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BRIEF OVERVIEW of AGRICULTURAL INFORMATION SYSTEMS in SOUTHEAST ASIA

An AID-sponsored investigation
in conjuction with the
National Agricultural Library

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INFORMATION SYSTEMS IN SOUTHEAST ASIA

The 1970's saw a dramatic increase in operating and planned information systems in Southeast Asia. These are documented in several sources. They appear as a maze to those working with them at a distance, and to those attempting funding. The greatest growth in numbers and investment of funds during the last 10 years has been through United Nations organizations. Judging from conferences, discussions with information and research specialists, the literature published, and other communications, these systems appear to be somewhat more sophisticated and more effectively organized in Southeast Asia than in others part of the Third World.

This acceleration and advancement have brought a new awareness to agencies and individuals who fund developing programs in the Third World. The knowledge of these systems by planners and organizers in the U.S., Canada, Japan, and Australia has spread to the degree that scientists, policy-makers, and funders are asking searching questions. These questions concern effectiveness, organization, utilization, and technical skills and needs.

Another force precipitating this investigation was the disparity between announcements about information systems in Southeast Asia and the informal communications about their operation and effectiveness. This difference between announced and actual capabilities is not uncommon with

libraries and information systems since such organizations tend to be viewed by users from a different perspective. Several indications of overlapping growth and services, coupled with reports of relative ineffectiveness, precipitated this investigation.

These areas of agricultural information were specifically identified for investigation:

- o Information organizational structures and functions within the region or within major countries,
- o Quality and handling level of bibliography, library, and information services,
- o Access to online and printed sources and their utilization,
- o Use of information services from outside the country or region,
- o Relationships of primary academic institutions to national, regional, and international efforts,
- o Machine-readable bibliographic data files other than AGRIS, and the potential for their use outside the sector,
- o Skills of information specialists in handling and developing agricultural information services, and training needs,
- o Major bibliographic compilations in manual form that might be utilized for machine-readable bibliographic efforts,
- o Role of science and technology components of national or regional organizations in agricultural information system creation, support, and use.

An effort was made to concentrate on commodities or areas of interest common on the long-term to the interests of the Agency for International Development (AID) and of the agricultural establishment of the U.S. These areas served for more intensive study and investigation: aquaculture, arid and dryland farming, cropping systems, land tenure, and tropical soils. Three of these are currently involved in joint projects of AID and the National Agricultural Library (NAL).

I. SCOPE OF INQUIRY AND METHODOLOGY

The most productive methods of supplementing the experience and knowledge of agricultural information systems of the investigator were: 1) interviews with organizers and some users of information systems in Southeast Asia, 2) examination of the operations and products of information systems, networks, and libraries, 3) discussions or group meetings with information agents, and 4) a structured approach to locating and analyzing currently influential progams, projects, and systems, as well as those of the immediate past.

Southeast Asia has major institutions and organizations concerned with information gathering, analysis, announcement, and dissemination. These were studied prior to the trip and those of greatest potential value were identified. Contacts were made at key locations to assess the appropriateness of visits to specific organizations, and to make certain that key people would be available. The organizations which might profitably be visited in Southeast Asia numbered over 100. This was reduced by concentrating on three primary areas: The Philippines, Singapore, and Thailand. For a more complete assessment of Southeast Asia, visits to Malaysia and Indonesia would be necessary.

Singapore was included for two important reasons:

1. The existence of the regional office of the International Development Research Centre (IDRC) with experienced information officers responsible for scientific and technical information system evaluation and investment in the sector. Their knowledge and counsel greatly aided this study.

2. Singapore is not a Third World country and its advanced state of development and progress serves as an inevitable magnet in the region. It is a strong force with tremendous influence.

The trip began with 5 days in the Philippines followed 9 days later by 4 more working days there. Singapore required 2 days, and 4 were spent in Bangkok. Discussions were held at the University of Hawaii on the return trip for an updating on agricultural information projects in the South Pacific, and to learn of the Univesity's information and library capabilities.

Information Systems

To satisfy the requirements of time, the aim of the investigation, and the needs of AID, limitations were placed on the types and scope of the systems and organizations to be examined.

1. Agriculture vs. Science and Technology. Within the U.S. and other developed countries it is increasingly difficult to segregate agriculture from the total world of science and technology when dealing with information for education, research, development, implementation, production, and marketing. To a larger degree, the same is true of many developing areas of the world. The literature and action needed in less-developed countries are usually less sophisticated. As the sophistication and complexity increase, so does the crossover in disciplines, literature, and information requirements. Similarly, the agricultural information systems are often undeveloped or restrictive to the point that one is required to turn to larger systems such as science and technology. Because both of these situations exist to varying degrees in Southeast Asia, it was necessary to deal with specialized agricultural systems as well as more broadly based science information systems, networks, or sharing groups. For the same analogous reason, one cannot be restrictive with institutions; examples might include a university library supporting many disciplines, or a national telecommunications authority where many uses must be incorporated into one administrative structure.

