NEW HORIZONS IN AGRICULTURAL INFORMATION MANAGEMENT

PROCEEDINGS
OF AN INTERNATIONAL SYMPOSIUM
MARCH 13-16, 1991
BEIJING, CHINA
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New Horizons in
Agricultural Information Management

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Gary K. McConne
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Table of Contents

Foreword ................................................................. viii

Keynote Address

Problems, Issues, and Challenges for Agricultural Information Systems and Services in the Developing World
L. J. HARAVU .................................................................. 1

Session I: Management and Development of National Agro-Information Systems

Database Design at ICRISAT and the Experience of Using External Databases
L. J. HARAVU .................................................................. 13
Implementation Results, Roles and Effects of the Chinese Agricultural Information Services Project
WANG Xianfu ............................................................... 24
The AGRIS System and the Participation of China
Helga SCHMID ............................................................. 32
Ten Years’ Progress in China’s Computerized Information Retrieval and Its Future (Abridged)
ZENG Minzu ............................................................... 40
A Brief Introduction to the Computerized Agricultural Information Retrieval Systems in China
Chunpei HE ................................................................. 47
Efficient Architecture and Development Strategy of Agricultural Information Systems in Developing Countries
CHEN Qiben ............................................................... 54

Session II: Information Management and New Technology Application

The Infusion of Quality in Agricultural Information Services
Syed Salim AGHA ........................................................ 58
Access Points to the Database of Bibliographies of Agricultural Documents in China and Their Retrieval Functions
WU Zeyi ........................................................................ 64
Management of the AGRIS and CARIS Regional Centers in Southeast Asia
Josephine C. SISON ....................................................... 75
Preliminary Study on the Microcomputer-aided System for Compiling an Agricultural Thesaurus and the Establishment of a Descriptor Database Management System
FANG Luming and WANG Caihua .................................. 85
Digitized Image Transmission Using High Speed Telecommunications Networks  
Gary K. MCCONE ................................................. 92
The Integrated System of Database Creation and Computer-based Editing  
and Composition  
WANG Huaihui ................................................... 98
Expert Systems for Agricultural Use: Recent Developments and Applications  
A. Mangstl and V. Troll ........................................ 103
A Study of the Khonkaen University Research Information System  
Daruna SOMBOONKUN ....................................... 114
Establishment of the Chinese Agriculture Abstracts Database  
GUO Jian .......................................................... 120
On the CAB Thesaurus  
HOU Hanqing and XU Jia ..................................... 125
Realization and Application of Large Capacity Chinese Character Disk  
Operating System (LCCDOS)  
NIU Zhan Liang, BAI Juping and LIU Huifang .................. 134
The Close Associations between Indexing and Microcomputer Software  
Maintenance  
BI Jinping ......................................................... 140
Program for Automatic Creation of Subject Indexes by Computer  
WANG Huaihui .................................................... 145

Session III: Management and Development of Regional  
Agro-Information Systems

SEAWIC: Its Organization, Objectives and Activities  
Ruben C. UMALY and Soetitah SOEDOJO ...................... 152
Strengthening the Establishment of a Chinese Regional Monographic  
Agricultural Document Database  
YAN Ming-zhi, LU Ping and MA Tao ............................. 162
Indonesian Plan for an Integrated Management Information System for  
Agricultural Research and Development  
Prabowo TJITROPRANOTO and Liannie K. DAYWIN ........... 169
Creation of an Information Database and a Developmental line of Agro-  
Information Retrieval Techniques in Northeast China  
ZHENG Yegang and XIN Huajun ................................. 173
Cybernetic Analysis of Scientific Information Services for Agricultural  
Development in China  
CHENG Xiaolan and CAI Jianfeng ................................ 178
Functioning of the National Agricultural Information Network (AGRINET)  
D.Y. RATNAVIBHUSHENA ....................................... 190
Agricultural Information Services of Hupe Province  
LI Zezhou .......................................................... 200
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some Ideas on the Tendencies of Information Services by the Regional Information Agencies of Agricultural Science and Technology</td>
<td>205</td>
</tr>
<tr>
<td>Ideas on Effective Ways of Transforming Agro-Information into a Productive Force</td>
<td>213</td>
</tr>
<tr>
<td>Present Situation and Strategy of Development in Information for Agricultural Science and Technology in the East China Administrative Area</td>
<td>218</td>
</tr>
<tr>
<td>Coordination of Information Work on Agricultural Literature in Northwestern China</td>
<td>224</td>
</tr>
<tr>
<td>Discussion on Elementary Assignment on Information of Agricultural Sciences and Technology at the Provincial Level</td>
<td>231</td>
</tr>
<tr>
<td>A New Domain of Agricultural Information Service at the Provincial Level -- The Combination of Information Analysis and Database Building</td>
<td>237</td>
</tr>
</tbody>
</table>

