Research for Tomorrow

Information Centers: From Irradiation to Biotechnology and Beyond

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Modern agricultural research is a dynamic enterprise requiring the digestion of large amounts of information to help give it focus, direction, and justification. As the Nation’s storehouse for that information, the National Agricultural Library (NAL) answers a steady flow of inquiries. From scientists and technicians across the country, come inquiries like these:

- A scientist in Texas conducting research on polyculture of channel catfish and freshwater prawns in a 10-acre pond is in need of the latest studies on the subject. Her continuing research may lead to increased production of farm-produced fish to help satisfy international food needs and increase farmer income.

- A U.S. Department of Agriculture (USDA) research administrator attempting to determine risk factors in the potential release of genetically engineered organisms into the environment requires an exhaustive search of the literature. This information will help guide the Agricultural Research Service in formulating policy for future biotechnological research.

- In Oregon, a university faculty member serving on a national task force focusing on emerging industrial crops requests data on levels for tomorrow. Terry then accesses the national Extension plan-of-work data base to see if other States are working in priority areas similar to those in Terry’s county.

While closing up the office, Terry notices the worn briefcase behind the door. Smiling, Terry thinks, “I used to take that thing home loaded with papers many a night. All I need now is my computer at home and here at the office. I’m able to perform at a professional level with new tools and feel proud to be a part of the Extension system.”
of investment in new crops research. The data supplied reveals a minimal national investment of resources. This information is supporting the development of industrial crops vital to the economy.

- A team of USDA scientists petitioning the Food and Drug Administration to allow the irradiation of poultry meat at medium doses questions the potential of Clostridium Botulinum growth in the irradiated product. A comprehensive bibliography of published research findings substantiates their concern and offers a solution to the...
problem: controlled refrigerated storage.

Information centers at NAL are supporting researchers daily by supplying information that will lead to answers to these and other questions. Inquiries in subject areas such as biotechnology, aquaculture, critical materials, food irradiation, and food and nutrition are referred to information center coordinators who stand ready to use the world’s information base to deliver the documentation vital to a scientist’s research.

Life Cycle of a Question

NAL each year responds to more than 30,000 requests for information exclusive of the more than 150,000 requests received solely for documents. A portion of these questions will be reference research requests and will be directed to an appropriate subject-related center. Once there, they will be carefully analyzed and the most effective response determined.

Within a given center a wealth of information is available, and, literally, at the fingertips of a librarian or technical information specialist. Through the course of answering a complex research request, for instance, an array of computerized databases will be tapped to track the world’s published literature on a given topic, locate research in progress, and cull statistical data. Sophisticated search strategies will be designed to retrieve precisely the information needed, in the format in which it is needed.

Relevant documents will be selected and photocopied from NAL’s expansive collections or borrowed through interlibrary loan. A carefully constructed support network of subject area experts and organizations will be activated for referrals. Private files compiled ad hoc will be scoured. Finally, a detailed information package reflecting a potpourri of inputs will be assembled and readied for delivery.

Once a reference inquiry is completed to the satisfaction of the user, it will take on a new dimension within an information center. For the center’s coordinator, the question itself as well as the answer becomes information—information which will likely serve as the building blocks for expanding the resources of the center and NAL. The inquiry may be used as the basis for evaluating the strength of NAL collections in a particular subject area. How effectively was the question answered through on-site collections? Are core journal titles missing? Have important texts or directories been published recently that the Library should acquire? Is the best information contained in the private library of a noted expert or housed at another library, and should the center seek to duplicate it on microfiche, laser disc, or some other technology?

The question’s interest to a wider audience also will be considered. If the inquiry is on a timely topic likely to generate numerous requests for the same information, a Quick Bibliography, Special Reference Brief, or Pathfinder may be developed.

These information products direct users to the available literature and other resources with instructions for how to obtain the information. Other, more extensive bibliographies also may emanate from the original request.

Information Centers—Back to the Future

Information centers are a relatively new concept at NAL. Why information centers? What is the impetus behind their creation? And more importantly, how will their services differ from those the Library has traditionally provided? To answer these questions, let us digress a moment to the past.
Outreach activities such as attendance at professional meetings and trade shows heighten awareness of information center products and services.