2. International, Regional, and National. The primary aim was to examine the international systems useful to agriculture whether supported multi-nationally or by international or commercial organizations. These types absorbed the greater portion of time and inquiry. Examples are AGRIS, the informal scientific networks with international offices, and bibliographic and numeric data bases available in online and printed formats.

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). These organizations have coalesced around different subjects as education, culture, development, and others. Manila and Bangkok are home to many such organizations, most of which are autonomous in operation, in establishing goals and projects, and in implementation of information programs. All of them appear well-intentioned, and provide a unifying force within the region, which seems natural and generally beneficial. The information systems of these regional entities are of great potential influence; their programs were observed and studied for this reason.

In Southeast Asia as elsewhere, the institution which gets a service or product in place first usually exerts tremendous influence on others who follow. For this reason, any major data or information system being developed nationally with wide agricultural or education responsibilities was investigated. Most of these did not prove to be strong. The transfer of information system knowledge between countries is very limited because of the need for local adaptation and re-invention. These potential systems were discussed with knowledgeable people in the country or region, and two were investigated. None was considered of major regional influence at this time nor apt to be in the immediate future.

3. AID-Sponsored Programs. An effort was made to assess the formal information needs of AID programs in Southeast Asia. The Agricultural Development Officer (ADO) and staff members provided briefings and information in Manila and Bangkok. Inquiries were made in order to:

1. Obtain greater knowledge of AID's information needs for its operation in Southeast Asia;
2. Determine what method or structure of delivery would work best for AID and its sponsored work;
3. Gain opinions or knowledge of the capabilities of the national, regional, or international information systems and their use.

Given these caveats and aims, the concentration of discussions was with representatives of 1) international information systems (primarily U.N.-sponsored), 2) national and regional libraries and publishing offices, and 3) international centers with subject or commodity specialities.

The specific organizations visited or contacted are listed in Appendix A.

II. OBSERVATIONS ON THE PRIMARY INFORMATION COMPONENTS

A. EFFECTIVE INFORMAL COMMUNICATIONS

Informal communications channels are effective disseminators of information under a variety of circumstances. As the mass of information to be transmitted grows, the effectiveness of informal methods declines. As disciplines divide into specialized interests, the new specialties create their informal systems for interchange. The total approach to a discipline usually suffers; particularly is this true in agriculture. Southeast Asian scientists and national research leaders utilize the communication channels with mixed success. Included in information communications are: personal visits, seminars and workshops, technical newsletters or bulletins, correspondence, exchange of reprints, scientific and study exchanges. This investigation does not study the effectiveness of the informal communication methods unless communicators, information scientists, and librarians appeared to have a high potential for improving these mechanisms (14). On this basis and following the patterns of use found in Southeast Asia, these information methods are discussed:

1. Informal publications such as newsletters and bulletins;
2. Scientist-to-scientist exchange through correspondence, visits, and reprints;
3. Courses, workshops, and training.

14. See Ref. 14. This logical approach was used by communication officers of the International Agricultural Research Centers.

More formal information exchange mechanisms are treated elsewhere, particularly journals and other formal literature, information systems, and libraries.

1. Informal Publications. Informal printed matter continues to be viewed as an effective method of informing a large number of people. Scientific and educational networks utilize informal newsletters in several subject areas in Southeast Asia. Of particular importance are the newsletters of such organizations as the International Rice Research Institute, the International Center for the Living Aquatic Resources Management, and the information centers of the Asian Institute for Technology. The newsletters are substantive enough to serve several needs, brief enough to allow for quick review, informal and newsy, have pertinent columns of continuing interest, and concentrate on important agricultural subjects. Standard coverage includes: 1) summaries of pertinent, tested research, 2) lists of new facilites, demonstrations or technology transfer projects, 3) training and academic activities including details on courses, 4) announcmenets of coming activities of regional, national, or international significance including professional meetings, 5) significant new literature, and how to obtain it.

Although these newsletters vary from typewritten reproduction to glossy printed formats, their intentions and coverage are very similar within their own sphere of interest. Southeast Asia is using this method of communication widely within select agricultural disciplines. Newsletters or

informal publications appearing often and not requiring a review process can be excellent communicating tools, and should be encouraged to provide relevant, current and, well presented information. Subject networks which issue newsletters are increasing through promotion by FAO and other U.N. organizations, the international agricultural research centers, consortia, and associations. Because it is difficult to reach the appropriate people at the right times with adequate information, several modes of dissemination are necessary.

2. Scientist-to-Scientist Communication. Direct correspondence with scientists and groups with the same subject interest is still the most heavily used means of informal communication. The prospective ability of information agents and administrators to influence this process is not great, and therefore was not actively pursued other than to learn that this method is very important.

The exchange of journal article reprints by authors has revived, and is a popular method of dissemination. Today there is greater emphasis on supplying a reprint upon request, rather than sending large numbers to pre-set lists of individuals. Some libraries and information agents request reprints of authors as an economical substitute for purchasing or borrowing. Reprint exchange is working in Southeast Asia within narrow subject disciplines as well as across disciplines. The usual problems of mail distribution and handling slow the process. This is often the case with newsletters, which cannot always be sent by air or by speedy bulk mailings.