**Session IV: Scientech Information and Productivity**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The System of the PCARRD Applied Communication Division in Transferring Agricultural Technology to Farmers</td>
<td>242</td>
</tr>
<tr>
<td>Discussion on Functions of Agricultural Scientific and Technical Information in the Development of a Rural Commodity Economy</td>
<td>257</td>
</tr>
<tr>
<td>Information as an Economic Resource in Agricultural Development</td>
<td>266</td>
</tr>
<tr>
<td>Scientific and Technological Information is a Potential Productive Force</td>
<td>274</td>
</tr>
<tr>
<td>Integrated Root Crop Program (Philippines): A Coordinated Approach in Research Development and Extension</td>
<td>279</td>
</tr>
<tr>
<td>Farm Management Data for Thai Farmers</td>
<td>290</td>
</tr>
<tr>
<td>On Effective Ways for Information Research to Serve the Rural Economy</td>
<td>292</td>
</tr>
<tr>
<td>Preliminary Study on Ways of Transforming Agricultural Science Information into Productive Forces</td>
<td>298</td>
</tr>
<tr>
<td>Studies on Agricultural Information Research for the Development of a Rural Commodity Economy</td>
<td>305</td>
</tr>
</tbody>
</table>
Joining the Main Front for Economic Construction to Open Up a New Aspect of Information Research
SUN Xuequan and LIU Qingshui ............................................ 314

Establishing a New System of Agricultural Information Technology, Production and Marketing, and Promoting the Agricultural Technological Development of China
TONG Dijuan .................................................................. 319

On the Transformation of Agricultural Scientific and Technical Information -- Thoughts on Transforming Information into a Productive Force
YUAN Weimin ................................................................. 325

An Effective Way for Transforming Scientific Information into Productive Forces
LI Lunliang and YU Ying .................................................. 331

Broadening the Media of Communication of Agricultural Information and Its Role in Agricultural Development
LIU Shixing, LI Cuie and GONG Junjie ............................... 334

Session V: Development and Utilization of Agro-Information Resources

A New Approach to Information Systems Management at the International Potato Center (CIP): The Case of Information Services for National Potato and Sweet Potato Programs
Carmen SIRI .................................................................... 340

Preparing English Abstracts of Chinese Documents -- an Important Step Toward International Sharing of Chinese Information Resources
LI Kaiyang ....................................................................... 351

Linking Information Resources Sharing Management and Library Training in the South Pacific
Esther W. WILLIAMS ......................................................... 354

Resources of Chinese Agricultural Documents and Their International Exchange
ZHAO Huaying .................................................................. 369

Developmental Status and Trends of the Retrieval Journal System for Agricultural Information in China
JIA Shangang .................................................................... 377

Exploitation and Utilization of Sericultural Information Resources in China
GAO Zhicheng and CHEN Xichao ...................................... 385

The Agricultural Information Users in China and Changes in their Requirements
PAN Shuchun .................................................................. 390

BIOSIS as an Agricultural Information Resource
E. HODAS, M. O’HEARN and M. KELLY ............................... 398

On the Exploitation and Utilization of Agricultural Scientech Information
DING Jincheng .................................................................. 406

Exploitation and Effective Use of Scientific and Technological Information on Agriculture
LIU Yixian ....................................................................... 410
Appendix 1: Supporting Papers

Opening Address
  WANG Xianfu .......................................................... 451
Welcoming Address
  LIANG Keyong .......................................................... 452
Welcoming Address
  Clive David WING .................................................... 454
Welcoming Address
  WANG Tingjiong ........................................................ 455
Discussion ................................................................. 457
Summary Report of the International Symposium on New Horizons in Agricultural Information Management .................................................. 459

Appendix 2: Symposium Participants

List of Symposium Participants ........................................... 466

Appendix 3: Author Index

Author Index .................................................................. 472
A New Approach to Information Systems Management at the International Potato Center (CIP): The Case of Information Services for National Potato and Sweet Potato Programs

Carmen SIRI

Information Sciences Department
International Potato Center
Lima, Peru

Abstract
This paper describes the new approach to information systems management proposed by the International Potato Center (CIP) to support: a) research and transfer functions, and b) management and administrative operations.