When Isaac Newton, the first Commissioner of Agriculture, outlined the program for a new Department in 1862, he placed near the top of his list the establishment of an agricultural library. He believed that a rich mine of knowledge would be accumulated through exchange, gift, and purchase. With the blessing of Commissioner Newton and an appropriation of $4,000, 1,000 books were transferred from the Agricultural Division of the U.S. Patent Office. These volumes formed the nucleus of what was to become one of the most extensive collections of agricultural literature in the world.

The Library, from its inception, has been the principal agency in USDA for the acquisition, storage, and dissemination of scientific and technical information. A primary objective of the early library was to develop collections and provide services to support the Department’s programs. Since research has always been a key program, the Library grew into a major research library supporting not only all USDA agencies, but other related government activities as well.

As the Library’s collection and services steadily expanded, so did its reach. The Department’s agricultural library rapidly became the Nation’s agricultural library with a collection of 1.8 million volumes including 25,000 journal titles. Today, NAL is one of the largest agricultural libraries in the world. Nationally, it is the coordinator and primary resource for a network of State land-grant and field libraries that work together to deliver information to all sectors of the population—from the researcher to Extension workers, farmers, lawmakers, industrialists, students, private citizens, and others with an interest in agriculture.

Internationally, it is the designated U.S. center for the worldwide agricultural information system sponsored by the United Nations Food and Agriculture Organization (FAO). Roughly 60 percent of its collection is of foreign origin. Most of these materials are obtained through an international exchange program that brings some 100,000 items into NAL each year. A tradition of special donations and gifts by individuals and private organizations complements this process.

Over the years, NAL has become many different things to many people: an internationally recognized research library; AGRICOLA, a computerized database offering worldwide access to more than 2 million references to books and journal articles in the NAL collection; Special Collections, housing rare books, manu-
scripts, oral histories, photographs, and the donated private libraries of eminent scientists and administrators; CALS, an automated system which keeps USDA researchers alerted to the latest literature in their field of interest; the site of investigations into the use of laser technology and experts systems that are changing the means by which information is stored, distributed and used, and much more.

But for all of this, NAL remains a dynamic organization continually searching for ways to enhance its responsiveness to its current clientele and in the process reach new user groups. To help accomplish this goal, the Library decided to create information centers on various subjects and in doing so work with support groups in industry, Federal and State agencies, and the scientific community to establish these centers as national focal points for information dissemination activities. The Library’s unparalleled collections would provide the bibliographic and informational foundation from which these centers would grow.

### Structure of an Information Center

Recognizing that agriculture is a broad-based discipline, several factors have determined what subjects will initially be covered by information centers. These include: 1) Congressional mandate; 2) priorities within USDA; 3) availability of subject expertise on NAL staff; and 4) financial support and interest by agricultural trade and professional organizations.

While information centers are not physically isolated units—materials are housed at NAL within the regular collection—the designation of a topic as an information center will effect increased activity on several fronts including:

### Collection Development.

Strengthen the identification and acquisition of new books, journals, audiovisual materials, and computer software. Locate and acquire outstanding historical collections and oral histories that will help enrich the national collection. Enter these acquisitions into AGRICOLA and other computer data base systems, making materials available nationally and internationally through interlibrary loan.

### Information Products.

Develop researcher and consumer finding aids such as directories of experts, institutions, associations, and current research as well as guides to the literature such as subject bibliographies and pathfinders.

### Outreach.

Increase the awareness of information center products and services through presentations to interested organizations, attendance at professional meetings and trade shows, specialized brochures and pamphlets, and traveling exhibits.

### Public Services.

Provide expanded information services for responding to consumer and scientific inquiries through appointment of one or more NAL staff to coordinate a center’s response network.

### Information Centers at a Glance

Since the introduction of the information centers’ concept, several centers have been established and are operational. Some of their varied activities are:

#### Food Irradiation.

Interest in the uses of food irradiation to control insect and microbial contamination, prevent disease, and keep food fresher longer is growing among consumers, the food industry, and government. This interest has been stim-
ulated by public concerns over potential health hazards associated with the application of postharvest chemical treatments to food commodities. Public and private demand for information about food irradiation has spurred Library efforts to centralize and enhance access to the large body of food irradiation materials.