High importance is placed on visits of scientists and others to field sites, laboratories, and organizations with active programs. For those involved in planning, design, and long-term research, such interchanges were described as essential. Most organizations have long viewed the synergistic experiences of visits and discussions as worthy investments. A slightly reverse viewpoint, which questions such visits, has emerged in the past decade. Assessments of the value of these contacts and information exchanges have been few. Scientists regard such visits as vital to the establishment and continuation of intercommunicating networks.

3. Courses, Workshops, and Training. Few will dispute the need for extensive course and training efforts for a developing agricultural region. Their regional proliferation in Southeast Asia seems recently to have caused some concerns including those of quality, organization, effectiveness, and cost-benefit ratios. As a tool for information communication with the side benefit of putting people into contact on a one-to-one basis, the value returned continues to be appraised as high. The trend to linking agricultural training and workshops more closely with major and better-qualified academic institutions is well in place. Training involves a tremendous expenditure in Southeast Asia, and rightly so. It appears, however, that a sharpening of focus, improved quality of instruction, and concentration on topics of greatest interest might be worthy of the international organizations which sponsor much of this work.

II. B. ACCESS TO FORMAL INFORMATION SYSTEMS

Agricultural scientists and practitioners in Southeast Asia are heavily constrained in the utilization of formal bibliographic and information systems available outside their countries or region. Similarly, most information agents including librarians who might serve as windows or access points have difficulty overcoming the restraints imposed. These include a lack of technology and personal initiative, high costs and inadequate funding, organizational demands, cultural differences, and delays caused by distance or a lack of sensitivity.

In very few instances was there a lack of knowledge about the widely known information systems and their advantages, but there was a distinct gap between that knowledge and use of the systems. This low utilization is different from that in the United States where lack of use is heavily influenced by the abundance of informal sources, personal contacts, and the low cost of telecommunications. In Southeast Asia the informal networks among scientists and the use of newsletters work well, but these are but a partial solution to information needs. These less formal systems are the first point of use and should be encouraged. Routinization of information methods for the formal systems must also be encouraged. Without creation of vital, formal systems at reasonable costs, much more expensive information systems will grow until they cannot handle information transfer well. Southeast Asia is at the point of needing greater support for its formal information systems.

An example of lack of access is the limited use of online bibliographic or other data bases through a terminal and a telephone connnection. From the Philippines, the online U.S. utilities can only be accessed in Manila, and only from certain portions of the city. Two organizations were identified in Manila which performed their bibliographic searches online. These are two out of more than 100 which could benefit from doing so. This type of technical and philosophical problem can be overcome with careful planning. organizatonal effort, and long-term financial assistance. The same pattern is repeated elsewhere in Southeast Asia.

II. C. GOVERNMENTS AND ACADEMIC ORGANIZATIONS

Formal information systems providing detailed and long-term assistance and services require commitments and investments from an enlightened and persevering management. The process of education, research, and development are likewise commitments which require expertise, adequate funding, a long-time phase, and dedication of effort.

This is not a new phenomenon and is generally well understood and accepted, even if not implemented in developing countries. Southeast Asia must make long-term investments if the goal of information currency and use are to be realized. AID's investment in the educational process and the building of institutional capabilities is commendable, and the keystone to self-support. Governmental organizatons and academic institutions provide the stability and service capability in developed countries. It does not seem unrealistic to conclude that they might play the same role in less developed countries.

An additional requirement for acceptance and use of information systems is credibility, which usually means relatively independent and reliable agencies. This need is clear in Southeast Asia where natinal governments heavily influence academic and public-sponsored information systems. This complication is not easily solved, but AID and other agencies providing asisstance should find ways to mollify adverse political influences and instability. One method is to broaden the organizations so that they represent regional groups or international bodies. This technique has had mixed success in Southeast Asia, which suffers from a heavy

bureaucracy and lack of focus in many U.N. units. Some organizations are able to overcome these problems and deserve examination as the type of agent to form the nucleus of improved agricultural information gathering and dissemination.

Two examples will illustrate. The Asian Institute of Technology at Bangkok is over 20 years old. Through foundation financial assistance, skillful management, regional cooperation and support, high standards of instruction, and motivated students, it has been able to mold itself into a vital educational force. The National University of Singapore has also achieved an enviable record of academic instruction, and of information support through its library system. Although primarily for Singapore and its citizens, it is an excellent example of a commitment to improve knowledge transfer with information systems. These two examples have the basic criteria for which AID must search when endeavoring to improve agricultural information transfer in Southeast Asia:

1. institutions or organizations with long-term support and political stability,
2. organizations with progressive and demonstrated management skills,
3. organizations that can deal with regional needs and responsibilities, and,
4. independent and superior institutions.

Barriers exist in Southeast Asia which prohibit easy solutions of regional problems among organizations and institutions. These will take time to remove. A few organizations with broad outlook and support can easily improve the information flow of the sector without disruption of the national programs of institution-building. The immediate need seems two-fold: 1) supoprt 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.

Many of the key cultural, financial, and intellectual barriers can be altered or adjusted with a concerted effort and planning so that an acceptable intersupport system can be understood and accepted.

