



1990

Information and the End User: Proceedings of the VIIIth World Congress of the International Association of Agricultural Librarians and Documentalists

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Information and the End User: Proceedings of the VIIIth World Congress of the International Association of Agricultural Librarians and Documentalists

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International Association of
Agricultural Librarians and Documentalists

**Proceedings of the
VIIIth World Congress of the
International Association of Agricultural Librarians
and Documentalists: **Information
and the
End User****

May 28–31, 1990 • Budapest, Hungary

Conference issue:

*Quarterly Bulletin of the
International Association of
Agricultural Information Specialists*
vol. XXXVI, nos. 1–2, 1991

INTERNATIONAL ASSOCIATION OF AGRICULTURAL INFORMATION SPECIALISTS (IAALD)

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The Association was founded in 1955 to promote, internationally and nationally, the professional interests of agricultural information professionals. The word "Agricultural" shall include but shall not be limited to agriculture, forestry, agricultural engineering, fisheries, food and nutrition, agricultural industries, veterinary science, biotechnology and rural development. The IAALD membership is about 600, drawn from sixty countries. Activities include a General Assembly (at least once in five years), annual meetings of the Executive Committee and meetings of the Working Committees as occasion demands, and the issuing of publications in the field of agricultural information: bibliography, documentation, and librarianship.

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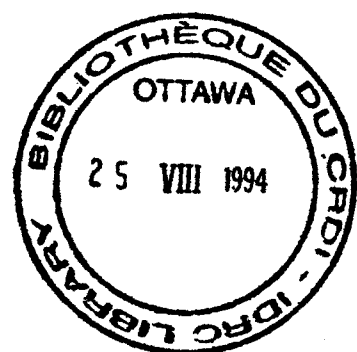
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Proceedings of the VIIIth World Congress of the International Association of Agricultural Librarians and Documentalists: Information and the End User

Hosted by Agroinform • May 28–31, 1990 • Budapest, Hungary

Edited by Antoinette Paris Powell
with the assistance of Amélie E. M. Charron



Conference issue:

*Quarterly Bulletin of the International Association of
Agricultural Information Specialists* vol. XXXVI, nos. 1–2, 1991

ISSN: 0020-5966

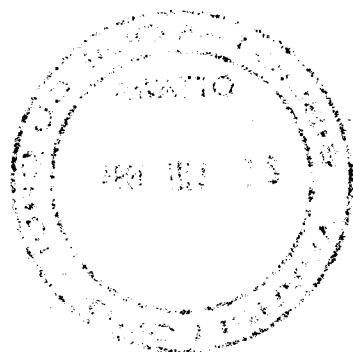
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Acknowledgements

Many people have volunteered their time and talent for this volume and there are several of them I wish to thank. The first group of people I wish to acknowledge is the Hungarian Programme Committee, chaired by Dr. Joseph Vágó, for providing the papers. I also want to thank AGROINFORM and Éva Herpay and the Hungarian Organizing Committee for doing such a fine job with the World Congress. Without them, there would be no proceedings volume. The production time on this volume was short because of the efforts of the staff at the National Agricultural Library in Beltsville, Maryland, USA; and Peter Schrempf and Evelyn Cook at Mann Library at Cornell University, Ithaca, New York, USA. This group of people created all of the electronic files by scanning the text into machine readable form. This is a formidable and time consuming task that is generally under appreciated and I want to publicly thank them for their efforts. The translation of the abstracts is a key to making this a useful volume worldwide and several people gave their time and talent for this. The French abstracts were done by Marie-Josée Jehl of CTA in the Netherlands and the Spanish abstracts were provided by Elizabeth Goldberg, Head of the Information Unit at CIAT. The German translating of abstracts was done by Wolfrudolph Laux of the Biologische Bundesanstalt in Berlin and he was assisted by Eva

Tönning and Christa Demmel. I wish to also thank Dr. Laux for editing the papers submitted in German, a time-consuming task so important to the quality of the publication. The German material had to be keyed into machine readable form by Amélie Charron, who had no knowledge of German, which presented another problem, that of proofreading. This onerous task went to my friend and colleague, Bradley Grissom, who with some help from Karl-heinz Boewe proofed all of the German papers and abstracts. I am very grateful for Brad's interest and support. I am also grateful for the support of Lillian Mesner, Technical Services Librarian on the staff of the Agriculture Library at the University of Kentucky, who provided technical expertise in the title page design. With Lil's help we were able to design a title page to satisfy both the serial and monographic nature of this publication. I would like to publicly thank Charles Chandler, the graphic designer for this publication. His interest and suggestions have made this a volume to be proud of. My biggest debt of gratitude goes to Amélie Charron, my right hand, who spent many hours proofreading both the draft and final papers, who offered suggestions on what would make this a better volume and simply for putting up with me during the past 2-1/2 months. That, in itself, was a monumental task.





Contents

Foreword / *Antoinette Paris Powell* v

VIIIth World Congress of the International Association of Agricultural Librarians and Documentalists

Welcome Address / *Dr. Joseph Vágó* 1

Keynote Address / *Jan Kennedy-Olsen* 4

Session 1 – Information for the Farmer and Advisory Services for the Scientist, Educator, and Entrepreneur – Pat Thompson, Moderator

- Introduction to End Users of New Electronic Media in the Library of the Wageningen Agricultural University: An Evaluation / *M.C.A. van Boven, G. Spikman* 11
- Searching for Forestry Information in Multidisciplinary Research / *Alois Kempf* 14
- Overcoming Constraints in an Academic Library: The University of Zimbabwe Veterinary Library—Information for the Scientist / *Lorraine Mutewera* 17
- Provision of Agricultural Information to Farmers and Extension Officers: A Catalyst in Increased Agricultural Production in Africa / *L.O. Aina* 20
- Information for the Mountain Farmer / *Anwar Ali Chaudhry* 24
- A Library Database and Its End Users / *Marie-Jeanne Mouchet-Rougelot* 29
- Planning, Forecasting and Simulation Models in Agricultural Advisory Work / *Anton Mangstl, Valentin Troll, Jürgen C. Vogels* 32
- Addressing the Information Needs of Farmers and the Extension Services: The Malaysian Experience / *Isahak Ailin Ton* 36

Session 2, Part 1 – Present Status and Role of Intermediaries – Jan van der Burg, Moderator

- Ten Years of Agricultural Documentation Services in Denmark / *Inger Mathiesen* 41

▪ Meeting the User's Need: The Most Important Task of the Information Specialist / *Éva Herpay* 44

▪ The Popularization of Scientific Information in Malaysia: the Role of Intermediaries / *Sumangala Pillai, Roslin Muhiddin* 46

▪ The CTA and International Cooperation in the Training of Agricultural Librarians and Documentalists / *Maria-Josée Jehl* 52

▪ Improving the Accessibility and Availability of Information in the Agricultural Library and Information System of China / *Qiaobao Zhang* 55

▪ The United States Agricultural Information Network (USAIN): Providing Information to the End User / *John W. Beecher* 59

▪ Probleme bei der Einrichtung eines Dokumentenverwaltungs- und Dokumentations-systems auf einem Personalcomputer mit besonderer Berücksichtigung von MICRO-CDS/ISIS / Problems Relating to the Set Up of a Documentation System and Document Management with Personal Computers: MICRO-CDS/ISIS / *Wilfried Lang* 62

▪ Do Specialized Literature Information Services Still Have a Chance in Agricultural Information? / *Wolfrudolf Laux* 66

▪ Technical Books for Agriculture: Publishing and Market Potentials / *Csaba Gallyas* 69

Session 2, Part 2 – Present Status and Role of Intermediaries – Susan C. Harris, Moderator

▪ Der Endbenutzer und der Informationsvermittler: eine Schnittstelle zwischen Datenbank und Suchfrage / The End User and the Intermediary—an Interface between Database and the Search Query / *Michael Scholz* 71

▪ Where East Meets West: The Supply and Exchange of Agricultural Information / *Colin Ogbourne* 75

▪ Improved Access to Agricultural Literature Through a Comprehensive, Detailed Agricultural Thesaurus / *Sarah E. Thomas* 80

- Preserving the Literature of Agriculture: A Model for Decision Making / *Samuel Demas* 83
- Die Rolle der Zeitschrift *Wirtschaftsfragen der Lebensmittelindustrie* bei der Verbreitung von Ökonomischen Informationen in der Lebensmittelindustrie / Role of the Quarterly *Economical Questions of Food Industries* in the Economical Information Service of Food Industries / *Tibor Bártai* 87
- Demonstrating the Value of Library and Information Services / *Tom Norton* 90
- ALAP: A Government Partner in Agricultural Information Activities / *Marina Barile-Frias* 94
- The Study of Information Requests and Forms of Meeting Them in Scientific Agricultural Libraries of the USSR / *V.G. Pozdnjakov* 97

Session 3 – Information Supply in Developing Countries – Jacques Schippers, Moderator

- Introduction of CD-ROM Technology in ACP Countries: Report of a CTA Project / *J.H.W. van Hartevelt* 101
- From Camels to Computers: The Realities of Increasing the Flow of Agricultural Information in Pakistan's Northwest Frontier / *Attaullah, Jane S. Johnson* 105
- Information Management Projects in Developing Countries: The Challenge of Working with Varying Levels of Infrastructure / *Barbara S. Hutchinson, Robert Varady, Charlene Baldwin* 110
- The "Information Center" Concept as a Fund-raising and Marketing Tool for Information Organizations in Developing Countries / *Keith W. Russell* 114

- New Technologies for Document Delivery and the Barriers to Their Use in the Developing Countries / *Mary Ochs* 118
- Determining the Current Core Literature in the Agricultural Sciences / *Wallace C. Olsen, Jan Kennedy-Olsen* 122
- Implementing Results, Roles and Effects of the Chinese Agricultural Information Services Project / *Wang Xianfu, Li Kaiyang, Pan Shuchun* 128

Session 4 – Information on CD-ROM
– John Metcalfe, Moderator

- Training for a Changing Environment: The Challenges in a Decentralized System / *Margaret L. Morton* 133
- Optical Technology: New Ways of Providing Information to the End User / *Pamela Q.J. André* 136
- Information Needs in Agriculture and Markets for CD-ROM Products: Results of a Joint Market Study / *Eleanor Frierson, Pauline A. Zoellick* 139
- Establishing an End User Searching Service Utilizing CD-ROM and Low Cost On-line Systems: The Changing Role of the Intermediaries in Providing Access to Information / *Douglas Jones* 146

Summation of the VIIIth IAALD World Congress with Directions for Future Developments / *Syed Salim Agha* 150

- Authors and Affiliations 155
- Index 157



Foreword

The International Association of Agricultural Information Specialists (IAALD) is pleased to present the papers delivered at its VIIIth World Congress held in Budapest in May of 1990. The conference theme was "Information and the End User" and 38 papers were presented from 15 different countries. This volume gives a true international perspective on the delivery of information to the end user. The volume is organized as the papers were given. It is divided into five sections, each section with a unique title. Each paper contains an abstract in English, French, Spanish and German to allow all of our readers to quickly scan the papers to read those that are of particular interest. Also added to each paper are keywords, descriptors that indicate the intent of the paper. The keywords are the subject entries for each article in the index at the end of the volume. The keywords are taken from the *ERIC Thesaurus*, 12th edition.

There are several other features of this volume I would like to point out. In addition to abstracts and keywords, we have included a list of the authors of the papers and their affiliations. While I did not have a complete address list, there should be enough there if you wish to write to a particular author. Also included in this volume is an index which combines author and subject in one alphabet. The subjects are derived from the keywords added as well as terms taken from the text of each paper. The index is designed to help you focus on a particular subject. The table of contents, on the other hand, lets you glance at the wide range of papers that were presented in Budapest.

This volume has been one year in production and has been an international group effort to accomplish. At the VIIIth World Congress the membership indicated that they wanted a proceedings volume but not enough people could pay the additional charge to have it. At the IAALD Executive Board Meeting last September it was decided to issue the conference papers as one volume in a combined issue of the *Quarterly Bulletin*. The first step in the production process was to get the papers from the Hungar-

ian Committee, they arrived in November. The papers were reviewed to see which ones could be acquired in machine readable form to save some keying and those authors were written and asked to provide an electronic file. The English abstracts were scanned into machine readable form by the staff of the National Agricultural Library and received in December for editing. In January, the papers were sent to Cornell for scanning into machine readable form and the English abstracts were sent to Germany, the Netherlands and Columbia to be translated into German, French and Spanish.

The spring months were a waiting period. Electronic files began arriving as did the translated abstracts. Much time was spent organizing and devising systems to allow us to track the progress of each paper. A test file was sent from Cornell in April to make sure that the scanned files could be read and edited and in June all the papers arrived on diskette and then the intense work began.

The editorial process took two and one half months to complete. Each electronic file had to be converted to a format the word processor would accept. The French and Spanish abstracts arrived in machine readable form but some of the diacritics were lost in the electronic transfer process and a computer program had to be written to take care of that problem. The edited files then had to be once again converted into a format the typesetter could accept and laser pages were produced. In total each paper was read a dozen times by several people. Every precaution has been taken in the editorial process to ensure accuracy in the papers printed here. Despite these precautions, errors may have slipped through. We hope that they are minor ones and apologize if this has happened. There was no editorial staff involved, simply people who volunteered much of their time and talent to get this volume published.

Antoinette Paris Powell
September 1991

Welcome Address

Dr. Joseph Vágó

Keywords: information services [Hungary]; information needs

ABSTRACT: In his welcoming remarks, Dr. Vágó discusses the importance of information from an economic and social point of view. The efforts of the Károlyi Mihály National Agricultural Library and its activities are described and the idea that information is an important element in everyday life is discussed.