Focus is on CIP’s Information Services that have been expanded in the recent years into an integrated system to better support national programs. A bibliographic database on the potato and sweet potato has been developed, that is based on CIP’s library collection which is of particular relevance to the needs of developing countries. Information services, such as retrospective searches and selective dissemination of information (SDI), bibliographies, and photocopy services are available to national researchers and others involved in crop development.

The information services complement the production of publications authored by CIP scientists and published both at the Center and in scientific journals. CIP is specially interested in supporting the interchange of information among national scientists and has supported activities directly aimed at this goal: an Agricultural Journals Publication Procedures Database, containing approximately 200 journals where potato and sweet potato researchers publish more frequently, is available to assist those wishing to publish in national or international journals. Furthermore, assistance has been given to support the publication of the first issue of the Journal of the Latin American Potato Association (ALAP).

Further considerations for information, diffusion and exchange are projected by the International Potato Center to support national research and development worldwide.

The International Potato Center has recently developed a new approach to information systems management that includes both research and management information, analyzed from a systems perspective. This new vision of information conceptualizes "the Center as a broad information system" (CGIAR, 1989), information is seen as an input and a product of both research and management, and is an indispensable element
of the operations of the Center. CIP sees information as one of its major products, together with research and training.

CIP’s information systems have two primary objectives: a) to support research and development, and b) to support management and administrative operations. These functions are viewed from an information systems perspective in Figure 1.

The underlying assumption behind this new approach is the role of information in achieving research objectives and in managing a center based on information and knowledge. The rapid pace of information technology change is a tremendous challenge that is affecting the way in which planning is done, operations are run and decisions are made.

We feel that the experiences of international agricultural institutions in information development should be shared, particularly with national systems. Particularly because the potential of information technologies application is constantly changing, an improved efficiency and output are among the expected benefits.

In viewing information as a resource that requires specific management beyond the traditional information and documentation activities, and as an essential component for overall operations, the Center has unified the resources dedicated to information processing and management. The Information Sciences Department now brings together the Communication, Information, Statistics, Computer and Public Awareness Units. The goals of the Information Sciences Department include:

- Assess information and communication needs.
- Design information and communication strategies.
- Provide the structure and mechanisms for information exchange and management within CIP and with National Agricultural Research Systems (NARS), donors, and the general public.
- Facilitate the exchange of information among national programs.

**INFORMATION SERVICES FOR NATIONAL POTATO AND SWEET POTATO PROGRAMS**

The International Potato Center, through its Regional Research Program and its Training Department, has established close ties with more than ninety national potato programs around the world, as well as with cooperative research networks.

In this collaborative experience, CIP has become aware that researchers, administrators, educators, and extension specialists from developing countries often have difficulty in obtaining information about potato and sweet potato research being conducted around the world. This problem is compounded by the barriers encountered by national scientists in publishing research results, thus limiting the exchange of valuable information with colleagues from other countries.
INFORMATION INPUT
(examples)

- Field and experimental data
- Professional contacts
- Scientific literature
- Library
- Planning conferences
- Thrust meetings
- Strategies
- Policies
- Plans
- Monitoring & Assessment:
  - NARS needs
  - Project implementation
- Systems & Technologies:
  - Information & computer
- Financial budget
- Accounting
- Human resources:
  - Contracts
  - Training
  - External support
- Equipment, supplies
- Facilities:
  - Procurement
  - Maintenance
  - Storage
  - Inventory

INSTITUTIONAL INFORMATION ROLE

- RESEARCH AND DEVELOPMENT

INFORMATION OUTPUT
(examples)

- Scientific information systems
- Research reports
- Publications:
  - Journal articles
  - CIP publications
  - Training materials
- Training
- Technologies
- Impact
- Reports
- Information systems
- Administrative reports
- Financial reports
- Progress reports
- Public awareness

Figure 1: CIP Overall Information System
When national researchers do not have access to updated information, their research suffers. Inadequate information exchange restricts the diffusion among the world community of scientific researchers. Most importantly, it widens the gap between national agricultural research or development systems and the international centers or developed country institutions that have more facilities to access information. CIP, aware of this situation, is taking action to develop an integrated information and communication strategy that can address these issues as part of its mandate.