II. D. ACCESS TO LITERATURE CITATIONS

AGRIS, commercial abstracting and indexing publications, libraries outside the region, the Agricultural Information Bank for Asia, and international organizations provide a wealth of references to agricultural literature. Many routine and specialized bibliographic publications are issued yearly. These are fine research and educational aids, but they suffer from problems in Southeast Asia as in many developing countries:

1. inadequate access to copies of the aids or of the documents cited, or both,
2. ineffective use of these literature aids,
3. cumbersome compilations not user-oriented,
4. untimeliness of specialized bibliographies,
5. ignorance of the services and tools available,
6. inability to buy the products or services,
7. regionalization of citation-gathering leading to limited use of citations from outside the region,
8. inability of organizations to respond adequately to the citation needs of individuals.

Southeast Asia has several excellent regional or national efforts underway which are aimed at improving the access to printed literature citations. Some have been in place for years and provide beneficial and widely used products. These need reassessment and more re-direction of purpose because of bibliographic influences outside the region. There is a tendency to provide mammoth bibliographies covering national programs such

as agriculture which are spinoffs of AGRIS input and service operations. These often receive precedence over the production of more comprehensive bibliographies; this emphasis can be a disservice to researchers or students working on advanced concepts or subjects. This tendency to parochialism should be challenged in order to provide the most recent and advanced knowledge.

Preparation of specialized subject bibliographies should be encouraged. The International Development Research Centre of Canada has provided direction and assistance to Southeast Asia to improve the use of agricultural and other literature. Different methods of compilation and alternative working relationships now should be explored. Both patterns of support and use of the products need systematic evaluation. Improvement of basic literature tools and products for Southeast Asia appears in order at this time.

1. Literature Searches on Demand. Few organizations in Southeast Asia can afford to provide citation compilations upon the request of a researcher or scientist. However, this is done manually in select situations. Most common is some brief assistance so that the requester can do his own compilation from the printed sources. Knowledge of how to stimulate online citation data bases is relatively unknown, and almost not done for a variety of reasons. The requester often goes away with inadequate assistance. This is a highly labor-intensive operation which does not have an easy solution where access to online citation files is non-existent or little utilized. Developed countries use online citation files because they cannot afford manual searching. The developing countries may not be at the same economic crossroads, but they are very close to it, and they need the other benefits provided by online searching. There are other obstacles which must be overcome as well, but limited success and implementation are feasible. For search-on-demand citation requests, an information revolution is needed for Southeast Asia to make the tremendous leap forward which is possible.

2. Keeping Current on the Literature. The standard methods at academic and research organizations of scanning or systematically reading published literature are extensively used in Southeast Asia. Browsing and some reading is a questionable alerting system because of the mass to be read, the inability to have all of the literature readily available, and the amount of time required to accomplish this. Other literature alertings systems are not extensively used, such as the Current Contents publications whereby title pages of the most important current journals are reproduced and published. Current Contents is published by the

Institute for Scientific Information in Philadelphia, which has a Singapore sales office. A Southeast Asian Current Contents in agriculture might serve that region well and be an economic success.

3. Impediments to Literature Citation Use. The use of literature tools to find agricultural and related information is in a state of slow growth in Southeast Asia. The basic problems are these:

1. lack of understanding by educators of the value of literature in technical and scientific agriculture,
2. a widespread lack of knowledge of the services and how they can be accessed,
3. lack of understanding of the economic need for up-to-date information and literature by researchers and scientists in agriculture, as well as research administrators,
4. information agents do not provide aggressive leadership in selling their programs or making the information capabilities dynamic,
5. shortage of funds coupled with a rational, short-term plan to overcome the lack of literature literacy, and
6. effective regional mechanisms to provide leadership, direction and reasonable alternatives for the long-term solutions.

These are not insurmountable impediments, even on the short-term.

II. E. GETTING THE DOCUMENTS

The corollary to knowing about important literature being published is getting the documents in hand for study. In developed countries there have been improvements in document delivery through commercial services from publishers, ability to buy select journal articles, mechanization of routines by governments and libraries, automation of ordering systems including coupling them to citation data bases, and improvements in telecommunications. These changes have influenced thinking in Southeast Asia regarding document delivery, but there is little beyond planning, and even this is mostly on the long-term.

The major problems facing effective document delivery nationally or on a sector basis read much like the obstacles to knowing about the literature published:

1. inability to buy or obtain the literature in original format,
2. inadequate literature collections in the region,
3. untimeliness or lateness of journals from developing countries,
4. telecommunications systems which are inoperative, cumbersome, or costly,
5. ineffective use of some available options, and
6. inability of organizations to respond with appropriate solutions.

Southeast Asian researchers depend heavily upon formal library and information systems for document delivery assistance. And within academic institutions, the assistance is very willingly given and helpful. Libraries can provide about 50% of the agricultural research literature needs immediately. This percentage is substantially higher in the instructional area. The frustration of learning about literature but not having it available for use is avoided by some organizations by issuing subject bibliographies in which they list ONLY those items they have within their libraries or institutions. This is often misleading to researchers since some of the best literature may be missing, and the representation of the subject is very incomplete. This practical solution to a difficult document problem must be viewed as short-term.