A direct result of these efforts has been the acquisition of several collections from the USDA Eastern Regional Research Center in Wyndmoor, Pennsylvania. These include the Raltech studies on the nutritional and toxicological properties of irradiated poultry meat and the findings from the Natick Laboratory and U.S. Army Test and Evaluation sponsored research on the effects of meat irradiation.

Together these collections represent research conducted by leading authorities in government, industry, and academia since 1945. These collections are particularly valuable for their inclusion of unpublished reports, supporting documents, and brochures. The acquisition of other toxicological studies is being pursued nationally and internationally through exchange agreements with foreign countries. The Center is working with the Agricultural Research Institute’s Special Committee on Irradiation Processes for Agricultural Products, the Coalition for Food Irradiation, and other organizations to help direct future expansion and to identify additional sources of support.

**Aquaculture.** Based on the National Aquaculture Act of 1980 calling for the establishment and maintenance of an information service for aquaculture, this Aquaculture Center has steadily increased its resources.

In collection development, the Center has acquired microfiche copies of the Virginia Institute of Marine Sciences’ (VIMS) sizable aquaculture collection. This document collection includes journals, books, reports, theses, proceedings, newsletters, and English translations of foreign papers. It provides coverage on the cultivation of marine, brackish, and freshwater organisms including disease, economics, engineering, food and nutrition, and legal aspects. The collection is particularly useful for its short, “how-to” articles and news items. And, perhaps most importantly, the VIMS acquisition places NAL in the position of being able to act more adequately as a document delivery backup for some of the more fugitive materials in this field.

The Center also has made inroads into streamlining worldwide aquaculture information collection and dissemination responsibilities. In an arrangement with the National Oceanic and Atmospheric Administration (NOAA) and the FAO’s Aquatic Science and Fisheries Information System (ASFIS)—an international bibliographic service covering the world’s literature on aquatic sciences and fisheries—ASFIS is supervising all indexing of aquaculture information. NAL supports ASFIS by ensuring a flow of aquaculture-related documents from its own acquisitions to be abstracted, indexed, and entered into the ASFIS database. This arrangement will permit a more thorough coverage of the literature of aquaculture than was previously available in AGRICOLA. It also will free NAL staff to provide better coverage in other areas.

As interest in aquaculture continues to accelerate, so does the demand for information. To help cope with the daily barrage of inquiries, Center staff are in the preliminary stages of developing an expert system that may someday perform some of the activities which now lie within the domain of the reference librarian. In the not-too-distant future, a would-be aquaculturist eager to start a catfish farm in Mississippi may be able to sit down
at a computer work station and, through a series of menu-driven questions and linkages with other systems, receive much the same in-depth service that has come to be expected from a reference specialist. Not as warm and congenial perhaps, but hopefully equally effective.

For the immediate future, however, the Center has several bibliographies and short guides to the literature available to assist users. Titles include general aquaculture, shellfish and milkfish culture, and salmon ranching.

**Biotechnology.** The Biotechnology Information Center was formed as part of a continuing effort to complement and support research priorities in U.S. agriculture. Biotechnology is creating new opportunities throughout the agricultural sciences—finding solutions to problems that were previously unapproachable. As the results of promising new research are reported, it becomes imperative that documentation is captured immediately and available for use by the scientific establishment.

The staff of the Biotechnology Information Center are working to ensure that all relevant biotechnology literature is indexed and accessible.
worldwide through appropriate bibliographic services. With the cooperation of USDA scientists and other biotechnology experts, Center staff have launched an intensive evaluation of NAL's present collections and future acquisitions policy to meet the challenges of this still-emerging field.

For USDA personnel, keeping posted on recently published biotechnology literature is possible through a CALS (Current Awareness Literature Service) system search of Telegen—a database of scientific, technical, and socioeconomic information related to genetic engineering and biotechnology. Full-text documents from Telegen in either hardcopy or microfiche can be furnished to USDA and non-USDA users. Through CALS, a scientist establishes a profile consisting of keyword terms to express a particular subject interest. The profiles are regularly compared with updated computer tapes from selected bibliographic databases producing for the scientist a listing of the most recent literature published on a given topic.

Related efforts of the Center have been the production of a list of NAL journal holdings in biotechnology and the preparation of subject bibliographies on the biotechnological aspects of plants, animals, soils, risk assessment, molecular techniques, food production and application, and biomass applications.