RÉSUMÉ: Dans son discours de bienvenue, Dr Vágó étudie l'importance de l'information d'un point de vue social et économique. Il décrit les efforts et les activités de la bibliothèque nationale Karolyi Mihaly, et soutient que l'information est un élément important dans la vie de tous les jours.

RESUMEN: En su discurso de bienvenida, el Dr. Vágó trata la importancia de la información, desde un punto de vista económico y social. Se describen las actividades de la Károlyi Mihály National Library y se discute la idea que la información es un elemento importante en la vida diaria.

ZUSAMMENFASSUNG: In seiner Begrüßungsansprache beschreibt Dr. Vágó die Wichtigkeit der Informationen aus ökonomischen und sozialen Gesichtspunkten. Die Fortschritte der Károlyi Mihály National Library und ihrer Aktivitäten werden beschrieben und die Idee, daß Informationen ein wesentliches Element des täglichen Lebens ist, diskutiert.

**Ladies and Gentlemen,
Dear Guests,**

It is my pleasure to welcome all participants of the World Congress of the International Association of Agricultural Librarians and Documentalists. I welcome you to Budapest, the capital of Hungary, which frequently provides a home for international meetings organized in various fields of the social life. However, I consider it a special honor to be the host of an international program dealing with information matters con-

cerning food production, a serious world problem.

I believe that opposition in the human mentality and attitude is being replaced by mutual understanding and cooperation. This forces back the danger of nuclear catastrophe and the threatening destruction of life. Regrettably, with the dimming of this shadow, our life does not become less complicated, because famine is dealing out injustice, hopelessness, death and misery to the majority of mankind. The processes taking place in the world offers hope for successfully coping with this problem of mankind. The struggle stemming from the nature of things is manifold, and it occupies nearly all fields of the human action. The success of national aspects is considerably influenced by the possession of knowledge, in other words, the possibility of obtaining the necessary professional information.

The international experience over the past decades indicates that information is more and more important equally a from social and economic point of view. The rapid development of information technologies further increases this significance in the remaining years of the century.

In many (mainly developed) countries, the situation, development, social and economic impacts, the necessity and possibilities of further development of information has been scientifically treated in depth. In several countries the investigations, conceptions built upon this, and the decisions were raised to the government level. Importance of the work is indicated by the fact that UNESCO has published documents summing up the international experiences in information matters.

The information conceptions and standpoints born in the various countries naturally are different, but in many they carry common features. For example:

- Information is regarded as extending to all spheres of society.

- Information policy conceptions constitute an overall loose frame, without concrete tasks.

- Independent, though in some questions connected, information conceptions were worked out for the main field of the social life.

- Each conception is engaged with marked attention to the role the state fulfills in the information organization and information supply. It is regarded as a national responsibility that the citizens should receive support for solving the problems by acquiring knowledge, which would develop their self-assisting abilities. The state assumes its responsibility primarily by supporting the information organizations and corporate systems.

- The international adaptation of the national information activity is treated as a prominent issue in the information policy of every country.

- The most debated sphere of the conceptions is the economic background of the information activity. The information as a commodity definition is formulated as a distinct opinion, but the reasoning of the "commodity opponents" proclaiming the danger of "information impoverishment" is at least of such value. Experience may be a guide in the dispute. Information services directly recovered in the production are accepted by the users as a commodity according to the market conditions.

The overall conceptional formulation of the matter of information has not yet taken place in Hungary, but the transformation process extending to nearly all spheres of our society, make it timely and necessary. The trends of development realized in the meantime fall into line with the international characteristics, but in their values they lag behind them. There are differences also in the build-up and standard of the

information infrastructure in some special fields. More than one fifth of the food-block of the Hungarian economy is occupied in the economic strength of the country and nearly every second hectare of agricultural land serves the export market. These activities require world standard knowledge for the sector.

AGROINFORM is the principal organization to take on this task and has been performing its information supply activity for more than four decades. The starting basis in this work is the Karolyi Mihaly National Agricultural Library functioning as network center, that maintains regular contact with over 1000 libraries and information organizations in nearly 100 countries of the world. Its role as national library fulfilled in the field of agriculture, food industry, forestry and in the primary wood industry is complemented by the deposit library and large museum collections. Its book stock, representing nearly half a million volumes at the present time is increasing by 10 thousand volumes a year on the average, and more than 3000 current periodicals are available for the users. An improved reading service is assisted by the recently realized new accommodations of the library which offers an opportunity for a more rational organization of the work processes and mechanization of the library activity.

In the latter case, our objective associated with the already realized computer-aided lending system is electronization of the processing, storing and searching activities, which, by improving the standard of service, assists in solving the mechanized production of the library publications. The library publishes between 56,000 and 58,000 publications a year in varying periods, which gives sufficient information about the value of the collection.

The traditional form of information import is effectively supplemented by the every-day use of the international computerized technical literature services. Among these, decisive weight is represented by the data bases of AGRIS, CABI and IFIS

regularly used mainly by those involved in the scientific life. The relations developed here are further assisted by the steps taken place recently, as a result of which Hungary became a member of CABI, and a joint project was established with IFIS to assist with the information supply of Hungarian food-science. The information supply of Hungarian agriculture is usefully supplemented by the new media employed in the last decade, audio-visual technology, telecommunication systems, as well as the organization of exhibitions associated with professional programs conveying personal experiences. Further expansion of the sphere of activity is represented by the Research and Development Service organized in the latter years, which organizes the research-development work, information supply and propagation of the results of the food-producing sector. Putting into service an independent data base of Hungarian language built on the international technical literature, offers modern and quick information availability for the users.

All these activities open the opportunity through AGROINFORM to supply information suitable for decision making in a complete form to the users. This offers versatile benefits for the users by satisfying the information demand, that is, the users receive service from emergence of the thought to the realization of it.

Esteemed Congress,

I believe, those present are in agreement with me in that the matter of information became an important element of our every-day life in the society of our age. Without information no intelligent human communication, scientific and economic relations are imaginable. That's the reason why some people call the society of today an information society, where with the aid of electronics, every human action is openly available for anyone. Revolution of the information technology opened the road for the realization of information world systems. Utilizations of the possibilities began, we can be the witnesses, in

several fields of international information systems function in regions and continents. Moreover with their interconnection we can assist even in the birth of world systems. These efforts can be found in the food-producing sector of the world, a good example for which is the theme of present congress. The relationship between information and the user on the agenda assists the user in recognizing the benefits offered by the new information technologies, but at the same time it points to the necessity of new information forms and systems satisfying the demand of users more efficiently. The direction of change in any case is improvement of the knowledge in the practice, and shortening the time of realization by emphasizing the new results of research. Processed information has an important role in this process, which more directly influences actions of the user. Satisfying these demands formulates new requirements for the information suppliers, in that the information specialist has an active role in the innovation process.

This is not a simple task, first of all this demand needs to be recognized, so it is necessary to modify the attitude. When this is achieved, then the necessary changes of the information activity can be carried out. First, the scientific, professional and economic mental forces have to be drawn into the information processing. This way, the real processes which, the information must be associated with becomes better known. At the same time, greater attention should be paid to recognizing the information demands and information gathering habits of the users. In another formulation this means, that under the commodity conditions—and presence of the information market cannot be denied—the marketing work is indispensable.

When I refer only to these main changes, I believe that the activity mentioned in the foregoing, already can be interpreted. With its realization the social significance of information activity increases, and if I may express my private opinion, I

profess that the value of information work equals that of the research work. These changes can already be found in international manifestations, moreover certain elements are present in the practice.

However, there are obstacles to our development, which are more and more pressing lately. This can be traced back fundamentally to economic reasons, in that the costs of technical literature and as a result the cost of information increased to such extent that the available financial sources are no longer sufficient.

As a consequence, a real and escalating impoverishment process began in professional information activity. Its impact was moderated so far by the existing national and international relations, but if the process moves on, decline of the standard will spread over the user's sphere, which would already appear in direct economic detriments.

It is necessary to call the attention of the government organs concerned

to this internationally experienced phenomenon. I believe the Congress has the competence and way to an express opinion in this matter.

It is necessary to preserve by any means the standard of the professional information, which gives sufficient information to develop knowledge of the citizens. At the same time, this is a social requirement and civil right, so its financial coverage is to be shouldered as a social burden.

Naturally, besides the vitally important external sources and assistance, the national and international collaboration of the organizations carrying on information activity is also necessary. In addition to getting acquainted with the world of each other, handing over the experiences and methods, and keeping up the practice of information exchange, new international solution strengthening relations is required. In this field, the realization of foundation or foundations supported by a wide circle—by all those who participate in the information

infrastructure—may be reckoned with, which could provide effective assistance for propagation of the information culture.

The weight in the thought is constituted by the internationalism—both in the sources and utilization—since if the science is above the nations, then the information is its inseparable partner.

I wish that the International Association of Agricultural Librarians and Documentalists—which has done much for its realization—should continue the Congress in this spirit, and to participate with its work in alleviating the food supply problems of the world. I wish useful experiences and enjoyable pastime in Hungary to those present in Congress.

EDITOR'S NOTE:

This paper was originally published as part of the 1990 Conference section of the Quarterly Bulletin of the International Association of Agricultural Information Specialists, 35(3):142-144.

Keynote Address

Jan Kennedy-Olsen

Keywords: information management; library management; librarians attitudes; library planning; information services

ABSTRACT: The issues confronting the professional practice are presented including the question of access to information in electronic form and the implementation of the "electronic library". The "electronic library" contains bibliographic information; full text documents; numeric data; and combined numeric and textual data. Examples are drawn from the experiences at the A. R. Mann Library at Cornell University in providing this type of information. The need for the profession to concern itself with the design of user's interfaces, today's definition of literacy, and the impact on library staff is presented. The address concludes with the profession's commitment to provide access to information without bias or discrimination against content, to maintain and preserve the accumulated records of this world's knowledge, and to foster the flow of information between our nations. The "electronic Library" does not alter this purpose.

RÉSUMÉ: Les problèmes rencontrés dans la pratique professionnelle, y compris la question de l'accès à l'information sous forme électronique et la réalisation de la "bibliothèque électronique", sont présentés. La "bibliothèque électronique" contient des informations bibliographiques, des documents en plein texte, des données numériques et une donnée mixte textuelle et numérique. Les exemples sont basés sur les expériences acquises par la bibliothèque A.R. Mann de l'Université Cornell, en fournissant ce type d'information. On présente le besoin professionnel qui est de se préoccuper de la conception des interfaces utilisateurs, actuelle définition de l'alphabétisation, et de sa conséquence sur le personnel de la bibliothèque. L'allocation termine par l'engagement de la profession à fournir l'accès à l'information sans parti pris ou discrimination envers le contenu, à maintenir et à conserver les données accumulées de la connaissance du monde et à encourager le flux de l'information entre nos nations. La "bibliothèque électronique" ne modifie pas cet objectif.

RESUMEN: Se presentan los temas que confrontan la práctica profesional como

son el acceso a la información en medio electrónico y la implementación de la "biblioteca electrónica". La "biblioteca electrónica" contiene información bibliográfica, documentos en texto completo, datos numéricos, y una combinación de datos numéricos y textos. Se mencionan ejemplos de experiencias de la A. R. Mann Library de Cornell University en relación con el suministro de este tipo de información. Se establece la necesidad de que la profesión se involucre en el diseño de interfaces con el usuario, en la definición actual de alfabetismo y en el impacto en el personal de las bibliotecas. El discurso concluye con el compromiso de la profesión de proporcionar acceso a la información sin prejuicio o discriminación contra el contenido, mantener y preservar los registros del conocimiento mundial acumulados y promover el flujo de información entre los países. La "biblioteca electrónica" es compatible con este objetivo.

ZUSAMMENFASSUNG: Es werden Kernpunkte der Informationspraxis einschließlich der Frage des Zugangs zur Information in elektronischer Form sowie die Erstellung der "elektronischen Bibliothek" dargestellt. Die "elektronische Bibliothek" enthält bibliographische Informationen, vollständige Textdokumente, numerische Daten, sowie kombinierte alphanumerische Daten. Beispiele liegen aus der Erfahrung der A.R. Mann Bibliothek der Cornell Universität vor, die diese Art von Information unterstützt. Außerdem wird die Notwendigkeit für den Berufsstand erörtert, sich mit dem Entwurf von Benutzerschnittstellen, der Beschreibung des heutigen Ausbildungsbedarfs und deren Auswirkung auf das Bibliothekspersonal zu befassen. Der Beitrag schließt mit dem Hinweis auf die Verpflichtung, den Zugang zur Information ohne Voreingenommenheit oder Diskriminierung des Inhalts zu gewährleisten, die gesammelten Informationseinheiten des Weltwissens zu pflegen und zu bewahren, den Fluß der Informationen zwischen den Nationen zu fördern. Die "elektronische Bibliothek" ändert nichts an dieser Absicht.

The purpose of a keynote speech is to present to the assembled professional community a sense of the profession's direction, and to characterize the nature of the issues confronting its professional practice.

The professional assembly here today is made up of members from 50 different countries. They represent many cultures, political situations and level of resources. For such a diverse audience, is it really possible to identify a common sense of direction for the profession, and is it possible to characterize issues of professional practice which are significant to all?

I believe it is. We are living at a point in the history of our world which presents us all with a common issue so sweeping in its impact, that it is significant to the direction and practice of our profession no matter from which country we come.

It is that issue which compels my remarks today.