Three methods of answering document requests were studied in some depth since this is an area of major information support.

1. Library Literature Collections. Building a strong agricultural research and instructional literature collection is best accomplished with consistency of funding, systematic acquisition, and a commitment to evaluation. These factors are not evident in Southeast Asia with the exception of one or two academic institutions. As with most institutional libraries, the collections grow in reponse to the requests of the users and

the availability of funds. This haphazard method can be supplemented with systematic planning and effort at a later time. The ability of Southeast Asian libraries to do this was not clear. General collections of government organizations and academic institutions are characterized by sporadic buying resulting in many gaps, a restricted focus on the most immediate subject with the resulting evidence of changes from one popular subject to another, lack of basic titles and editions, and a surprising strength in newsletters and current, informal information. Budgets of nearly all libraries are such that overzealous collecting is not a problem.

Collections of agricultural literature are 85% in English. Other language literature is represented in major, landmark journals. There appeared to be major shortages of Japanese literature even in the select subject areas important to agriculture. Book preference is given to English when a choice must be made. There is a heavy buying of monographs. This pattern follows the needs of the institutions as perceived by the librarians and others. The shift to more journal literature has followed growth in agricultural research programs within recent years. This choice for expenditure represents one of the most difficult decisions for academic institutions since costs of journals are escalating faster than for books. The recent recession and inflation in Southeast Asia have made the choices very difficult.

Few studies, union lists, or guides exist which could provide the basis for a more thorough study of regional collection strengths. Perhaps these are not serious problems. It became clear that a systematic plan of collection building on a regional basis could be put in place without fear of wastage or needless duplication. This is not foremost in the minds of the librarians; the same was true in the United States until 20 years ago. Literature collections of Southeast Asia could be molded to near self-sufficiency with a 5-year period given strong leadership, financial assistance, coordinated efforts of regional and international groups, and some hard work on the part of the librarians.

Restricted use of collections did not seem a major concern. Restrictions which exist are the result of financial or book resources, a common problem in many libraries. The librarians are clearly willing to aid other institutions and provide access to their collections. Personal attitudes do not restrict use of collections, but funding and the mechanism for service are a deterrent.

2. Regional Borrowing and Photocopies. Monographs are the largest portion borrowed among the academic institutions within the countries of Southeast Asia. Geographic proximity in borrowing is a major factor and has resulted in interlocking agreements within metropolitan areas. These agreements generally have not reached outside the major cities. There is substantial lending among institutions within a country and even some outside, but the general result is one of discouragement which is transmitted to the requester who in turn reconsiders the request. Borrowing within the country or region is so difficult that those academic

institutions that can afford it go outside the region do so. In non-academic institutions the problem is minor since borrowing of monographic material is slight.

Photocopies of journal articles or portions of books surpass the loaning of hardcopy books on a regional basis, and within countries except for academic institutions with little research. Libraries employ the practice of trying within their country before reaching outside. This hierarchical approach causes many delays since the location and availability of a title are often not known. Some institutions have abandoned the local-search principle because of the poor collections, delays in delivery, and the general inability of libraries to respond expeditiously. Metropolitan areas such as Manila have fewer borrowing complications, and articulation among the major institutions is workable. However, they also experience the usual frustrations of a journal issue not received, a lack of staff to provide the copies, and materials on loan and generally not available. These are compounded in more remote locations.

Regional borrowing and photocopy support are not as strong as they should be because of a lack of knowledge where the literature is held, and the difficulty of speedy communication. And there are the other numerous regional obstacles mentioned previously. Additionally, no regional solution is forthcoming because of national view-points and the lack of a clear responsibility to assist neighboring countries. These policies tend to be those of the parent organizations rather than of the libraries.

3. Getting Literature Out of the Region. Many possibilities for borrowing and obtaining photocopies exist outside Southeast Asia. The most commonly used in the sector are:

1. The British Lending Library's photocopy services. This service if of limited use because of its expense.
2. Photocopies from U.S. academic libraries and the National Agricultural Library. Southeast Asian libraries utilize U.S. collections and friendships at universities.
3. AGLINET services structured around the national citations in AGRIS which provides a national source for each entry. This document service is limited to the coverage of AGRIS and the ability of national sources to respond. Except within their own sector, Southeast Asian institutions do not use the service.

Libraries with financial, telecommunication, and staff capabilities utilize additional methods to obtain photocopies of the literature. Most common are these two:

1. Solicitation of reprints from authors. This has grown in popularity within recent years and is now actively suggested as an alternative to requesters of literature. The return rate is high although there is a long and often unacceptable delay when dealing worldwide.
2. Use of commercial services, usually as last resort. These can be characterized by the Institute for Scientific Information's photocopy delivery on its list of 5,000 scientific journals, and

the document services of Chemical Abstracts. This type of service is underutilized and needs funding and negotiated agreements to become effective in Southeast Asia.

