidly in the past decade. The U.S. Government recognized the fishfarming trend and responded with the *National Aquaculture Act* of 1980. A primary requirement of the act was a national aquaculture plan, which includes a call for a National Aquaculture Information System (NAIS) as a cooperative endeavor of Federal, State, and private organizations under the leadership of the National Agricultural Library of the U.S. Department of Agriculture.

In the late summer of 1983, I made a trip to Southeast Asia to study the agricultural information systems of that region for the Agency for International Development and the National Agricultural Library. One of the areas of concentration was aquaculture information. The following summary of the study concentrates on agriculture in the broadest sense, but commodity or more specialized information systems were considered as parts of agriculture.

The 1970s saw a dramatic increase in operating and planned information systems in Southeast Asia. These systems appear to be gaining sophistication and effectiveness.

Southeast Asia is in a period of resource and organizational sharing which has influenced the attitudes of information agents. Some of the resulting activities are assisted by private or governmental international organizations as well as by nations of the region. One such organization is the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) and its Agricultural Information Bank for Asia (AIBA). Such organizations have

Aquaculture-Agriculture Information in Southeast Asia

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coalesced around different subjects such as education, aquaculture, development, and others. The information systems of these regional entities are of great potential influence.

Effective Informal Communications

Informal communications channels are effective disseminators of information under a variety of circumstances.

The exchange of journal article reprints by authors has revived, and has been perceived as useful in aquaculture. The usual problems of mail distribution and handling slow the process.

Scientific and educational networks utilize informal newsletters in several subject areas and to great advantage in Southeast Asia. Of particular importance are the newsletters of such organizations as the International Rice Research Insti-

tute and the International Center for Living Aquatic Resources Management. Southeast Asia is using this method of communication widely within select agricultural disciplines; aquaculture is particularly well served. Informal publications appearing often and not requiring a review process can be excellent communication tools, and should be encouraged to provide relevant, current and well presented information.

Formal Information Systems

Agricultural scientists and practitioners in Southeast Asia are constrained in the utilization of formal bibliographic and information systems outside their region. Similarly, most information agents who should serve as access points have difficulty overcoming restraints. These include a lack of technology and personal initiative, inadequate funding, organizational limitations, cultural differences, and delays caused by distance or a lack of sensitivity. There is knowledge of the formal systems and their advantages, but there is a distinct gap between that knowledge and use. Without creation of vital, formal systems at reasonable costs, much more expensive informal systems will grow until they cannot handle information transfer well. Southeast Asia is at the point of needing greater support and focus of its formal information systems.

Access to Literature Citations and Documents

Abstracting and indexing publications, the Agricultural Information Bank for Asia, and other organizations provide a wealth of references to agricultural and aquacultural literature. Many routine and specialized bibliographic publications are issued. These are fine research and educational aids, but many problems remain. For example:

- Inadequate access to copies of the aids or of the documents cited
- Inadequate literature collections in the region
- Inability to buy the products or services
- Untimeliness of specialized bibliographies, or late arrival of journals
- National or regional thinking, leading to limited use of services outside the region

- Cumbersome nature of some aids
- Ignorance of some services and available tools
- Inability of organizations to respond adequately with appropriate solutions

Southeast Asia has several excellent regional or national efforts underway which are aimed at improving the access to literature citations. Aquaculture has particularly forward-looking programs.

Keeping Current on the Literature

The standard methods of scanning or systematically reading published literature are extensively used in Southeast Asia. Other less time-consuming literature alerting systems are not extensively used, such as the *Current Contents* publications whereby title pages of the most important current journals are reproduced and published. A Southeast Asian *Current Contents* in agriculture might serve that region well and be an economic success. Of greater immediate value would be the active use of SDI (Selective Dissemination of Information) or current awareness systems. Computerized databases for retrospective searching or SDI are relatively little utilized. Telecommunications and high costs dictate low online use in Southeast Asia.

For search-on-demand citation requests, an information revolution is needed for Southeast Asia to make the tremendous leap forward which is possible. This can be done a number of ways. A major investment should be made to provide computerized current awareness on published literature to scientists and libraries in Southeast Asia. This should be developed through commercial or library services in the U.S., and from FAO in Rome. AIBA services should be used if feasible. The area cannot wait for widespread online services and the solutions to its telecommunications problems.

Improving Document Delivery

Major improvements could be made in document delivery services nationally and regionally with the investment of less than \$500,000 for each of 3 years by an articulated document delivery service within countries and Southeast Asia utilizing key institutions, a hierarchical

approach to obtaining photocopies, a limited access and shared-cost arrangement with the participants, and negotiated buying and delivery services from within the sector as well as from out-of-sector commercial and governmental sources. As a backup for document services in the region, immediate attention should be given to the long-term strengthening of one Southeast Asian library. Also assistance should be provided to develop and win approval of a network of libraries with special collection responsibilities, coupled with document delivery responsibilities and agreements.



BIOTROP library, Bogor, Indonesia.

Database Creation

Bibliographic databases are beginning to serve a substantive support role in developing areas. The Agency for International Development has supported the creation of bibliographic databases on aspects of agriculture. FAO is doing likewise in aquaculture. It is time to assess the trends, determine which datafiles need to be created, and establish criteria for organizational involvement.

Management and Organization

The basic and more difficult problems with formal information systems in Southeast Asia are these:

- Lack of understanding by educators of the value of technical and scientific literature
- Shortage of funds coupled with lack of rational, short-term plans to overcome the lack of literature literacy
- Widespread lack of knowledge of the services, and how they can be accessed
- Information agents who do not provide aggressive leadership in selling their programs or making the information capabilities dynamic

- Lack of understanding of the economic need for up-to-date information and literature by researchers, scientists and research administrators
- Lack of effective regional mechanisms to provide leadership, direction, and reasonable alternatives for the long-term solutions

Related Observations

Barriers prohibit easy solutions of regional problems. The immediate need seems two-fold: 1) support of institutions and programs which can bridge the technological and intellectual barriers on a regional basis, and 2) support of major national institution-building on a coordinated and rationalized regional scheme.

An attempt should be made to initiate a Southeast Asia action group with interest in agricultural information systems. The Agricultural Information Bank for ASIA (or SEARCA) might be the nucleus. International supporters and assistance groups should be included in the planning, as well as operators of major discipline systems such as the Southeast Asian Fisheries Information Service (SAFIS).

Personal and minicomputers offer potential for local information organization, training, and experience with minimal displacement to larger systems. Efforts should begin on the identification of appropriate software, equipment, uses, funding and organizations.

Study tours, scholarships, or fellowships should be provided for information specialists from several areas of work, but particularly for those who are movers and shakers, and who would improve the effectiveness and efficiency of information systems. They must equally be carefully directed to quality programs some of which need to be developed. They should work extensively with accredited academic institutions outside Southeast Asia, and outside the technical aspects of information handling.

Telecommunication capabilities are holding back information and economic development. There must be a satellite communication system at low cost to spur information services as the computer and telecommunications have done elsewhere.