Information is a powerful commodity. It provides a nation the basis for innovations, the resource for an informed citizenry, and thereby, the key to the progress of the society. There is a clear relationship between a society's quality of information, and its progress and wealth.

Today the world is being revolutionized by the impact of powerful computers, particularly microcomputers, and telecommunications. The driving force of this technology is its ability to generate new types of information which before have been unthinkable. It can be stored in small spaces, retrieved and manipulated with dazzling speed, and transmitted to a distant location in seconds. Information will be the power brokers of the future; or, expressed differently, the ability of a nation to generate and exploit information using the power of computer technology is at the heart of its ability to remain as a competitor in the global economy. Information has become a strategic commodity in the global economy.

Librarians are the custodians of society's recorded information. Our theories and practices have provided

society with systematic access to this world's knowledge. Access, however, has been based in the print tradition. Today, because information is being generated in electronic form, we will have to shift our perceptions and abilities from providing access to information in the printed format, to providing access to information in the electronic form. Librarians do not have the option of claiming that their mission is to provide access to the records of civilization as long as those records are in print form.

Information, produced in electronic form, has become a resource so powerful, that it is emerging as a key commodity in a nation's ability to survive in the global economy. Our role as custodians of society's information has never been as crucial as it is today, since nations will flourish or fail depending upon their ability to exploit information using this powerful technology. This technology imperative is not important just to the United States, nor just to Japan; it is of astonishing importance to all nations.

David Brandin remarks in his book *The Technology War*, that

"Information wealth is becoming a new type of capital known as knowledge capital."

Libraries in the future will have no alternative but to collect major portions of their societies' information in electronic form. This is the direction we all have in common here today.

The issues then, confronting our professional practice are concerned with how libraries can make the transition effectively to the electronic storage and dissemination of information. Let us call it implementing the electronic library.

There are certain assumptions which must underlie the development of the electronic library.

- The fundamental purpose of the library remains unique and continues to be its responsibility to connect the user with the records of scholarship.

- The records of knowledge will increasingly be stored electronically rather than in print. Users' workstations, their microcomputers, will be-

come more and more central to providing access to information.

- Libraries have a critical stake in the nature of users' workstations, as well as the telecommunications networks which link these machines.

- There is a fundamental innovation in the style with which users interact with electronic information compared with print.

- Information in electronic form must be incorporated seamlessly into the library collection.

I thought that perhaps it would be helpful to provide a case study which illustrates how one library is making the transition toward the electronic library. The case study is that of the Albert R. Mann Library at Cornell University.

Mann has a vision of the electronic library. The vision is centered on the user at the workstation. The "workstation" is defined as each user's microcomputer connected to the local network which is in turn connected to regional, national and international networks. The user enters the electronic library through a single gateway and window at the workstation. The locus for the user's access to information is now outside the four walls of the library; it has become the home, the office or the laboratory.

The electronic library is constituted by several broad categories, or types of information. First is the category of bibliographic information, databases which provide citations to the literature of a discipline. Examples of these are Medline, Agricola, Commonwealth Agricultural Bureaux International Abstracts, Agris, Chemical Abstracts. Another form of bibliographic database is the holdings of a library collection, or at a wider level, the holdings of many libraries such as the OCLC database.

A second broad category of information is the full text of documents. Ideally, a user will search a bibliographic database such as Medline, or such as a library's holdings, and generate a wish-list of citations. These would be linked to the full-text which would be retrieved and displayed on the screen.

The third broad category of information is numeric data. A familiar example of this is Census data. Here, typically, the user will want to extract a sub-set of data related to a topic and also be able to identify all other numeric files which contain data related in some way to that topic.

The fourth category is a combination of numeric and textual data. An example of this is the *Genbank* database. This database is a record of all reported nucleic acid sequences. Researchers are encouraged to submit their sequences to the database. It is used by scholars working on DNA sequences as a means of checking whether or not the sequence they are working with has been identified before.

The electronic library encompasses resources which are held at the user's local level, loaded on a central machine within the institution. So, for example, Medline or Agricola tapes may be mounted locally and accessed by the local community under a license agreement. Numeric files, full text, and numeric/textual databases can also be held at the local level. But the electronic library encompasses access to resources which are available via government networks, private networks, national and international networks. The location of the resources should not be of any account to the user and the mode of access should be transparent.

In setting about creating the electronic library Mann has loaded five large bibliographic databases on a campus mainframe. The first four databases are Agricola, and three subsets from BIOSIS in the subject areas of entomology, genetics and nutrition. They are searched using BRS software. The fifth database contains the records of the holdings of the sixteen Cornell Libraries. All databases are accessible by users in their homes, offices or laboratories at any hour of the day or night.

The second component in the electronic library is numeric, or statistical files. Mann has loaded a number of these; for example:

- The National Resources Inventory which is an extensive inventory

of the land and water resources of all non-federal land in the United States. Variables include land use, conservation treatment, soil classification, vegetation and wildlife habitat. The data are not available in print and are useful to a broad range of researchers, from plant scientists to agricultural engineers.

- The Foreign Production, Supply and Distribution of Agricultural Commodities. This file provides data on the acreage harvested, total imports and exports, and total domestic consumption. Commodities include grains, rice, dairy products, poultry, livestock, oil seed, cotton, coffee, sugar, tobacco and cigarettes.

- The Toxic Release Inventory Database is a database which provides data about specific toxic chemicals released as a result of routine manufacturing activities. It helps to provide a picture of a community's chemical risks.

A library programmer has worked to develop a software system which provides an introduction to the system of files, explains how a search can be developed, executes the search and formats the results of the search to meet the individual needs of the user. The software allows the user to extract data from any of the files, different though they are from each other, using a common search process, and it also retrieves related data from other files. So, for example, a user would like statistics on corn production for five states over a ten year period. The software will search all files in the system looking for corn production related statistics and limited to the five states. The user identifies whether the information should be provided by state, year, production level, etc. and whether it should be a text file or suitable for loading into a spreadsheet program.

A third component of the electronic library is the full-text books and journals. Instead of using book and journal literature in the traditional printed form, users can read the full-text of this literature on the screens of their workstations. We have started with the discipline of Chem-

istry. Our beginning collection is the American Chemical Society's twenty journals, back to 1980, with selected journals back to 1974. These journals are the most important and most prestigious of the United States journals in fundamental chemistry. Although they represent a small percentage of the material indexed by Chemical Abstracts, they represent 80% of the material identified as most important at the Cornell Chemistry Department. The total text amounts to approximately 500,000 pages, or 55,000 articles. To this full-text we will add the journals of the Royal Chemistry Society and a number of chemistry books published by Springer-Verlag. This large database is searched by software specifically designed for searching and retrieving from full-text.

The fourth component of the electronic library is textual-numeric databases. an example of this is the *Genbank* database. This is a Genetic Sequence Database containing all reported nucleic acid sequences. As mentioned earlier, it is used by scholars working on DNA sequences as a means of checking whether or not the sequence they are working with has been identified before. Examples of other files purchased are the *Geology Database* (environmental data), *Climod* (weather data), and *Farm Land Values*.

In addition to the electronic resources accessible at the local level, the user also has access, via networks, to resources located at remote locations. Examples of these are the databases provided by Dialog and Maxwell Online (formerly BRS), OCLC's new product EPIC, and the 15,000 files of ICPSR (Inter-university Consortium for Political and Social Research).

This great variety of resources is not useful unless the users understand what is available in the electronic library; and then are able to connect easily to any resource. Mann is implementing a gateway, or single entry point, through which the user enters the world of the electronic library. The gateway presents to the user a catalog of the resources avail-

able, provides some assistance in making the choice, and connects the user to the selected database. The gateway provides entrance to both locally available resources as well as those available on the national and commercial networks.

The scenario before us then is that of users at workstations accessing data and the full-text of literature regardless of locations. We must ensure that a wide variety of information resources is accessible, that this accessibility is presented to the users in an intelligible way, that the data resources are usable, that the users' workstations can perform the functions well, and that the networks have sufficient bandwidth to support the sharing of information resources between institutions.

It is relatively easy to describe the implementation of the electronic library. The implementation itself, however, presents complex organization and professional issues. I will review several of the most significant.

First, the issue of mounting large bibliographic databases locally when the same database is available on CD-ROM and through access from a vendor such as Dialog. It is an expensive undertaking and the questions is, why do it? Examples of such databases are Agricola and CABI Abstracts both of which are available as tapes for local mounting, as compact disks, and through a vendor.

A comparison of the cost of each would certainly raise the question of how local mounting of a data base could possibly be justified.

The rationalization lies in the advantages provided by the locally mounted databases. They can be accessed from anywhere at any time; the user does not have to go to the library as is the case for CD-ROM, nor depend upon a librarian nor worry about the costs of the search as is the case with online access through a vendor. The access environment is almost perfect for the user. On this basis, it is hypothesized that usage will be so attractive that it will increase to the point where the cost per search is lower than the cost of a

Table 1 – Costs of local online access—*AGRICOLA* (3 years)

Item	Amount
> Magnetic storage	\$35,000
> Search-and-retrieval software license	
Year 1 license	\$19,000–52,000+
Year 1 maintenance	1,800–4,950+
Year 2	2,400–6,600+
Year 3	2,400–6,600+
Total	\$25,600–70,150+
> Database acquisition (NTIS charges)	
Year 1	\$5,000
Year 2	1,500
Year 3	1,500
Total	\$8,000
> Database processing (BRS Onsite charges)	
Year 1	\$10,000
Year 2	6,000
Year 3	6,000
Total	\$22,000
> Database use (NAL charges)	
Year 1	\$5,000
Year 2	5,000
Year 3	5,000
Total	\$15,000
Grand Total	\$105,600–150,150 plus computer
> Search-and-retrieval software based on current BRS/Search pricing.	
> Database acquisition fees based on current NTIS charges.	
> Database processing fees based on BRS "Onsite" program.	
> Database use fees based on NAL's charges to landgrant institutions.	

Table 2 – Costs of compact disk based workstation access—*AGRICOLA* (3 years)

Hardware	Amount
> PC-AT compatible micro with fixed disk	\$2,000
> CD drive	850
> Printer	450
> Workstation furniture	500
Total	\$3,800
Data	Amount
> Archival disks	\$1,000
> Year 1 Subscription	950
> Year 2 Subscription	950
> Year 3 Subscription	950
Total	\$3,850
Grand Total	\$7,650

Table 3 – Costs of remote online access through BRS and Dialog—*AGRICOLA* (3 years)

Item	Amount
Year 1	\$2,755
Year 2	3,168
Year 3*	792
Total	\$6,715

*Year in which Agricola on CD was installed

search through a vendor and lower even than a compact disk search.

Mann Library is gathering data on this. We conducted a survey of a group of users concerning their use of bibliographic databases before we provided access to the databases to them at their workstations. This group was then given access to the databases. At the end of this year we will conduct a second survey to assess the use of the databases and the users' opinion about their value.

However, as is clear, costs and use may not justify purchase of computerized information for mounting locally, desirable through that may be.

A second significant issue is the proliferation of computer files becoming available each year. Today a proliferation of computer files is available. Eg.:

- In 1985 there were 1,084 numeric databases listed in the *Computer Readable Databases Directory*. In 1988 there were 1,278 numeric databases, an 18% increase in 3 years.

- In 1985 the *Directory* listed 535 full-text databases. In 1988 there were 1,285, a 140% increase in 3 years.

- In 1978 the online information industry generated over 500 million dollars in revenues. In 1987 its revenues were over 3 billion dollars, a 500% increase in 9 years.

- In 1983 the civilian departments in the Federal government distributed 1,461 information products electronically. In 1987 they distributed 6,261 products electronically.

In the United States, there is an enormous problem in gaining access to this information. There is an almost total lack of coordination among Federal agencies, for example, concerning which data are to be produced, how the data will be delivered, and to whom the data will be made available. In many cases, agencies have no set mechanism or policy for public access to electronically stored data. The following anecdote provides an excellent illustration.

Mann Library made an attempt to learn more about data availability by selecting six files listed in a directory of Federal databases which seemed

likely to be of interest to patrons. Inquiries were sent to the source agencies, asking about access to those specific files and requesting a list of all other computer files produced by the agency. Two agencies provided extensive documentation on ways of accessing a variety of data files. One Agency sent an explanation of why it prefers to process data requests within its office and one sent documentation for a single file. The office of the Army Corps of Engineers which was listed in the directory called to say that it was not aware of having any computer data.

In addition to the Federal Government's data, data collected by agencies or companies can be of interest to researchers. Often, outsiders are granted access to the data or the agency ships the data to another machine designed for public access. At other times the agency generated a print report. Sometimes the next block of data is loaded into the agency's system and the earlier data are discarded. For example, the Chicago Board of Trade collects daily data on trading activity. These data are accumulated into monthly summaries and published as print tables. The computer files of the data remain on the computers until the space is needed to generate another summary, generally about two months. The earlier files are then deleted.

The print industry has developed a reasonably efficient, effective method of distributing monographs and serials. Through vendors, jobbers, established catalogs of in-print materials and direct mail lists, publishers are able to inform libraries about their publications. By comparison, computer files can and are 'published' by almost anyone with access to the hardware which generates the information. In addition, most electronic information producers do not yet realize that libraries might be interested in computer files; they tend to focus their marketing on the end-user. Because of these differences, locating computer files is a more complicated and extensive process than locating print materials. The routine reviewing

structure that exists for print materials has not been established for computer files. Until this exists, gaining access to electronic information is an extremely time-consuming process.