**Critical Agricultural Materials.** The Critical Agricultural Materials Information Center was created in response to agriculture's new and emerging role as a supplier to the Nation's industrial base. This Center's information collection, dissemination, and preservation activities focus on the use of domestically produced agricultural products that have the potential for providing industrial materials of vital importance to the economy, the defense, and the general well-being of the Nation. Where the United States has a high degree of reliance on foreign suppliers for certain key products, research into the production of crops that can substitute for these commodities has taken on a new urgency. Some of the products from these nonfood crops that can provide raw materials for industrial application include natural rubber from guayule; lubricating oil from jojoba; nylon from crambe; paper from kenaf; lauric acid from cuphea for the soap and detergent industry; surfactants from meadowfoam; plasticizers from rapeseed; and chemicals, industrial carbon char, carbon black and alcohol fuels from forest products.

In support of this research, NAL has made considerable progress in enhancing coverage of critical materials literature with the help of the Arid Lands Information Center (ALIC) at the University of Arizona. Through a cooperative agreement, area experts are identifying, acquiring, cataloging, and indexing newly published materials. Also, noncopyrighted materials from the extensive guayule and jojoba collection at ALIC have been microfiched and indexed with the support of the USDA Office of Critical Materials.

The Center operates in consultation with the Office of Critical Materials to develop bibliographic products and provide services to advance the research and development of these emerging crops. *Quick Bibliographies* are available from the Center on a range of farm and forest crops with industrial potential including Chinese tallow tree, crambe, cuphea, kenaf, lesquerella, lunaria, stokesia, and vernonia.

**Food and Nutrition (FNIC).** This highly successful Information Center serves as a model for new ones. The Food and Nutrition Service and NAL in 1971 founded FNIC as a national repository of educational and
training materials for use by persons in USDA's Child Nutrition Program (school lunch, child care, etc.). The 1977 Farm Bill established FNIC as a resource for State education agencies and other interested persons.

FNIC serves many types of users including researchers, educators, school food service personnel, cooperative extension agents, and consumers. It can help a school administrator implementing a program of nutrition education or a food service manager interested in effective techniques for supervising personnel. The Center maintains an extensive collection of audiovisual materials (e.g., films, videocassettes, posters, games) that deal with human nutrition, food service management, and food science.

Reference services are provided by a staff of registered dietitians and nutritionists. FNIC also is a national demonstration center for food and nutrition microcomputer software with over 100 programs on topics such as diet analysis and nutrition education available for review.

FNIC, in addition, contributes the food and human nutrition portion of the NAL's AGRICOLA database which includes abstracts. Pathfinders developed cooperatively with the Pennsylvania State University list appropriate information resources for consumers, educators, professionals, and others on a wide variety of topics. Over the years, several selected bibliographies have been published. As a result of two of the publications, FNIC has become the national depository of all training and education materials developed by USDA's Supplemental Food Program for Women, Infants, and Children (WIC) and the Nutrition Education and Training Program.

FNIC works closely with the Food and Nutrition Service, Human Nutrition Information Service, and Extension Service of USDA, as well as with various agencies of the U.S. Department of Health and Human Services, the March of Dimes, the Society for Nutrition Education, and the American Dietetic Association.

The Center has established a dissemination network with State representatives of the American School Food Service Association and the State nutrition educators for WIC.

**Information Centers . . . Preparing for the Future**

The identification of high priority topics for inclusion in the Information Centers Program is an ongoing process. Suggestions and recommendations are considered from all sources. Centers soon to be established include Alternative Farming Systems, Fibers, Horticulture, and the Family.

Much of the work so far has been done with existing NAL staff and funds. Additional resources will enable NAL to expand its activities even further.

As NAL plots a future course for its information centers, the needs of research remain a prime consideration just as they were more than a century ago. But unlike the previous century, the Library has moved beyond its traditional role as primarily the keeper of the Nation's agricultural knowledge. The information explosion and the advent of new technologies to cope with it has challenged us to mobilize the knowledge collected, and to integrate and repackage it to make it more meaningful to the people that use it.

In preparing to meet the information needs of research in the next century, specialized information centers will offer a forum for librarians and scientists to explore the complexities of information and to cooperate in the search for advanced methods of communicating the wealth of new agricultural information issuing from research centers around the world.