Several needs have oriented CIP’s approach and strategies to information and communication development.

1. Information Needed to Support National Agricultural Research Systems. CIP concentrates its research on potato and sweet potato issues that are of specific interest to developing countries addressing research for which it has a comparative advantage. CIP collaborates with national programs responding to research needs and priorities, supports research and development efforts, provides needed training, research results and improved technologies. National researchers, and others involved in agricultural development also require information on the potato and sweet potato for conducting research and program development. CIP receives letters and requests daily from national programs that request updated information as an input to their research or to solve problems they are confronting in their work. Since its founding, CIP has developed a strong communications program to produce publications required for the transfer of information and in the form of training materials.

Despite these efforts and strong linkages with national programs, the needs of national potato and sweet potato researchers for updated information on latest research could not be fully addressed and, thus, computerized information systems have been developed.

2. Information to Support Former Training Participants. A major element of CIP’s research and development strategy is a training effort directed at enabling national researchers to conduct research that could have a positive impact on potato and sweet potato production in their countries. In the last five years, more than 5,000 persons have participated in CIP training. The large number of persons trained have an increasing need for updated information on research available in CIP’s specialized library in Lima and in larger agricultural databases.

A strong need for research information was identified in a follow-up study of approximately 500 former CIP trainees, conducted in 1984. Over 44 percent of those who responded to the survey indicated that lack of information was a limitation to conducting their research.

3. Need to Support the Exchange of Information among National Programs. The above mentioned study also revealed that national programs are conducting research and attaining results that could be of interest and of benefit to others producing potatoes under similar growing conditions. However, these results are not always published and
shared among potential users. Many do not have the skills or facilities to publish due to lack of information on publishing procedures, language and translation obstacles, the high cost of publishing, and monetary exchange barriers.

4. Need to Train National Researchers on How to Access Information. CIP'S training contacts with national potato and sweet potato researchers has revealed that most national potato and sweet potato program researchers, administrators, educators, and extension specialists have never had any formal training on how to access information from local or international sources. This limitation, together with the deficiency of agricultural information in developing countries, often leads to duplication of research, and thus to inefficient use of scarce financial resources for research.

5. Need to Supply Scientific Information to CIP Research. CIP scientists continually require updated information for their work. CIP has supported its scientific staff's information needs with library services since the formation of the Center.

ACTIVITIES AND ACCOMPLISHMENTS OF CIP'S INFORMATION AND COMMUNICATION SERVICES

Several activities described below have been undertaken to assist CIP and national program scientists worldwide in obtaining information required for their work.

CIP's Communication Activities
The mission statement of the Communications Unit states that it "supports CIP in the development and implementation of communication strategies through the generation, design, production, and delivery of communication services and products. These include publications, photography, audiovisual aids, editing/writing, translation, and communication training. By participating with CIP scientists in diagnosis of user needs, the Communications Unit helps to develop and deliver optimum quality products and services. Support is given to CIP research, administration, and training intended to assist in the exchange of research-based information between CIP's regional operations and its main headquarters as well as among national scientists, particularly through networks, professional associations and mass media."

CIP's publication program is well known among potato researchers worldwide and includes regular publications such as the CIP Circular, Annual Report, scientific documents and books, and printed and audiovisual training series.

The mailing list for sending publications includes over 6,000 individuals and institutions from around the world.

CIP's Library
CIP's Library has provided information services to CIP's scientists and trainees at headquarters since its formation in 1973. CIP is regarded by national potato programs as an important source of information on potato research. Since 1987, as CIP assumed
the mandate for sweet potato research, the library has started collecting sweet potato literature which is being included in CIP's database.