A third issue of significance is the development of effective interfaces between the user and the electronic resources. The success of the human-computer interaction is largely dependent on the nature of this user interface; this is, how well the information retrieval, manipulation and presentation functions provided by the interface satisfy the user. This is the human-computer dialogue whose purpose is to accomplish the user's task. All the mechanisms used in this dialogue constitute the interface—the physical devices such as keyboards and screen displays, as well as the computer's program for controlling the interaction. In short, it is concerned with the human, the computing environment, and the "fit" between them. For example, when using the compact disk version of *Agricola*, the interface is made up of the functions the software can perform and, just as importantly, how well it communicates with the user through screen displays, to help accomplish the searching task easily and well.

A user interface which will be particularly crucial in the future is the interface between the user and the electronic text of journal and book literature. There are increasing signs that publishers are investigating the publishing of books and journals in electronic form, as the costs of traditional publishing increase, and the costs of electronic media decrease. The user will access the full text of journals and books in the electronic library rather than through using the familiar printed volume.

The transfer from print to screen, however, is not a simple process. The act of reading literary text on a screen, rather than in print, poses questions for both human information processing and computer information processing.

There are definite advantages to be gained in accessing book and journal literature via a computer. Nevertheless, if the human-computer interac-

tion is problematic, user resistance to the system will develop. This will result in avoidance of the system which, in turn, throws into jeopardy the whole structure of the research communication process.

Access to, and the use of, the electronic form of journal and book literature, then, must allow the user to be at least as productive and comfortable as when accessing the printed version of this same literature. The user's success with information retrieval will be dependent on the interface at the workstation.

In providing the electronic full-text of chemistry books and journals at Cornell, Mann Library is conducting extensive investigations into the use of this electronic literature. Our primary purposes are to assess the effectiveness and acceptability of electronic access to books and journals as compared with paper, and to identify the most desirable functions of the user interface to an electronic system of literature. The evaluation is being conducted in two ways: first by observing users reading the electronic literature for normal everyday use, and second, through running deliberate experiments in which subjects are given specific tasks to carry out with both the print and the electronic text, and comparing their performance. Comparisons will include full text searching vs. searching using controlled vocabulary, the display of the image of the page vs. display of the ascii text, and the overall comparison of paper with electronics.

In a different study which Mann recently conducted we were presented with a particularly graphic illustration of the importance of the user interface in the success of the user accomplishing the searching task. The purpose of the study was to evaluate user preference for a text-based interface (IBM PC) or a graphics based interface (Apple Macintosh) to bibliographic information stored on CD-ROM. We used the ERIC database, a bibliographic database in the field of education. The compact disk databases are very popular with, and mostly

used by students, so the population for the experiment was students.

Each student participating in the test was given a series of simple tasks to perform on both the Macintosh and IBM versions of ERIC. A group of 40 students participated. A librarian observed the students' searches and recorded comments and observations. The librarian did not answer questions or make comments but the student was encouraged to comment aloud so that his or her stream of consciousness could be noted. After completing the search on both interfaces, and before any discussion with the librarian, the student completed a questionnaire. Although 24 of the 40 students had never performed a search on a CD database, all were at least minimal level users of IBM or Macintosh personal computers.

What was completely astonishing to us was that all students experienced frustration, struggling to complete the tasks in spite of online help and the printed guide. Comments such as "I'm so confused" and "I must tell you, I hate this" were not unusual. Much of the session was consumed by attempting to find help. Terminology was confusing and seemingly simple tasks like printing records were anything but simple. Forty-one percent (41%) were unable to print on either machine. This was astonishing because the compact disk databases are popular and heavily used; we made the assumption that the users were successful.

It is not my intent here to go through an analysis of our findings, but to make the point that the interface was the key to the students' success, or in this case, failure, in accomplishing their task. And this is an interface which is generally believed to be effective and intuitive.

It is clear that our profession must concern itself with the design of the interfaces on which users depend to make effective connection with the resources in the electronic library.

Literacy can be defined as having the skills necessary to make the connection to that information needed to survive in society.

Literacy as we know it today is manifest in the ability to read and write. However, this has not always been the case. Before the written record came into widespread use in 11th century England, the oral tradition dominated. To be literate meant to have the ability to compose and recite orally. The spoken word was the legally valid record.

The emergence of the quill pen, and the producing of written texts on paper were the beginning of the technologies which have brought us to our current concept of literacy; in addition, the steam driven rotary press, the spread of railroads, innovation in the manufacturing of paper have also played a significant role in developing the skills of literacy and allowing mass society to connect to the information needed to function in society. The current notion of literacy has evolved from the technology of the quill pen, paper, movable type and the mechanically powered rotary press. The bundle of skills we call literacy has evolved with technology. Today, the dominant technology is the computer and telecommunications. In its turn, it is forcing a fundamental innovation in the conceptualizing and use of information.

I submit that in an era when society's information is increasingly produced by the computer and retrieved from electronic storage, literacy has to include the ability to locate, retrieve, generate and manipulate information using electronic processes. In short, the traditional notion of literacy has to expand, once again compelled by technology.

Today, as the transition occurs from information in print to information in electronic form, the traditional skills of reading and writing are no longer sufficient. To them must be added new skills of retrieving information from a variety of electronic systems and formats, and of organizing and manipulating information using electronic processes. Libraries need to teach, or see that teaching occurs, to provide users with the computer skills required to find, use and communicate

information, as it moves from the print tradition to the electronic.

And, finally an issue of considerable significance is the impact on the library staff of implementing the electronic library. I will mention a few of the effects we have seen at Mann.

- Staff throughout the library depend on the smooth functioning of a technical infrastructure of workstations, networks, large computers and software for the performance of daily work and for the delivery of essential library services.

- Reference staff include a computer files librarian, an interface and database designer, a computing statistician, two programmers, and three information literacy specialists.

- All staff handle electronic information, but fifty percent of the staff have responsibilities predominantly related to electronic information.

- All staff members attend workshops on such topics as campus mainframes, the library computing environment, SAS and dBase.

- Research and development projects in the library explore the applications of emerging information technologies in the control and delivery of scholarly information in electronic form.

- Recent advances in mass storage and display technology are used for the control and delivery of electronic full text with graphics.

- Catalogers question the constraints of the MARC record for an on-line environment and information in electronic form; a cataloger's job description requires knowledge of the principles of relational databases.

I would like to conclude today in the way I began, to acknowledge again that we are a very diverse audience with considerable difference between us. We come from different geographic locations, we eat different food, our art and music are different, we come from different size organizations with various purposes, we serve different audiences, we have different levels of resources with which to work, and we are part of different national ideologies and political structures. It is these differences which, in

the end, will drive what we can do and how we must do it.

But, no matter what our differences in nationalities and as individuals, as a professional community we share a commitment. It is our common purpose to provide access to information without bias or discrimination against content, to maintain and preserve the accumulated records of this world's knowledge,

and to foster the flow of information between our nations. This function provides the infrastructure for the progress of our societies.

Today our profession is being challenged by the computer revolution and the creation of electronic information. This does not change our purpose; to the contrary, we must reassert our purpose, because we are living in a world where access to

information has become a key in the ability of our nations to survive in the global economy.

EDITOR'S NOTE:

This paper was originally published as part of the 1990 Conference section of the Quarterly Bulletin of the International Association of Agricultural Information Specialists, 35(3):145-151.

Introduction to End Users of New Electronic Media in the Library of the Wageningen Agricultural University: An Evaluation

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Keywords: information services; user satisfaction (information)

ABSTRACT: The library of the Wageningen Agricultural University aims at offering the end-user easy access to agricultural bibliographic databases. Users of the library can do computer searches in the catalogue of the Agricultural Libraries in the Netherlands (Agralin) or, assisted by information specialists, in international on-line databases. High costs prohibit most students from using the international bibliographic sources in agriculture; AGRIS, AGRICOLA and CABI on-line, and they have to turn to the printed versions. Introduction of end-user products such as CD-ROM has made computer searching of international bibliographic databases within the reach of the students. After a testing period, AGRICOLA on CD-ROM and Current-Contents on Diskette (CCOD) were introduced to the library users. To evaluate these media, untrained end-users were asked to complete a questionnaire after searching either the AGRICOLA CD-ROM or CCOD. The information gathered helped the library staff objectively evaluate the products and answered a number of questions concerning the products.

RÉSUMÉ: La bibliothèque de l'Université agricole de Wageningen vise à offrir, à l'utilisateur final, un accès convivial aux bases de données bibliographiques agricoles. Les usagers de la bibliothèque peuvent faire des recherches sur ordinateur dans le fichier des bibliothèques agricoles des Pays-Bas (Agralin) ou, avec l'aide des spécialistes de l'information, interroger en-ligne des bases de données internationales. Les frais élevés empêchent la plupart des étudiants d'utiliser les sources bibliographiques internationales agricoles en-ligne, AGRIS, AGRICOLA et CABI, et les obligent à se rabattre sur les versions imprimées. L'introduction de produits pour l'utilisateur, tels que le CD-ROM rend la recherche informatisée des bases de données bibliographiques internationales accessible aux étudiants. Après une période d'essai, AGRICOLA sur CD-ROM et Current-Contents on Diskettes (CCOD) sont présentés aux usagers de la bibliothèque. Pour évaluer ces médias, on a demandé à des usagers non formés de remplir un questionnaire après avoir fait des recherches sur les CD-ROM AGRICOLA et CCOD. L'information rassemblée a aidé le personnel de la bibliothèque à évaluer objectivement les produits et a répondu à un nombre de questions concernant ces produits.

RESUMEN: La biblioteca de Wageningen Agricultural University pretende ofrecer a los usuarios fácil acceso a bases de datos

bibliográficos en agricultura. Los usuarios de la biblioteca pueden hacer búsquedas en computador en el catálogo de Agricultural Libraries in the Netherlands (Agralin), o búsquedas en línea, con ayuda de especialistas en información, en bases de datos internacionales. El alto costo de los servicios impide que la mayoría de los estudiantes utilice las fuentes bibliográficas internacionales en agricultura—AGRIS, AGRICOLA y CABI en línea—por lo cual tienen que recurrir a las versiones impresas. La introducción al servicio del usuario de productos como el CD-ROM ha puesto al alcance de los estudiantes la búsqueda en computador en bases de datos bibliográficos internacionales. Después de un período de prueba, se pusieron al servicio de los usuarios de la biblioteca AGRICOLA en CD-ROM y Current Contents en disquete (CCOD). Para evaluar estos medios, se solicitó a usuarios no adiestrados que llenaran un cuestionario después de hacer la búsqueda en AGRICOLA en CD-ROM o en CCOD. La información recolectada ayudó a que el personal de la biblioteca evaluara objetivamente los productos y respondió varios interrogantes en relación con los mismos.

ZUSAMMENFASSUNG: Die Bibliothek der landwirtschaftlichen Universität Wageningen ist bestrebt, dem Endbenutzer einen leichten Zugang zu landwirtschaftlichen bibliographischen Datenbasen anzubieten. Bibliotheksbenutzer können per

Computer im Katalog der landwirtschaftlichen Bibliotheken der Niederlande (Agralin) oder mit Unterstützung von Informationsspezialisten in internationalen Online-Datenbasen recherchieren. Hohe Kosten verhindern die Online-Nutzung der internationalen bibliographischen Quellen auf dem Gebiet der Landwirtschaft AGRIS, AGRICOLA, und CABI durch die meisten Studenten. Sie müssen die gedruckten Versionen zu Rate ziehen. Die Einführung von Endbenutzerprodukten wie CD-ROM haben Computerrecherchen in internationalen bibliographischen Datenbasen für Studenten erschwinglich gemacht. Nach einem Testzeitraum wurde AGRICOLA auf CD-ROM und Current Contents auf Diskette (CCOD) für Bibliotheksbenutzer eingeführt. Um diese Medien zu bewerten, wurden ungeübte Endbenutzer gebeten, einen Fragebogen nach einer Recherche in AGRICOLA CD-ROM oder CCOD auszufüllen. Die so gewonnenen Informationen halfen dem Bibliothekspersonal, die Produkte objektiv zu bewerten und beantworteten eine Menge von Fragen im Zusammenhang mit den Produkten.

Introduction

The Library of the Agricultural University, in Wageningen, the Netherlands is situated in the "Jan Kopshouse" which is shared with the Centre for Agricultural Publishing and Documentation, Pudoc. We have a common management, the Chief Librarian of the University is also the director of Pudoc, and we share computer facilities. The Library acts as a national library resource centre and Pudoc is the national centre for AGRIS input. We subscribe to 12,000 current periodicals, and the collection of monographs is 300,000 titles. An agricultural union catalogue is maintained for the collections of the Agricultural University, of the research institutes of the Ministry of Agriculture, Nature Management and Fisheries, and of other centres that have strong liaisons with agriculture, many of them outside Wageningen. The catalog is maintained on a Hewlett-Packard minicomputer.

The Library has a national function and serves a wide variety of users: research workers, students from Dutch and Belgian agricultural universities, agricultural colleges, stu-

dents from abroad on international Masters of Science courses and visitors on sabbatical leave. Through a menu-driven on-line public access catalogue (OPAC), visitors can freely consult the data base. International on-line data bases are also searched by staff of the Library or Pudoc on request. As the costs of such searches have to be recovered, students occasionally use such services.

The number of data bases available on CD-ROM has had a major impact on users attitudes and costs. To evaluate these phenomena, we installed two test facilities: a PC with a Philips CD-ROM player permitting access to United States National Agricultural Library's AGRICOLA and to the Royal Netherlands Tropical Institute's Abstracts on Tropical Agriculture (ATA) and a PC on which Current Contents on Diskette, Life Sciences (CCOD—Life Sciences), was available. Both work stations are situated in the area open to the public and visitors who used these products were asked to fill out a questionnaire. Reference librarians were available to offer assistance when needed and to ensure proper use of the equipment.