II. F. SKILLS OF THE INFORMATION AGENTS.

Within agriculture, the information agent designation usually includes extension and public information officers, information centers and library personnel, documentalists, and publishing and editorial staffs. But a broader view is possible as noted in the study of the communication responsibilities of interantional agriculutral centers:

> "Communication is not only the responsibility of information specialists; every scientist and administrator spends a substantial portion of his or her time in information activities..." (14, pp.2)

The definition of information agents had to be cut back in order to make a reasonable survey in the limited time available. This section is concerned with those specialists associated with publications, information centers, libraries, and data centers, in short, those individuals or organizations charged with the formal information transfer process.

A rather uniform set of characteristics emerged from interviews and discussions with these individuals. The information agents are more retiring than aggressive; they tend to believe firmly in the printed word as a change agent; they are cautious in making changes in technology and the organization of information; and, they tend to follow the direction of their administrative superiors rather than influencing or directing them from a professional point of view. There is little doubt about their general ability, or their knowledge as to what is happening in the information world around them, including technological advancements.

Degrees in specialities, including some double degrees, are standard. National institutions equip them with academic credentials, basic skills, and the ability to keep abreast. Many have U.S. degrees. The international community provides general and specialized training usually adequate to the needs of the technical work. Knowledge dispensed at workshops or in training seems readily understood. Opportunities exist for many to travel for a broad understanding of trends and changes.

What is lacking in the skills of these information specialists? The primary missing ingredient is the need and the drive to make things happen so that changes and improvements will take place. This is partially the result of survival and organizational conditioning, it is also a cultural influence. This lack must be overcome if there is to be a greater impact. If the group does not make a greater impact, other agents with different job titles will take on the responsibilities. An attitude expressed about

international agriculture center communicators applies: "... communication specialists will need to be as innovative in communication as scientists are in research; they must be more inquisitive, aggressive, and responsive to the changing and growing Center research programs." (14,pp.2)

The technical skills that are standard in developed countries, but not present in Southeast Asia are not beyond the intellectual capabilities of the majority of developing country personnel. They have not learned skills for which they do not yet see a need. The most extreme example would be for a librarian at a remote location learning online bibliographic searching when no data bases can be interrogated from that or 95% of Southeast Asia.

II. G. TECHNICAL AND EQUIPMENT CAPABILITIES.

Is it possible to make advancements by introducing technical equipment? And, are the technical capabilities available to make it function properly? These relevant questions must be divided into geographic, technical, and cultural parts. The geographic and cultural follow the pattern of other capabilities already discussed.

As mentioned earlier, it is technically possible to perform online computer searching on an international basis in Manila and Singapore, but not 10 miles away. As a rule of thumb, day-to-day technical operations in Southeast Asia are less and less feasible the greater the distance from a metropolitan city. This applies to microform readers and their use, photocopy machines, automation equipment, building of data bases, delivery from automated retrieval systems, telephone, and telecommunications. These requirements of modern information systems are limited by equipment or service capabilities, as well as the requisite operating skills. There is scant reason to train and equip if the machines and people cannot function due to other limitations.

Therefore, the basic limitation is the spread of technology, nationally or regionally. In select information centers and publishing organizations, these technical shortcomings have been obviated by a variety of ingenious measures. The printing capabilities of shops outside metropolitan areas are great, for example, since this technology dates back many decades in Southeast Asia, and its associated skills have developed with the technological changes.

Within information storage and retrieval work, the equipment capacities have been limited. Selected international and national agencies have computer facilities and are expanding them. These few operations, however, have had to overcome the restrictions of national policies, and also have been fortunate enough to enjoy a broad base of financial support, technical expertise, and out-of-country assistance. Even when this support is available, the end result has not been electrifying in the information gathering and dissemination efforts. An example is the aid given by the International Development Research Centre with the gift of computer equipment with excellent input and retrieval software to spur development of the AGRIS data base and its utilization. Training in information processing, machine handling, and related areas was provided. Yet the Agricultural Information Bank of Asia which was the recipient is not utilizing the equipment, the data bases, and the information retrieval anywhere near its initial aim 4 years after installation. The problems in this instance probably are characteristic of those of other technologies and equipment: 1) the initial dedication to care and maintenance fades with time and administrations, 2) the equipment and systems do not meet their assumed capabilities, or are disappointing in other ways, and 3) there is a general inability to meet the changing nature of technical equipment, or to hassle the constant care and feeding needed.

Latter-day stand-alone smaller systems, such as personal and mini-computers, are begining to offer potentials for decided improvements. With these computers and many software packages commercially available, small organizations can process hard data from research, as well as other

information, without elaborate support equipment and training. This capability may be the best and most appropriate technology for limited information storage and retrieval in developing countries. One international organization in Southeast Asia has designed a format for the recording of statistical data collected within two or three cooperating countries with the intention of swapping disks. The data may not be published for years under this plan, but still can be regionally utilized by those participating in the resource-sharing network.

II. H. ADMINISTRATION, FUNDING, AND EVALUATION

The funding and administration of information systems usually determine their success, and this certainly is evident in Southeast Asia. These influential factors are different for national, academic, regional, and international systems in this geographic sector.