Information produced and collected by CIP is unique in that it focuses on topics of particular relevance to developing countries. The subject scope of CIP's specialized library collection covers potato and sweet potato literature from all over the world, with a good coverage of topics applicable to the torrid zone and produced by researchers from developing countries. Presently, the collection includes approximately 7,050 books, 450 journal titles, 190 annual reports, and 7,800 reprints. Included in these are unpublished research reports, and bulletins with limited circulation. Documents are found in English, Spanish, French, and Portuguese, as well as several other languages.

The collection of books, theses, and monographs is classified according to the Library of Congress classification scheme. Within this classification the section on potato and sweet potato has been expanded to accommodate a wider range of topics.

To ascertain the extent to which the literature from CIP's potato collection is referenced in other databases, in 1984 a random sample of 100 references representing the various categories of the collection was sent to AGRIS and CAB for cross-referencing. Seventy-six percent of the CIP sample was not found in the AGRIS database and 66% was not found in the CABI database. Although these are preliminary results, they indicate that many documents in CIP's library may not be found in large agricultural databases.

CIP's Information Unit
Despite a strong library collection and services, additional staff and resources were required to provide services that would respond effectively to requests from national programs. In response to this need, CIP created its Information Unit in 1985 through a joint CIP/IDRC project.

With the development of the Information Unit, CIP has been able to better assist those national programs that do not have access to updated agricultural libraries and/or have limited financial resources.

CIP's Bibliographic Database
The Information Unit has developed a database composed of information from CIP's Library collection, including non-conventional literature. The database consists of bibliographical data and keywords. While abstracting is not done, abstracts in English, Spanish, and French are included in the database if present in the original document. The database contains over 30,000 references on potato and sweet potato literature, and is updated daily with all new documents and publications received by the library.

The indexing and retrieval of information is done using keywords that have been organized into the CIP Thesaurus which contains over 2,000 descriptors. FAO's AGROVOC, the CAB Thesaurus, and NAL's Agricultural/Biological Vocabulary served
as references in developing the *CIP Thesaurus*, as well as the list of controlled vocabulary developed previously in the Library.

Access to external databases. CIP has obtained magnetic tapes of potato and sweet potato references from CABI and AGRIS and manages them on the computer at headquarters. Also, other agricultural databases can be accessed via satellite. Communication with AGRIS in Vienna and DIALOG in Palo Alto, California is also undertaken regularly. DIALOG is used for searching in major agricultural databases such as AGRICOLA, CABI, BIOSIS PREVIEWS, CRIS/USDA, and FOOD SCIENCE AND TECHNOLOGY ABSTRACTS.

**Information Services**

The Information Unit provides the following information services to CIP and national potato and sweet potato program researchers:

1. **Retrospective searches.** This service consists of the retrieval and printing of bibliographic information contained in the various databases available. Use of this service is made upon request. A Retrospective Search Form has been developed for assisting users when they request information, so as to permit a better identification of the topic of their interest. Since 1986, with the initiation of these services, the Information Unit has provided 1,260 searches for 152 users from CIP, and 329 from national agricultural systems.

Although efforts have been made to provide these services on a worldwide basis, we have found that most of the users are from Latin America due to facility of access and diffusion (Figure 2) (Cabrejos, 1989). Nevertheless, since 1989 special efforts have been underway to strengthen linkages with other continents where these services may also be required.

![Figure 2. Geographic Origin of Users of CIP Information Services](image)
2. Selective Dissemination of Information (SDI)

The SDI service was started in September 1987 and presently serves over 125 users from national programs, CIP headquarters, and regional staff. Two hundred SDI profiles have been designed to date. Figure 3 describes the distribution of SDI users.

An SDI profile form has been developed for subscribing to this service. SDI profiles are evaluated to ensure the accuracy of the information provided. These services are provided free of charge to users from national program, CIP headquarters and regional staff, as well as others such as university professors and students. An evaluation of these services is presently underway. CIP’s policy of individual profiles for SDI services has contributed to the popularity of these services.

3. Specialized bibliographies. Major topic areas for bibliographies were defined based on CIP’s priority research areas and on demand from external users. In the past, the library has produced specialized bibliographies in topics such as potato nematology, virology, storage, the potato tuber moth, fertilizers and others. These bibliographies have been diffused widely to trainees, libraries, national programs, and other institutions and persons requesting them.