The User Population

Our evaluation aimed at getting answers to the following questions:

- Has accessibility of agricultural information improved?
- Has there been a better satisfaction to the need of bibliographic information?
- How user-friendly is the search software?
- Does use of these new media require more supervision and assistance by library staff?
- Is there a need for other data bases on CD-ROM or diskette?
- Is there a need for similar facilities at other centres, e.g. branch libraries or institutes outside Wageningen?

Of 120 users, 60 returned the questionnaire with 16% using CCOD—Life Sciences, 82% using the CD-ROM facilities and 2% using both facilities. The most of the CD-ROM users were students while the most of

the CCOD—Life Sciences were scientists. A possible reason could be that only CCOD—Life Sciences was available at that time and it might not have met the students' need for broad agricultural information. The user breakdown for the product appears in Table 1.

Table 1 – Patrons Using CD-ROM Products by Type

Users	CCOD	CD-ROM
Students	17%	53%
Scientists	50%	27%
Library staff	2%	9%
Others	31%	11%

Search Results

The results of the major questions about the search results are presented in Table 2. Based on discussions and evaluation of the strategies used, our impression is that roughly half of the users had tried to improve their search results by amending their strategy by using additional search terms.

Table 2 – General Expectations about the CD-ROM Products

Response	Proportion of Users
Enough references	50%
Less than expected	23%
More than expected	13%
No answer	14%

We also asked the users what percentage of the references was found relevant and to what extent users were satisfied with the total results. These are presented in Table 3 and Table 4.

Although 32 of the users had a precision rate of less than 25%, the general satisfaction was high with 74% of the respondents rating the results "good" or "very good". Comments from the 9% rating the results "not good" included search technique

Table 3 – Relevant References Found

Precision	Respondents
100–75%	10%
75–50%	20%
50–25%	36%
less than 25%	32%
no answer	2%

Table 4 – User Satisfaction

Category	Respondents
Very good	8%
Good	66%
Mediocre	10%
Not good	9%
No response	6%

too difficult; data bases offered did not meet disciplinary requirements; and less relevant titles found than expected.

User Friendliness of the System and Staff-support.

Table 5 reflects the users view on the help function, on-screen menu, function keys, manual, and the assistance of the library staff. Because of the small sample, we did not present these figures for each of the three systems separately. Eighty per cent found searching easy and 18% found it difficult. Of the three modules, AGRICOLA on SilverPlatter scores best with its on screen menus and function keys and all users found these easy to use. None of the users found the printed versions, Bibliography of Agriculture and Abstracts on Tropical Agriculture easier to use but 16 of the users of CCOD, found the machine-readable form more diffi-

Table 5 – Evaluation of CD-ROM Assistance

"Tools"	very good	good	mediocre	poor	not used
Help function	3%	48%	27%	9%	3%
On-screen menu	5%	47%	37%	3%	—
Function keys	2%	42%	19%	—	—
Manual	12%	28%	26%	4%	13%
Library staff	20%	37%	7%	6%	30%

cult to use. The figures of the library staff-support are not conclusive because the staff became more enthusiastic as the experiment proceeded and for some users they seemed to be real magicians just by striking keys initially overlooked by the users. This enthusiasm spread to the users who got more and more excited and some of them wanted to download complete databases. One user, without having any previous knowledge of PCs or retrieval tried everything including things that did not even exist. Neither hardware nor software could stand up to that ingenious kind of treatment, and the staff were driven to despair. This particular user wrote on his questionnaire: "I like the system very much, but I think the staff cannot cope with my enthusiasm."

Conclusions

For end-users who can't afford a paid on-line search, CD-ROM has

proved a successful extension to the library's information services. Their search results would have been much better if only they had more training in logic, Boolean operators and vocabulary control. Access to these media greatly enhances user's motivation to search literature; 96% responded that they intended to use CD-ROM more often. There was a need for uniformity in retrieval languages; users experienced the different ways of searching as confusing. SilverPlatter will soon supply most major data bases related to agriculture and allied disciplines so it offers an attractive product. Users are asking for more data bases on CD-ROM and there is a need to install similar facilities in branch libraries. We currently subscribe to six CD-ROMs: AGRICOLA, CRIS, ATA, BIOSIS, AGRIS, and CABI. As long as there is not a good multi-user solution, printed versions are still needed.

Searching for Forestry Information in Multidisciplinary Research

Alois Kempf

Keywords: forestry; networks; information sources

ABSTRACTS: Following the definition of the FAO, forestry is considered to be part of the agricultural sciences. Recent developments are strengthening this relationship. Forest scientists now do research with an ecological or a socioeconomic approach. To satisfy these information needs scientists have to use a variety of information sources from different research fields. This paper gives a short introduction to forestry information services, with special emphasis on reference databases. Various strategies for on-line searching are presented and technological developments which have an influence on the dissemination of forest-related information are described. The problem of identifying the right people, institutions or documents for a specific topic is discussed with reference to European examples. It is concluded that existing personal and institutional networks for both end-users and intermediaries should be intensified to get an appropriate orientation in the still increasing mass of data and knowledge.

RÉSUMÉ: Selon la définition de la FAO, la sylviculture est comprise dans les sciences agricoles. Des développements récents renforcent ce lien. Les scientifiques en sylviculture font à présent, de la recherche avec une approche plus écologique ou plus socio-économique. Pour satisfaire les besoins en information, ils doivent utiliser une variété de sources d'information de différents domaines de la recherche. Cet article nous donne une brève introduction aux services d'information forestière avec un accent particulier sur les bases de références. Il présente différentes stratégies pour la recherche en ligne et décrit les développements technologiques qui ont une influence sur la distribution de l'information sur la forêt. Le problème de l'identification des spécialistes, institutions et documents pour un sujet bien précis est étudié en se référant à des exemples européens. L'article

conclut qu'il faut augmenter le personnel et les réseaux institutionnels existants pour les utilisateurs aussi bien que les intermédiaires, afin d'obtenir une orientation appropriée dans la masse toujours croissante de données et de connaissances.

RESUMEN: De acuerdo con la definición de la FAO, las ciencias forestales se consideran parte de las ciencias agrícolas. Los avances recientes confirman esta relación. Actualmente, los científicos en ciencias forestales investigan con un enfoque más ecológico o más socioeconómico. Para satisfacer estas necesidades de información, los científicos tienen que hacer uso de una variedad de fuentes de información de diferentes campos de la investigación. Este trabajo proporciona una breve introducción a los servicios de información en ciencias forestales, con énfasis en las bases de datos de referencia. Se presentan diversas estrategias para la búsqueda en línea y se describen los avances tecnológicos que afectan la disseminación de información en ciencias forestales. Se discute el problema de la identificación de las personas, instituciones o documentos adecuados en un tema específico, y se dan ejemplos de casos en Europa. Se concluye que se deben intensificar el personal y las redes institucionales actuales al servicio de los usuarios e intermediarios, para lograr una orientación adecuada del cada vez mayor volumen de datos y conocimiento.

ZUSAMMENFASSUNG: Wenn man der Definition der FAO folgt, so ist die Forstwirtschaft als ein Teil der Landwirtschaftswissenschaften zu betrachten. Die jüngsten Entwicklungen bestätigen dieses Verhältnis. Die von den Forstwissenschaftlern gegenwärtig betriebene Forschung besitzt einen stärker ökologischen oder sozioökonomischen Bezug. Um hier Informationsbedürfnisse zu befriedigen, müssen die Wissenschaftler Informationsquellen aus verschiedenen Forschungsgebieten verwenden. Der Aufsatz gibt eine kurze Einführung in die forstwirtschaftlichen Informationsdienste, wobei der Schwerpunkt auf den Auskunftsdatenbanken liegt. Verschiedene Strategien für

Online-Recherchen und technologische Entwicklungen, die Einfluß auf die Verbreitung forstbezogener Informationen haben, werden beschrieben. Das Problem, die richtigen Menschen, Institutionen oder Dokumente für ein spezifisches Thema zu ermitteln, wird unter Bezug auf europäische Beispiele diskutiert. Es wird der Schluß gezogen, daß das vorhandene Personal und institutionelle Netze sowohl für die Endbenutzer als auch für die Vermittler intensiviert werden sollten, um eine angemessene Orientierung in der noch steigenden Informations- und Wissensflut zu erreichen.

Introduction

Forests are like chameleons, they change their physiognomy according to their surroundings. Seasonal changes, geographical variations, and many site features form a constantly changing pattern which scientists call the forest ecosystem. While some scientists are looking at the trees, others are analyzing the soils and a third group is monitoring the wildlife population. Still others are enumerating the economic and social aspects of forests like afforestation programmes, recreational activities or tree felling. Thus, searching for information in forest science means collecting data from many disciplines.

This presentation will give a short introduction to the variety of forestry information sources and discuss some developments that affect the way forest information is disseminated and retrieved. As far as technological change is concerned, information specialists from the agricultural field are quite familiar with the current trends. Forestry is, however, a much smaller sector in terms of manpower and funds than agriculture in general. This fact

Figure 1 – Number of documents retrieved with “forest tree(s)” and “fagus” in selected databases, 1985–1989

forest (tree; trees)				Database name	fagus			
IX	CT	TI	AB	(ED = 85 to 89)	IX	CT	TI	AB
2058	1829	323	5	AGRICOLA	323	316	71	1
3584	3168	621	33	AGRIS	1034	191	184	10
10	4*	6	0	BIOLIS	337	337*	4	0
426	51*	204	231	BIOSIS Previews	553	394*	151	376
2458	1413	308	532	CAB Abstracts	1294	1236	129	446
1615	737	285	297	CAB Forestry	1214	1187	124	384
185	0	183	3	ELFIS	831	633	76	8
37	10	12	21	ENVIROLINE	4	0	2	2
73	0	72	2	PHYTOMED	232	232	33	3
448	324	126	0	SCISEARCH**	107	0	107	0

Key to abbreviations: IX: Basic Index field
 CT: Controlled Terms field
 TI: Title field
 AB: Abstract field

*Results of UT-field (Uncontrolled Terms)
 **“Research fronts” in the CT-field

Source: DIMDI, March 1990 / Entry date: 1985–1989

could explain the small number of forestry publications within IAALD (e.g. Evans 1988, Schrader 1987).

Diversified Forestry Information Services

One has to go through descriptions on forestry documentation from the 1960s or 1970s (Beak 1967, Evans 1979, White 1978) to realize how much the situation has changed. Today, scientists still read printed journals or use secondary information sources in printed form such as *Forestry Abstracts*, *Forstliche Umschau*, and *Social Sciences in Forestry*. Scientists also have information available on a microfiche, a diskette, a compact disk, or in an on-line version on several host systems. Moreover, scientists can subscribe to special services for the selective dissemination of information (SDI), called “Alerts”, “Current Awareness Service” or “Standard Profiles”. This selective dissemination of information is available in turn in different media. Databases such as AGRICOLA, BIOSIS, CAB Abstracts, PASCAL or SCISEARCH are good examples of this technological diversification.

Which choice will a scientist make to satisfy his information needs? Will he accept the end-user role and work with the new media? Will he use the menu-driven form of on-line databases? Will he take advantage of the

specialized knowledge of library staff or will he ignore the mass of publications and rely on correspondence between peers and on gatherings of special interest groups? We must leave open these questions for lack of empirical data. Forestry is apparently not a preferred subject for investigations in information science (see references in Kempf and Louis 1988) and forestry-related databases are usually discussed together with those in agriculture (Armstrong and Large 1988: 350-352).

Forestry Information in Bibliographic Databases

It is difficult for indexers to find an idea that covers all aspects of forest science. Database producers have chosen different ways to solve this problem. In AGRICOLA, AGRIS and ELFIS there are subject codes starting with the letter K. AGRICOLA uses a cross-reference practice (K001), in addition to the *CAB Thesaurus*. BIOSIS has the subject code 53500 for “Forestry and forest products” as well as the biosystematic codes for plants and animals. In CAB a forestry subunit covers the abstract journals *Forestry Abstracts*, *Forest Products Abstracts* and *Agroforestry Abstracts*. The “research fronts” in SCISEARCH represent a special type of indexing.

Another useful search strategy is to limit a search to forest tree species. Two examples in Figure 1 illustrate

what one gets as references and why from various databases. The results remind us to be aware of database structure and database coverage. BIOSIS, CAB and ENVIROLINE include abstracts. BIOLIS and ELFIS cover biological and agricultural literature in German. AGRIS uses a multilingual thesaurus, PHYTOMED a bilingual one. BIOSIS and SCISEARCH translate all original titles into English.

Figure 1 does not list all bibliographic databases relevant to forest science. Often one has to use cross-searching techniques, on-line thesauri, and statistical analysis of results to find the appropriate database and the right terms (Piternick 1989). One can browse through the indexes of different database fields as terminology in forest science is not as standardized as it should be. Some host systems support this search behaviour with their new price policy to the benefit of both end-user and intermediary.

Networks for Forestry Information

For two reasons, I would like to draw your attention to the International Union of Forest Research Organizations, IUFRO. IUFRO represents for many scientists a valuable forum for exchanging information between colleagues. A IUFRO list, dated January 1990, shows 241 subject and

project groups. These research units cover almost every aspect of forest science, for example **Forest hydrology, Impacts of air pollution on forest ecosystems, Forest operations in the tropics, Wood processing and Forest history**. Three units are concerned with information work: *S6.03 Information systems and terminology* (Kempf 1988), *S4.02-04 Geographic and management information systems*, and the project group *P6.01 Forest Decimal Classification System, FDC* (Schenker 1988), which will be publishing a short version of its classification in English, French and German this year. The IUFRO Secretariat has been substantially re-organized since 1986 to provide new premises, permanent staff, modern telecommunication facilities, and the creation of a bibliographic database containing publications from IUFRO meetings. The IUFRO Secretariat will become an additional referral service for forest scientists (Schmutzenhofer 1988).