1. National Systems. As noted, there are few of these formal systems at this time, although some planning is underway. The national bibliographic input to AGRIS is fairly well organized with heavy administrative direction by FAO. There are moves, particularly in the Philippine government, to group information units along functional lines rather than by subject. This includes statistics and computer operations. Academic groupings of libraries and information units are not strong on systems, and attempt to give the impression of self-containment.

As with most activities in these countries, administration and funding come directly from the parent organization, as does responsibility for products and services. The administration in academic and governmental units can be characterized as short on the investment and administrative support needed to improve services. Variations from this observation are few. One exception is Kasetsart University which appears to give greater administrative support to information systems than most agriculturally oriented universities or colleges.

Information support people, academic or otherwise, tend to be removed from the agricultural research organizations or faculties they serve. This administrative attitude and practice are also manifest in the funding and planning of the information units. Evaluations of service are little used whether for information and libraries, or for agricultural research.

2. Regional and International Systems. The value of information systems is generally acknowledged by administrative officers and funders of the current regional and international systems in Southeast Asia. This is not to say that the handling, understanding, and direction are enlightened. Administrative problems of these systems are: 1) broadening of scope and coverage to the point that the original direction or intention is obscured, 2) swings in funding levels, particularly among consortia, so great as to be disastrous to the development of reliable service, 3) direction and responsibility difficult to affix since there are so many separate or organizational units involved, and 4) problems caused by distance and the resulting difficulty of communication. Evaluations of international systems are undertaken, particularly those of the U.N.; regionally sponsored systems are less subject to systematic review. Sometimes the systems outlive their usefulness. The systems should not be eliminated, but most of them need tougher management approaches to their direction, modes of operation, and cost-benefits. The enlightened creation of some information systems and service does not carry over later to enlightened management. Roller-coaster funding in some agencies is destructive of consistent improvement and adjustment.

3. AID Systems and Actions. AID's support of information and library services in Southeast Asia is not substantive in dollars. The investment is minor compared to AID's total Southeast Asian expenditures, even when the support mechanisms in the U.S. are included. These are the types of expenditures put in place fairly consistently: 1) funds for academic institution-building, including monies for libraries; 2) consultancies and design funds for national systems, particularly in agricultural statistics, extension, and remote sensing, 3) direct suport of some cooperative scientific networks for information exchange, and 4) substantial support for training and workshops. Additionally, the annual allocation made by the U.S. Government to the international agricultural centers has provided some assistance for information dissemination and library operations. This support varies with the centers and their administrators. The international agricultural centers consider information communication a prime responsibility.

AID's expenditures and support for overseas systems have not been coordinated in a manner to provide impact on the long-term. The review processes at time of funding as well as the evaluation process do not have a collaborative aim. This is not a major fault when the funding is low. Since information systems are of increasing importance to agricultural and scientific efforts overseas, this oversight needs attention. A systematic review of the dollars invested is exceedingly difficult.

II. 1. INTERNATIONAL SPONSORS.

Many of the agricultural information problems of Southeast Asia should be solved regionally. Many of the short-term needs can readily be met by funding commercial services in the region or outside, and by services from other types of organizations such as libraries in the U.S. Either long- or short-term efforts will have a higher possibility of success if they are cooperatively implemented by those supplying funds or services, or by those international leaders with a continuing interest. Among these are the FAO along with other select U.N. units, the International Development Research Centre, AID, and, potentially, the Consultative Group on International Agricultural Research. All have a presence in Southeast Asia and anticipate relatively long-term commitments in several countries or for regional actions.

The regional approach to the building of information systems for agriculture has some participants already on the scene, the Agricultural Information Bank for Asia (SEARCA) being the most evident. This information system is heavily tied to FAO; but it also is not delivering some of the services and programs promised for Southeast Asia some years ago. Independent international support of AIBA has been extensive, but is waning.

The interest and potential for putting in place more aggressive, short-term efforts appear to be clear among the international organizations. These out-of-region sponsors, as well as developed agencies from developed countries, probably could be brought together for a clearer plan of action in order to provide a heavier impact on the agricultural information needs of the region.

III. RECOMMENDATIONS FOR AID AND COOPERATORS.

These are the primary recommendations drawn from the investigation. They are aimed at the Agency for International Development which has responsibility in the U.S. government for major action in agriculture in the developing countries. Some of the recommendations if implemented in a year or two could increase dramatically the availability of information in Southeast Asia. Many of the recommendations must be reviewed on the long-term.

1. AID's investments have been more evident in recent years in support of agricultural information system planning, design, and support. A major portion of direct information assistance overseas and of suport in the U.S. comes from the Bureau of Science and Technology. The Bureau is cognizant of the trend to assistance for agricultural information systems. The Bureau should take the lead in getting coordination of all AID investments and planning for Southeast Asia. This calls for a high-level science and technology information officer with extensive practical experience in documentation systems, information science, agricultural information systems, libraries and modern methods of information handling.

2. This science and technology information officer should be the cornerstone of all of AID in its agriculture and science information investments including Title XII for institution building, and area desks.

3. AID should attempt to revive a Southeast Asia action group with interest in agricultural information systems. The Agricultural Information Bank for ASIA (or SEARCA) might be the nucleus as in the past. The organizational structure can be informal provided the mechanisms for change and funding are present.