As an output of the CIP database, at present two specialized bibliographies have been produced—*True Potato Seed* and *Integrated Pest Management of Potatoes*—and others are being planned. They are made available free of charge to national program personnel, selected libraries, and CIP headquarters and regional staff.

4. Accession lists. A monthly list of accessions is published and distributed to all CIP headquarters and regional staff, depository libraries, and national potato programs.
5. Document delivery and referral. CIP has the advantage of having the original documents in its library to backup the information services offered from the CIP database. Photocopies of documents are sent to persons requesting them for research purposes. Upon request, CIP offers up to two articles or thirty photocopies free of charge with each search or SDI update to national program staff. When requests for documents which are not in the library are received, the Information Unit makes efforts to obtain the documents, or the user is referred to where the document may be obtained.

Assess Information Needs and Services
Regularly, feedback is received from NARS and CIP staff through correspondence and individual evaluations of searches and SDIs. This permits a better identification of users' information needs and an evaluation of the effectiveness of the services rendered. At present, a more complete evaluation study is underway. Searches and SDI evaluation forms are regularly sent to users to obtain feedback.

ACTIVITIES TO ENCOURAGE THE EXCHANGE OF NATIONAL RESEARCH INFORMATION

CIP makes special efforts to ensure that research conducted by national programs is diffused worldwide through CIP and other databases. The following actions have been undertaken to assist in these efforts.

1. Development of a database of publishing procedures of major agricultural journals in developed and developing countries. At present, publishing procedures from all journals contained in the library have been entered, and the database contains approximately 200 references. We are now expanding the coverage of this database with journals from international and local sources. Information on procedures for publishing is provided free of charge to national researchers wishing to publish. It is expected that this activity will encourage the publication of research results and enhance the exchange of national research results and development experiences with others.

2. Supporting national or regional journals to publish issues on the potato. CIP supports selected national or regional journals so that they can publish issues on the potato. The country's existing resources are used, such as its infrastructure and publication experience, as well as communicators and editors that work in coordination with the national programs. An example of this is the support provided to initiate the Journal of the Latin American Potato Association (ALAP). At present, efforts are underway to expand this type of activity in Africa where needs in this respect have been expressed.

ACTIVITIES TO DEVELOP THE ABILITIES OF NATIONAL PROGRAM SCIENTISTS TO ACCESS INFORMATION

In developing abilities of national researchers to access information from CIP as well as from other international and national information services, CIP has undertaken the following activities:
1. Trainees and visiting national researchers have been trained to use CIP information services. Training sessions on database searching are frequently conducted by the staff; this process guides users in their future inquiries for information. Furthermore, orientation of trainees on how to use the library complements this activity.

2. The Information Unit staff has participated as instructors in CIP courses to train national participants in how to access information.

3. A slide set is currently being produced, for training national researchers and extension specialists to assist in CIP's regional and in-country courses. The objective is to enable them to better access information sources available locally or internationally, including those provided by CIP.

**COOPERATION WITH OTHER CGIAR CENTERS**

In 1985, CIP hosted the CGIAR Documentation and Information Services Meeting that brought together representatives of the information services of all the Consultative Group for International Agricultural Research Centers (CGIAR), as well as some other International Agricultural Research Centers (IARC's). The objective of this meeting was to explore possible areas of collaboration between the centers. The meeting placed special emphasis on the responsibilities of the centers with respect to NARSs.

As a follow up to this meeting, CIP participated in the organization of the II CGIAR Documentation and Information Services Meeting held in January 1989 at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). A series of information activities have taken place as a result of the first meeting and have been documented in the report of the ICRISAT meeting. The output of the second meeting has been thirty action plans developed for inter-center collaboration of which several actions are underway.

**FUTURE COLLABORATIVE CHALLENGES**

Although information and communication activities at CIP are being developed into a strong integrated system, we envisage that increasing efforts are required to face the challenge of the future. As an initial concern, we are analyzing the need to decentralize information services. The use of new technologies, such as CD-ROM are also being considered for transfer and exchange of databases with developing countries. Online searching of the Lima databases via satellite is planned for the near future. The use of facsimile transmission for document delivery has been used in selected cases, and could play an important role in the coming years with increased efficiency and lower costs of communications.

In collaborative ventures with national systems, CIP is interested in exploring possible ways of strengthening information services support as well as the exchange of information among national researchers.
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