Other organizations like the FAO (Hilmi 1986) or research institutions like the International Council of Research in Agroforestry, ICRAF, contribute to the diffusion of results in forest science (Labelle 1987). Forestry libraries and information centres have traditionally played an important role in localising and delivering original documents. Recently they have become partners in the production of bibliographic databases or have built their own reference tools on a regional or national level. In France, Nancy and Champenoux supply data for AGRIS and PASCAL. The German database ELFIS receives input from Hamburg and Vienna. The forestry library in Helsinki produces the FINFOR database, which is part of

the Finnish KATI database. The trend of catering to special user groups has also led to improved document delivery, as examples from France and Yugoslavia show. It appears that the most advanced institution that is "networking forest information and services" (Rutherford 1987) is the FS-INFO of the U.S. Forest Service (see also Yerke 1971). Similar networks that I am not aware of may be running in other parts of the world. It will be a task for the future to intensify the existing personal and institutional networks in forestry. IAALD and IUFRO S6.03 activities can contribute to the promotion of these objectives.

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Overcoming Constraints in an Academic Library

The University of Zimbabwe Veterinary Library: Information for the Scientist

Lorraine Mutewera

Keywords: veterinary medicine; information services

ABSTRACT: A brief history of the University of Zimbabwe Veterinary Library is presented including the original setup and the change to branch status of the Main University Library system. The problem of running a casual library as well as the constraints of becoming a full fledge library are presented. The lack of computers in the whole library system rules out the concept of information at your finger tips. Everything is done manually so Selective Dissemination of Information is too time consuming and is not at all practical. The problems of funding, manpower, and electronic equipment and ways in which some of these problems were solved are discussed. Solutions include rearranging the book fund, arranging a document delivery with Utrecht University Library, and arranging funds to purchase a CD-ROM product. Current awareness was established by photocopying contents pages of incoming journals and disseminated to all staff members.

RÉSUMÉ: L'installation originale et le changement de statut vers une unité dépendante du système de la bibliothèque principale sont présentés à travers une brève histoire de la bibliothèque vétérinaire de l'Université de Zimbabwe. Le problème de gestion d'une bibliothèque temporaire, ainsi que les contraintes du changement vers une bibliothèque en titre, sont présentés. L'absence d'ordinateurs dans le système de la bibliothèque écarte le concept de l'information disponible aux bouts des doigts. Tout se fait à la main et la DSI est très lente et pas pratique du tout. Les problèmes de financement, de main-d'oeuvre et d'équipement électronique et les manières de résoudre certains de ces problèmes sont décrites. La réorganisation du fond documentaire, l'organisation d'un service de fourniture de

documents avec l'Université d'Utrecht, et l'obtention de fonds nécessaires à l'achat d'un produit CD-ROM sont des solutions. Un bulletin des sommaires des périodiques a été créé et est diffusé à tout le personnel.

RESUMEN: Brevemente se presenta la historia de la biblioteca de la Universidad de Zimbabwe, incluyendo la organización inicial y el cambio al estatus de rama del sistema de la Biblioteca Central Universitaria. Se discuten el problema de manejar una biblioteca improvisada y las limitaciones de convertirse en una biblioteca organizada. La falta de computadores en todo el sistema de la biblioteca elimina el concepto de acceso inmediato a la información. Como todo se hace manualmente, la Diseminación Selectiva de Información es demasiado lenta y no resulta nada práctica. Se discuten los problemas de financiación, mano de obra y equipo electrónico, y las soluciones a algunos de estos problemas. Estas incluyen la reorganización del fondo de libros, la organización del envío de documentos con Utrecht University Library y la organización de fondos para adquirir un producto en CD-ROM. Se estableció un servicio de alerta en el cual se fotocopian las páginas de contenido de las publicaciones periódicas que llegan a la biblioteca, que se envían a todo el personal.

ZUSAMMENFASSUNG: Eine kurze Beschreibung der Veterinärbibliothek der Universität von Zimbabwe wird gegeben einschließlich ihres ursprünglichen Aufbaus und ihres Wechsels zu einer Zweigstelle des Main University Library Systems. Das Problem der Führung einer Gelegenheitsbibliothek wie auch die Zwänge, eine voll leistungsfähige Bibliothek zu werden, werden dargestellt. Der Mangel an Computern im gesamten Bibliothekssystem lassen das Informationskonzept auf Knopfdruck nicht zu. Alles wird von Hand gemacht, so daß die selektive Informationsverteilung zu zeitaufwendig und nicht im geringsten praktisch ist. Probleme mit

Mitteln, Arbeitskräften und elektronischer Ausrüstung sowie Wege, wie einige dieser Probleme gelöst wurden, werden diskutiert. Die Lösungen sind u.a. die Umordnung des Buchbestandes, die Einrichtung einer Dokumentenversorgung mit der Utrechter Universitätsbibliothek und eines Fonds zur Beschaffung von CD-ROM-Platten. Eine laufende Information wurde durch das Photokopieren von Inhaltsübersichten der eingehenden Zeitschriften und deren Verteilung an das gesamte Personal eingeführt.

The Veterinary Library of the University of Zimbabwe is the youngest of the branch libraries of the University of Zimbabwe, inaugurated in September 1986. Its existence came about as a result of the veterinary faculty requesting the main library for assistance in opening a specialized branch library. A room was already available within the faculty that was equipped with shelving and audio visual equipment that included cassettes and a microfiche reader funded by the European Economic Community (EEC).

When it first opened, the only services offered were reference service and the circulation of material. The collection consisted of 900 volumes and 20 periodical subscriptions and there was seating space for 25 students.

The initial emphasis was on ensuring that proper records were created for the book stock that had been moved from the Main Library. Library of Congress Subject Headings (LCSH) were chosen for subject analysis over the classified catalogue that was used in the main library. It was felt that LCSH would adequately meet

the needs of a specialized library. The users responded favorably as they had better subject access than users using the main library catalogue.

The veterinary faculty had received a donation of £100,000 sterling from Barclay's Bank, London, in 1982 for the purchase of books and library equipment and had been under utilized until the inception of the Veterinary Library. The veterinary librarian initiated a book ordering campaign by circulating relevant publishers catalogues to all members of staff. This led to problems such as, over ordering, including irrelevant titles, and the Faculty representative to the library committee was used to weed out the irrelevant orders. Today the Veterinary Library has the most recent books not only in veterinary medicine, but also in the biological sciences and general medicine and has become popular with students and staff from these other two faculties.

There has been an active controversy between the Main Library, the faculty and the veterinary librarian on whether some of the Barclay's Bank money should be used for an electronic security system. There is a growing theft problem that will become even more of a problem as we become more popular with the other faculties. The veterinary librarian feels some of the money should be spent on the security equipment to protect the collection. The faculty and the university librarian feel that the theft problem can be contained without having to buy the system. In 1986, eight volumes were lost, in 1987, nine volumes and in 1989, twelve volumes were missing. These figures may not sound alarming compared with the rest of the University Library system, but when you consider the cost of the scientific book, an electronic system that would reduce book theft to zero would pay for itself within a very short span of time. The veterinary librarian has not given up hope and will carry on trying to convince all parties concerned that an electronic system would be worthwhile.

In early 1987, with the help of the

faculty, the Veterinary Library managed to acquire a photocopier that was a great help since students did not have to look for photocopying facilities. The Veterinary Library acquired a photocopier before some of the older branch libraries. The veterinary faculty has been a great help in developing the library and has an advantage over other faculties in that it was funded by the EEC and there is still an active EEC programme of cooperation.

Whenever the library has had a problem the faculty has always come in to help in whatever way they could. In 1989, the veterinary librarian was included in an active programme of cooperation existing between Utrecht University Veterinary Faculty and the University of Zimbabwe Veterinary Faculty. This was a learning experience for her as she was attached to Utrecht Veterinary Library for two weeks that gave her an insight on how information can be at your finger tips in a fully automated library. She also got to choose books and periodicals that were part of the excess book stock that had resulted from the different University Veterinary Departmental libraries amalgamating into one big library. On this study tour the veterinary librarian also visited veterinary libraries in the United Kingdom.

Soon after the Veterinary Library was opened it was discovered that there were some books that were very heavily used so a small reserve section was opened with books that could not be loaned for more than a day. The rest of the material in the Veterinary Library is on short term loan as well and only goes out for 3 days. All faculty support this practice because it discourages users from hoarding books.

Individual current awareness was started for members of the staff but it turned out to be too time consuming and cumbersome as it was being done manually. Having to get the relevant articles through inter-library loans was also a hindrance since we did not receive most of the cited journals. As an alternative we started circulating

the contents pages of incoming journals and this has turned out to be more effective and practical.

A project proposal was submitted to EEC by the veterinary librarian for AGRICOLA on CD-ROM and the EEC agreed to fund it. This is the most significant thing that has happened to the Veterinary Library since it opened and we hope it will be up and running by the end of September. Through the continuing programme of exchange cooperation that the faculty has with the EEC, the University of Zimbabwe Veterinary Librarian has set up a document delivery service that will be funded by the programme, which will be useful when we start operating the CD-ROM as our periodical subscriptions only stand at 39.

Periodical subscriptions have been a source of concern for the Veterinary Library. In 1987, we were requested to cut our periodical subscriptions by half. This was a great blow to the faculty since they depend on journals for more current information. Since then there have been fewer funds available for periodicals and to circumvent the problem some of the Barclay's Bank money has been diverted to periodicals. There is enough money in the account to cover five years of subscriptions and we hope by the time the money runs out we will have found alternative funding sources. About half of our subscriptions are being covered by this fund.

The Veterinary Library now has its own accessions list that is circulated to most members of the Zimbabwe Veterinary Association. The Veterinary Library also has an exchange programme with 33 other institutions for the Zimbabwe Veterinary Journal.

One of the controversial issues that came up right after the Veterinary Library was opened was whether it was to be open after hours. The faculty wanted this service but the library needed extra manpower to do it. Finally a compromise was reached where the library was open to 10:45 P.M. on two nights a week. This service operated for a full 1 1/2 years before the library decided to discon-

tinue it because of poor use and we are back to closing at 4.30 P.M.

One of the policies of the University Library system is that all branch librarians should do their own cataloguing and this is done at the Main Library. This in turn leads to considerable lengths of time away from one's library meaning that the librarian is not always available to the user. The veterinary librarian spends about 2 1/2 days in the Main Library cataloguing out of a five day week. The branch librarians are campaigning to have their cataloguing handled by the Main Library so they can have more time with their users.

Members of the Zimbabwe Vet-

erinary Association also have access to the library. In 1988 only seven of them were using the library but by 1989 seventeen members had come in and consulted the library. Visiting lecturers have commented on how well stocked our library is. We now have 2,700 volumes and subscribe to 39 periodical titles. The additional use has caused us to look for more seating. An indication of how well our service is doing is that circulation has increased from 7,538 to 10,009 in two years.

Resource sharing is being promoted by the information section of the Southern African Centre for Co-ordination of Agricultural Research

in the SADCC Region (SACCAR). Two workshops have been held co-sponsored by CTA and SACCAR. Communication in the region is poor and ways of improving communication should be considered such as fax machines.

Our future projections are to turn our library into the Agriculture and Veterinary Science Library. We are looking into moving the animal science collection from the Main Library to the Veterinary Library. We hope we will be one of the first libraries in the University of Zimbabwe library system to automate our book stock.

Provision of Agricultural Information to Farmers and Extension Officers: A Catalyst in Increased Agricultural Production in Africa

L.O. Aina

Keywords: rural extension, adult farmer education, library services, Africa

ABSTRACT: Agricultural information needs of extension officers in Africa are identified as control of major pests, credit and co-operatives, proper handling of insecticides, marketing of agricultural products etc. The information needs of farmers are identified to be in areas of the supply of fertilizers, pest and diseases control, planting materials and credits and loans. The emphasis on information needs of farmers is on "why", "who", "where" and "how" to obtain information. In order to understand the information needs of their client, librarians' and information specialists' training and education should be re-oriented to include courses on agricultural sciences, rural sociology, adult education and computer sciences. The University of Botswana will start a certificate programme in agricultural information with the support of the Technical Centre for Agriculture (CTA), which is sponsoring the General Programme for Education in Agricultural Information, PROGEFIA. With the provision of appropriate and timely agricultural information to extension officers and farmers, an increase in agricultural production in Africa may be attained.

RÉSUMÉ: Les besoins en information agricole des vulgarisateurs en Afrique sont, après identification, le contrôle des principaux parasites, le crédit et les coopératives, l'utilisation correcte des insecticides, la commercialisation des produits agricoles, ... Les besoins en information des agriculteurs relèvent du domaine de la fourniture d'engrais, du contrôle des par-

asites et des maladies, de l'équipement de plantation, de crédit et de prêt. L'accent sur les besoins en information des agriculteurs est sur "pourquoi", "qui", "où" et "comment" obtenir l'information. Afin de comprendre les besoins de leurs clients, la formation et l'éducation des bibliothécaires et des spécialistes en information devraient être réorientées pour inclure des cours sur les sciences agricoles, la sociologie rurale, la formation pour adultes et l'informatique. L'Université de Botswana va lancer un programme de certificat en information agricole avec l'aide du Centre Technique de Coopération Agricole et Rural (CTA), aux Pays-Bas, qui parraine le Programme Général de Formation en Information Agricole, PROGEFIA. En fournissant à temps, une information agricole appropriée aux vulgarisateurs et agriculteurs, on pourrait arriver à une croissance de la production agricole.