4. The informal scientific information network concept should be encouraged across national and some disciplinary lines. The newsletters, informal reports, workshops, and one-on-one communications should be the province of specialized groups working with information specialists. Other international funders should be encouraged to participate.

5. Funds should be found as soon as possible to provide an articulated document delivery service for Southeast Asia utilizing key institutions in the sector, a hierarchical approach to obtaining photocopies, a limited access and shared-cost arrangement with the participants, and negotiated buying and delivery services within the sector and from outside commercial and governmental sources.

6. Immediate attention should be given to the strengthening of one Southeast Asian agricultural library as a backup for information services in the region to all Southeast Asia. Collection building and assistance must be on the basis of current bibliographic and financial strengths,

long-term commitments of the institution, and with the cooperation and assistance of other international organizations.

7. Evaluation, review, and testing of information systems in Southeast Asia must be a more routine matter. AID should find ways to provide this assistance by contract, consultancy, or agreement. The formal review and funding procedures within AID should be examined with appropriate review procedures.

8. 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 online services to reach it in 5 years.

9. Personal and mini-computers offer tremendous potential for local organization, training, and experience with minimal displacement to larger systems. Planning should begin on the identification of appropriate software, equipment, uses, and organizations.

10. Specialized citation data bases of 50,000 to 150,000 citations covering more than 13 years of literature are needed. The topics of greatest value to the area and its agriculture should

be identified, files created and placed at appropriate locations for use.

11. There must be active pursuit of a satellite communication system at low cost to provide the acceleration of services the computer and telecommunications provide elsewhere. Plans underway by the IDRC and the CGIAR should be encouraged, and broadened to insure agricultural information system access by national organizations.

12. The concept of strong, core agricultural literature collections should be explored for libraries or information centers, including criteria for core building at the provincial level, at the national and the international levels. 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.

13. AID needs a coordinating council of U.S. organizations concerned with agricultural information systems for Southeast Asia. It would provide a voice in setting the direction, policies, investments, and priorities. Such a council would include representatives from major AID units, one or two international agencies with heavy information interests, land-grant and other academic representation, and one or two Federal units.

14. Study tours, scholarships, or fellowships should be provided for information specialists from several areas of work, but

most particularly those who are movers and shakers, and who would improve the effectiveness and efficiency of information systems. They must equally carefully be directed to quality programs some of which may need to be developed. They should work with accredited academic institutions outside Southeast Asia.

15. Trade and political barriers at the national level need to be reduced to aid acceleration of information exchange. This is a difficult task, but with the support of the information industry some problems should be resolvable.

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APPENDIX A

INSTITUTIONS and ORGANIZATIONS VISITED

PHILIPPINE ISLANDS

U.S. Embassy, Agricultural Officer
U.S. Agency for International Development
Agricultural Development Officer, Project Officers (2), Librarian
United Nations. Development Programme Field Office, Chief of Office
United Nations. Information Centre & Library, Director
United Nations. Food and Agricultural Organization, Chief of Office
International Center for Living Aquatic Resources Management
Director; Editor of ICLARM Newsletter; Librarian; Program Officers (4)
International Center for Technology Transfer, Inc., Program Officer

Philippine Government
Dept. of Fisheries, Program Officers (2)
Ministry of Industry Library, Librarian
National Science and Technology Authority
Program and Information Officers (2)
Philippine Technology Resource Centre, Computer Center, Director

Los Baños Facilities
International Rice Research Institute, Librarian and Publication Officer
Agricultural Information Data Bank for Asia, Librarian and Director
United Nations. Regional Network for Agricultural Machinery, Director and Deputy Director
University of the Philippines, Director of Library

Visayas State College of Agriculture, Leyte
Agricultural Program Officers (2)
AID/Cornell Institutional Program, Director
Librarian and Staff

SINGAPORE

International Development Research Centre, Asian Office
Information Program Officers (2)
National University of Singapore, Librarian and Staff Members
National Library of Singapore, Deputy Chief Director

BANGKOK, THAILAND

U.S. Agency for International Development, Agricultural Development Officer
United Nations. Development Programme Field Office
Chief of Office, Program Officer (1)
United Nations. Economics and Social Commission for Asia and the Pacific.
Agricultural Division, Chief, Program Officers (2)
Population Division Clearinghouse and Information Section, Deputy Chief and Staff Members
United Nations. F.A.O. Regional Office for Asia and the Far East, Senior Information Officer
United Nations. F.A.O. Network of Aquaculture Centres in Asia, Coordinator

Asian Institute of Technology
Deputy Directors of Library (2), Directors of Information & Analysis Centers (4)
Southeastern Asian Fisheries Development Centre, Deputy Director
Thai National Documentation Center, Chief

HONOLULU, HAWAII

University of Hawaii, Moana Campus
Director of Libraries & Staff Members
College of Tropical Agriculture and Human Resources
Assoc. Dean; Information Specialist

U.S. Dept. of Agriculture
A.R.S. Tropical Fruit and Vegetable Research Lab., Director & 7 Scientists
Forest Service. Institute of Pacific Island Forestry, Director and Staff (3)