RESUMEN: Las necesidades de información agrícola de los agentes de extensión en África se identifican en las áreas de control de las principales plagas, crédito y cooperativas, manejo adecuado de insecticidas, mercadeo de productos agrícolas, etc. Las necesidades de información de los agricultores se identifican en las áreas de suministro de fertilizantes, control de plagas y enfermedades, material de siembra, y acceso a créditos y préstamos. Se enfatizan las necesidades de información de los agricultores en términos de "por qué", "quién", "dónde" y "cómo" obtener información. Para comprender las necesidades de información del usuario, se deben reorientar la capacitación y la educación de los bibliotecarios y especialistas en información, de manera que incluyan cursos en ciencias agrícolas, sociología rural, educación para adultos y ciencias de la computación. La Universidad de Botswana com-

enzará un programa de certificado en información agrícola con el apoyo del Centro Técnico para la Agricultura (CTA), ubicado en los Países Bajos, el cual está auspiciando el Programa General de Capacitación en Información Agrícola, PROGEFIA. Con el suministro de información agrícola adecuada y oportuna a los agricultores y a los agentes de extensión, es posible lograr un aumento en la producción agrícola de África.

ZUSAMMENFASSUNG: Die Informationsbedürfnisse von Landwirtschaftsberatern in Afrika werden mit Bekämpfung der Hauptschädlinge, Kredit und Bereitschaft zur Zusammenarbeit, ordnungsgemäßem Insektizidumgang, Handel mit landwirtschaftlichen Erzeugnissen usw. identifiziert, die Informationsbedürfnisse der Bauern dagegen mit Düngemittelzufuhr, Bekämpfung von Schädlingen und Krankheiten, Pflanzenmaterialien sowie Krediten und Darlehen. Die Betonung bei Informationsbedürfnissen der Bauern liegt auf "warum", "wer", "wo" und "darauf", wie man Informationen erhält. Um die Informationsbedürfnisse ihrer Kunden zu verstehen, sollte die Ausbildung der Bibliothekare und Informationsvermittler umorientiert werden und Kurse in Landwirtschaftswissenschaften, Agrarsoziologie, Erwachsenenbildung und Computerwissenschaften einschließen. Die Universität von Botswana will ein Programm mit Abschlußexamen auf dem Gebiet der Agrarinformation mit Unterstützung des Technical Centre for Agriculture (CTA), Niederlande, starten, welches das General Programme for Education in Agricultural Information, PROGEFIA, sponsert. Mit der Lieferung geeigneter und rechtzeitiger landwirtschaftlicher Informationen an Berater und Bauern dürfte eine Zunahme in der landwirtschaftlichen Produktion Afrikas erreicht werden.

Introduction

Africa has an active population of 231,411,000 and is primarily an agriculture dependent continent with 64.3 percent of the active population engaged in agriculture (FAO Yearbook, 1988). In recent years, attention has been focused on the provision of agricultural information to all agricultural information user populations including policy makers, research scientists, planners, extension officers and farmers. This is because most agricultural libraries in the Continent tend to concentrate on the provision of information to research scientists and to a lesser extent, policy makers. The provision of agricultural information to farmers and extension officers is neglected and this hinders increased agricultural production in Africa. This predicament is not peculiar to Africa and according to Gregorio and Sison this problem also exists in the South East Asia. Some studies have revealed that extension officers and farmers need information just as the research scientists and policy makers (Russell 1983; Aina, 1985; Nampoya 1986). This paper will identify areas of activity where information can be provided by agricultural libraries to farmers and extension officers, and how the training of librarians and information specialists can be adapted to meet these needs.

Information Needs of Agricultural Extension Officers

Agricultural extension officers occupy a strategic position in the agricultural production cycle. They link between the farmers and research scientists, and between farmers and policy makers. Thus a constant supply of appropriate information to this group of agricultural information users will enhance the quality of information they provide to farmers, researchers and policy makers: This need becomes more important in the era of integration of research, extension and training effort for the purpose of serving the farming community and the

Table 1 – Ratio of Farmers to Agricultural Extension Officers in the Southern African Region, 1984/85

Country	Agricultural Labour Force	Extension Officers	Ratio of Extension Officers to Farmers
Botswana	783,020	525	1:1500
Lesotho	1,426,800	972	1:1500
Malawi	5,376,000	3,183	1:1700
Swaziland	453,750	359	1:1300
Tanzania	16,884,000	6,113	1:2800
Zambia	3,804,930	2,175	1:1700
Zimbabwe	5,950,000*	2,047	1:2900

Source: Eyomo, M.L. 1987. "The Current status of Agriculture in SADCC Region and the Need for Trained Manpower for Agricultural Research, Extension and Training". In *Appropriate Manpower for Agricultural Research and Extension in the SADCC countries. Proceedings*. Edited by P.J. Boyle. Gaborone, SACCAR, 7.

*FAO Production Yearbook, 1985.

agricultural industry. Taylor (1989) has advocated a full integrated system of both research and extension with a view of working together and serving the farmers together. Providing information only to the research scientists without providing the same to agricultural extension officers, will negate the desirability of integration. In Africa the ratio of agricultural extension officers to farmers is inadequate and an adequate supply of information will lighten the burden of extension officers. Table 1 shows the ratio of agricultural extension officers to farmers in the Southern Africa region in the 1984/85 season.

The average ratio of extension officers to farmers in Southern Africa is 1:1900 and the situation is not better in the other parts of the Continent. As of 1974, the ratio of extension officers to farmers in Nigeria was 1:20,000 but the recommended ratio of extension officers to farmers is 1:750 (Williams 1974). With this alarming ratio in Africa many farmers may never come in contact with extension officers so many farm problems may never come to the attention of extension officers. If public libraries in the various rural districts or local government agencies are able to document these farm problems and make them available to agricultural libraries, then extension officers through agricultural libraries will be aware of farm problems and they would be able to call these problems to

the attention of research scientists so they can find solutions to the problems.

There are many other areas in which extension officers need information. In a study I conducted in 1986 with seventy-three agricultural extension officers in Nigeria, I found that extension officers had a variety of agricultural information needs (Aina 1986). A rank order of their expressed information needs is listed in Table 2.

It appears from the Table, that extension officers would need information in a variety of areas, which could be supplied by agricultural libraries. In the same study, it was found that extension officers rarely used the libraries as a source of agricultural information but depended on their bosses and colleagues and to a lesser extent on salesmen of agro-based industries. From Table 2 it is obvious that agricultural libraries can supply information that would meet some of their needs, by making available, annual reports, manuals, handbooks, brochures or catalogues of agro-based industries, newsletters, directories of agricultural commercial firms/research institutes, consultancy reports, Hansards, to name a few.

Information Needs of Farmers

Most farmers in Africa are illiterate, yet it is possible for agricultural libraries to supply agricultural information to farmers. It has been

Table 2 – A Rank Order of Expressed Information Needs by Agricultural Extension Officers

Information Need	Relative Frequency (%)	Rank Order
Control	76.7	1.0
Credit and co-operative	74.0	2.0
Proper handling of insecticides	74.0	2.0
Marketing system of agricultural products	72.6	4.0
Field supervision of programme	68.5	5.0
Organising farmers' association	68.5	5.0
Principles of crop production	65.8	7.0
Conduct of field trials	61.6	8.0
National prices of commodities	58.9	9.0
Legislation on agricultural products	58.9	9.0
Innovation approaches in extension	57.5	11.0
Socio-economic characteristics of farmers	56.7	12.0
Production skills and propagation techniques	56.2	13.0
Community Development	54.8	14.0
Tax relief, tax laws	54.8	14.0
Public land, and procedural laws, land act	53.4	16.0
Animal production and Management	50.7	17.0
Setting up agri-business	49.3	18.0
Provision of electricity supply, pipe borne water etc.	49.3	18.0
Programme planning	43.8	20.0
Experimental designs and technique	43.8	20.0
Administration and supervision	42.5	22.0
Import duties on farm machinery	28.8	23.0
Data analysis and research writing	27.4	24.0
Others (Group action, modern methods of crop production, communication skills)	5.5	25.0

suggested that all what one needs to do is to identify somebody who is literate in the farming community and make him the information gatekeeper (Lawani, 1982). Other farmers will receive information from him on a regular basis, as agricultural libraries could supply various sources of agricultural information to the information gatekeeper. In a study I did with farmers in six rural villages in Nigeria I found that farmers needed information mainly in the areas of fertilizers, pest and disease control, planting materials, and credits and loans. What is apparent from this study is that, farmers want to know, "why", "where" "how" and "who" to see concerning their needs, yet the library can supply the information that will lead to "why", "where", "who" and "how" to obtain information needed.

Conclusions and Recommendations

In order for agricultural libraries to be able to function effectively in

the provision of agricultural information to farmers and extension officers, the education and training of library professionals will have to be re-orientated. There are at present 15 library schools in Africa, eight in Nigeria, one each in Botswana, Ethiopia, Ghana, Kenya, Sierra-Leone, Zambia and Zimbabwe. Some of these library schools have courses on agricultural information, generally elective courses. For this reason I am advocating a Masters degree programme with specialization in agricultural information (Aina, 1989) where rudiments of agriculture, rural development, adult education, sociology and computer science will be taught. Fortunately, the Technical Centre for Agriculture (CTA) in Netherlands is sponsoring the General Programme for the Training of Agricultural Information (PROGEFIA) in developing countries. We, at the University of Botswana are taking an active part in the implementation of this programme and we intend to start a certificate programme in agricultural information. This will ensure

that the graduates of this programme will be able to function effectively in an agricultural extension setting and in a farming community.

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Information for the Mountain Farmer

Anwar Ali Chaudhry

Keywords: agricultural skills; rural extension; appropriate technology

ABSTRACT: Special requirements for delivering information to the mountain farmer and the role of the International Centre for Integrated Mountain Development (ICIMOD) in Nepal is discussed. The need to preserve "local knowledge" to let the system evolve and to introduce the technology that matches the physical and intellectual capabilities of the target group is expressed. The appropriate media to transfer the technology is presented in light of the geographic terrain of the target groups.

RÉSUMÉ: Les besoins spéciaux en information pour les fermiers montagnards, sont discutés ainsi que le rôle du Centre international pour le développement intégré de la montagne (ICIMOD) au Népal. La technologie introduite et la nécessité de conserver la connaissance locale et de laisser évoluer le système, devrait correspondre aux capacités physiques et intellectuelles du groupe cible. On étudie les médias appropriés pour transférer la technologie à la lumière du terrain géographique des groupes cibles.

RESUMEN: Se discuten los requisitos específicos para el envío de información al agricultor rural y el papel del Centro Internacional para el Desarrollo Rural Integrado (ICIMOD) de Nepal. Se trata la necesidad de conservar el "conocimiento local" y de dejar que el sistema evolucione; la tecnología introducida debe estar acorde con las capacidades físicas e intelectuales del grupo objetivo. Se discuten los medios apropiados para transferir la tecnología, teniendo en cuenta el terreno geográfico de los grupos objetivo.

ZUSAMMENFASSUNG: Die speziellen Bedürfnisse von Bergbauern an Informationsvermittlungen und die Rolle des International Centre for Integrated Mountain Development (ICIMOD) in Nepal steht dabei zur Diskussion. Die Notwendigkeit "lokales Wissen" zu erhalten, das System auszuarbeiten und Technologie einzusetzen, sollte zu den physischen

und intellektuellen Fähigkeiten der Zielgruppe passen. Die geeigneten Medien zur Übermittlung der Technologien werden in Hinblick auf die Geographische Lage der Zielgruppen besprochen.

Introduction

The word "mountain" is used as an adjective with the word "farmer" to give prominence to his specific geographic setting. The unique characteristics of his geography distinguish him from the farmer on the plains. This does not imply that nothing is common between the two. The basic and the most important difference is the three dimensional spatiality of the mountain areas that is the prime cause of many unique features, such as diversity of agro-climatic zones because of rapid change of scenarios over short distances, isolation because of inaccessibility, and fragility, erosion and landslides because of the slopes. I have developed the theme of my paper on the premise that the specific geographic, institutional, and socio-economic conditions of the mountain farmer have a direct bearing on the generation, flow, and use of information. To restrict the length of the paper, I will concentrate on the Hindu Kush-Himalayas.

Extension in Mountain Areas According to the Traditional Interpretation

Since we are discussing extension in the mountain environment, it is imperative to analyse the general idea of area specific extension and evaluate its implications for mountain areas. A well-known authority in agricultural extension, A.T. Mosher (1978) has suggested to synchronize the intensity of extension efforts ac-

cording to the potential of the area for increased agricultural production. He has made three categories: areas with immediate growth potential (IGP), areas with future growth potential (FGP), and areas with low growth potential (LGP). According to his classification criteria, most of the mountain areas fall in the LGP category. He recommends maximum investment on extension in IGP, medium in FGP, and low in any extension effort in LGP. He says:

At any time, each country usually also has some areas of *low* (agricultural) *growth potential*. These LGP Areas are places where we have little hope of being able to increase farm production even in the more distant future. The topography is too rugged, or rainfall is very scant, and there is no feasible means of irrigation, or the soil is too saline. These LGP Areas are regions so unpromising that it does not seem worthwhile trying to make them agriculturally more productive. My inclination would be not to introduce extension agents into such areas at all. (Mosher, 1978)

His logic seems justified when one takes into account the investment dynamics measured with the traditional yardstick of cost/benefit ratio. From the equity point of view the mountain farmer needs preferential treatment. Agriculture has been the age old solitary source of livelihood for the mountain dwellers. Today he is hard pressed with the lack of options for gainful employment in activities other than agriculture. According to ESCAP about 71 percent of all workers are engaged in agriculture. If we apply the same logic of cost/benefit ratio to set the priorities for investment to create infrastructure for alternative sources of livelihood, the mountain areas would be

equally unattractive. Let us look at it from another angle. It is obvious that the negative effects of degrading agriculture and the consequent over exploitation of the resource base are not restricted to the mountain areas. These flow downstream under the force of gravity like material things. Dams become silted and floods devastate the plains. In a lighter vein, we can term it as the "remote nuisance value" of the degrading mountains. With serious thinking it becomes the determining factor in cost/benefit analysis of investment, if we include in the benefit the possible saving of rehabilitation costs due to recurrent damages resulting from not investing in greening and sustainability of the mountains.

Components of Information flow

Information transfer process consists of the following four basic components:

**Source → Message →
Channel → Receiver.**

The flow of information is affected by all aspects of any of these components. Because each case prescribes its specific controlling conditions for the communications process, it is essential to know the habits and the habitat of the mountain farmer. It will help to develop suitable extension strategies for the mountain areas by providing empirical criteria to assess the probability of their success. The discussion in this paper covers these four components of information flow to the mountain farmer.

Source of Information and Message

The primary source of extension information is the agricultural research institutes engaged in basic and applied research. For information relating to biological systems, such as plants and animals, adaptive research is necessary before giving any extension information to the farmers for large

scale application. Adaptive research is to see the ability and degree of adaptation of new varieties or breeds and the response of the existing ones to new timings (sowing, maturing), new chemicals (fertilizers, pesticides), new ecozones (altitudes, precipitation, radiations), etc. This site specific research is usually undertaken jointly by the research institutes and the extension agencies. Great diversity of agro-climatic zones within short distances renders adaptive research specially important for mountain areas.

The number of research institutes in or concerned with the mountain areas is very low compared with the plains, even in the same country. In the few existing institutions in the mountains the workers are mainly from the plain areas where most of the educational and training institutions are located. Their orientation is for the plains because no educational institution has special courses in mountain agriculture where subjects like rain-fed agriculture, tropical agriculture, arid and semi-arid agriculture are taught. There is a feeling of hardship and of deprivation of modern amenities among the research workers and there is little motivation. In some countries such as Pakistan, 40 percent of the pay is given as a hardship allowance to those working in the mountain areas but it is not a sufficient attraction for the top level specialists and researchers. This problem hinders the development of appropriate agricultural technology.

International realization of this neglect of the mountains and the resulting degradation of these areas crystallized in the form of the establishment of the International Centre for Integrated Mountain Development (ICIMOD) which began in 1984. Its primary purpose is to promote ecologically sustainable development in the mountains and improve the well-being of their inhabitants. ICIMOD is a multi-disciplinary organization, having Mountain Farming as one of its primary programmes. Taking the practical approach, ICIMOD operates through the concerned national

agencies with minimal field operations. Its primary focus is on policy makers to influence the policies to become optimally favorable for the development of mountain areas. Its strategy is to supplement the national efforts avoiding duplication. Extension in the field remains the national mandate but the comparative reviews of national extension systems is in the purview of ICIMOD. What I am presenting here are my personal views on the subject without implying the recommendations or endorsements of the ICIMOD because the review process is still in progress.

Recently, a new type of information has caught the attention of the experts. It has been given different names, such as indigenous knowledge, local wisdom or traditional skills. In the mountain areas, which are undergoing rapid changes because of the fragility, the utility of indigenous knowledge is very high. It becomes clear from the definition of the indigenous knowledge given as follows:

Indigenous knowledge (IK) is "local knowledge"—knowledge that is unique to a given culture or society. This knowledge is the information base for a society...Indigenous knowledge is dynamic; it changes through indigenous creativity and innovativeness or also through contact with other knowledge systems... Indigenous knowledge often is unknown to or overlooked by development workers seeking solutions to agricultural and rural problems. Indigenous knowledge represents successful ways in which people have dealt with their environment. (Warren, 1989)

A critical problem emerging from intervention of researchers is the rapid erosion of indigenous knowledge. The usual reason for this is the ethnocentric attitude of research scientists, i.e., they consider the indigenous knowledge to be inferior.

In developing extension information, special attention should be paid to the existing farming systems. Because agricultural development is an evolutionary process, we should not try to shift directly from the sickle to

the harvester. The indigenous knowledge should be given due importance. There are numbers of examples where the recommended technologies failed because they totally neglected the local knowledge base. The best approach in the traditional agricultural societies of the mountains is to blend the indigenous knowledge with the modern approaches. The proportion of "foreign" technology in the blend should be minimum in the beginning and be increased progressively over time according to its degree of suitability and success. By winning the confidence of the target group step by step, it also allows one to find the best mix. At this stage the system would have established a self-sustaining mechanism of absorbing new knowledge through a process of osmosis between internal and external knowledge systems.

Increased agricultural output is a combined product of many parts and not only of extension information. It would be counterproductive to concentrate only on extension information in isolation from the required infrastructure. For example, if we are recommending a new variety or breed, which is not available to the farmer, he will be frustrated if he tries to adopt it...After adoption and achievement of enhanced production he is not able to sell the marketable surpluses because of poor access to the markets he will equally be disappointed. The extension service will lose credibility and effectiveness. Mosher has outlined the essential infrastructure for progressive agriculture as follows:

- (1) retail outlets for farm supplies and equipment (inputs)—conveniently available places where farmers can buy fertilizers, seeds, pesticides, implements, etc;
- (2) markets for farm products—places where farmers can sell their produce;
- (3) production credit—conveniently available and on appropriate terms;
- (4) local verification trials—that test what cultural practices developed at distant research stations will produce locally;

- (5) extension education; and
- (6) farm-to-market roads.

The idea of an economic ceiling of productivity is important when we compare the agricultural production in the mountain areas with that in the plains. The economic ceiling of production is the upper limit up to which it is profitable for the farmer to produce more and it is determined by the prices of the farm products and the opportunity cost of land, labor, and production inputs. Because of inaccessibility and poor communication, the transportation costs of inputs to the farms and farm products to the markets are higher. By this comparative disadvantage the mountain farmer can hardly compete with the farmer in the plains with ordinary farm products. His economic limit of production is sure to remain lower than the farmer in the plains.

In this case research and extension can help the mountain farmer to identify his comparative advantage in agricultural production. Based on research, to find agro-ecological suitability of mountain areas for various crops and breeds, extension agencies should develop packages of technology that enable the farmers to tap this comparative advantage. Although farmers are mostly aware of this advantage because of their cumulative experience, the quick and wider access to agro-climatic data, modern soil, and water testing facilities can usefully supplement the local knowledge. To illustrate this point I will mention here the production of seed potato in Kalam, Pakistan. Leaf roll virus of the potato, carried over to the next generation through seed, very severely reduces the yield. The vector for this virus is an aphid that does not exist at high altitudes in the mountains thus eliminating the transfer of virus to the plants. Using this natural advantage, large scale seed multiplication has been established in the Kalam area. Similarly, in Himachal Pradesh of India, largely a mountainous state, the commercial introduction of apple was also based on the comparative advantage of the area.

As a general rule, mountain con-

ditions suggest that a new technology would be more sustainable if it does not increase the dependence of the mountain farmer on 'outside' sources for achieving the best levels of yield. This is more true for the subsistence farmer than for the commercial one. Even for commercial farmers, the best choice is for high value and low volume products for economical transportation to the market.

Making a process or a thing responsive to the mountain characteristics is not always a complicated job. Many times it is simply a matter of common sense. The packing of inputs should be smaller and lighter because the requirements of a small farmer will be less, and he might have to carry packets on his back over long distances and high altitudes. Moreover, he might not afford to buy bigger packages. This small consideration will provide the farmer with options more than "yes" or "no". Engel mentioned the response to such a requirement as follows: "Scarce Input Support (the name given to an ICA-CCH revolving fund) played a complimentary role, particularly where commercial linkages for input supplies to peasant farmers were inadequate. This was the case, for example, with the supplies of improved grass seeds; the improved seeds were sold commercially in 60-kilo bags but, with the support of the revolving fund, they were re-packed in 3- or 5-kilo bags for those peasants who were interested in trying out smaller quantities." (Engle, 1990)

For easy adoption the technology should match the physical and intellectual capabilities of the target group. It is reflected in different adaptive practices of the mountain farmer. An illustrative case has been reported by Bishop in 1989. Zomo is the female hybrid offspring of a cow and a male yak. The first generation has hybrid vigor and gives twice as much milk as either the cow or the yak. Its milk has significantly more fat (6.8%) than cow's milk (4.4%). There are two types of herding, cow/yak herds for breeding to produce and sell zomo, and zomo herds for production and

sale of the butter. The amount of labor required for the cow/yak herd is much less than the zomo herd. With the migration of the young to the urban centres, the cow/yak herding is the preferred option for older people even though it is less profitable than zomo herding.

Channel (Media of Communication)

The most important link between the source and the recipient of information is the extension agent. Drawing an analogy from the premise developed by Muzaffar Hussain, the extension load is greater in the mountain areas with smaller land holdings as compared with the plains with bigger holdings. This is because the recommended practice would be applicable only on a small area (adopter's own holding). Because of inaccessibility, the reach of each extension agent is more restricted. The print media have more limitations because of illiteracy and mass media like radio and TV have the limitations of less people being able to afford the equipment. TV is further limited because it needs electrical supply. The power of transmitters in radio and TV stations restrict the area of coverage to receive the radio and TV programmes but new developments in portable radios and power batteries that are rechargeable with built-in, hand-operated small generators are making radios a usable medium for the remote mountain areas. (Muzaffar Hussain, 1984)

Undulating terrain in the mountain areas obstructs the radio and TV signals, creating shadow areas where transmissions cannot be received. These areas as well as other areas that are not covered by the national radio broadcasts, stand as good candidates for establishing local or village radio stations costing as low as \$1000 for 2-watt transmitter that can cover about a 10 kilometer area. To minimize operational costs, local progressive farmers from local areas may be trained because these radio stations do not require highly skilled operators. Laflin has described the

conditions to justify installation of local radio station as follows: "If investors in development conclude that a) the focus of development activity is agricultural and therefore rural, local and probably remote, and that b) it therefore makes sense to promote information systems that reach local people with maximum efficiency, then it is possible to make a strong case for local radio." (Laflin, 1989)

Experience in the mountain areas has shown that the most effective means of technology transfer is person to person communication within the same ethnic group. The Tuki Programme in Nepal (Integrated Hill Development Project, 1989) can be cited as a successful example of such a technology transfer.

Tuki is a trained, conscious, active and dedicated farmer. He develops farming materials, uses them and distributes them to others. He disseminates the agricultural development activities and policy of HMG [His Majesty's Government of Nepal] to the farmers at the grass roots level. Tuki is a model farmer among the farmers using modern and improved farming methods. Tukis...have spread the waves of agricultural development in the villages. They have not only unlimited knowledge and skills, but also the capacity to know the demand of the village farmers and to transfer their knowledge and skills to the others.

A similar participatory approach for diffusion of innovations had been adopted in another project in the Philippines as follows:

Demonstration trials were set-up on farmers' fields in strategic areas to emphasize on-farm verification of improved production technologies with the active collaboration of a selected group of farmers known as Farm and Home Advisers (FHAs). Technologies proven suitable and economically feasible under San Isidro conditions were disseminated and recommended for adoption while other practices proven to have agronomic, economic and social constraints were discarded or subjected to further studies in the land owned by the project...The FHAs who were elected from among members of a contigu-

ous group of households, have to demonstrate the application of innovation, serve as change agents and farmer leaders, and serve as a link between the San Isidro Rural Systems Development Project (SIRSDP) extension agents and the rest of the community. The farmers who may have problems on crop production could contact the assigned FHA in their area or the SIRSDP crop production staff. (Villamayor et al, 1989)

In short, the strategy for agricultural extension used in the plains needs to be adapted to suit the mountain areas. The case of Training and Visit (T & V) system of agricultural extension in the mountain districts of Nepal will illustrate this point.

The experience in implementing the T & V System through the Hill Food Production Project has proved that these are mostly geographical and topographical aspects that do not allow a faithful implementation of the model. Such aspects cannot be changed. The only solution is to adjust the model to the real conditions in the project area...Too drastic changes could lead to something different from the T & V model. One modification in the model is already being practiced by the project in terms of monthly rather than fortnightly training of extension agents. (Qamar, 1985)

Recipient (Mountain Farmer)

The success or failure of any extension effort is determined by the rate of adoption of the recommended practices by the farmers. It is a complex process. Isolation of the mountain farmers from the mainstream economic activities has kept them unaware of life styles better than that they are used to. Thus giving an incentive for a better life is an ineffective motivator to attract extra effort that is essential to avail the opportunities offered by any development programme. Very limited options to earn a living due to fragile resource base have made the mountain farmer more vulnerable to natural and economic vagaries such as drought,

landslides, crop pests, product price fluctuations and inflation. The mountain farmer, like the smaller farmer in the plains, is caught in the vicious cycle of poverty. His risk taking ability is very low, so he is generally reluctant to try innovations. Even if convinced to try, he does not have the money to buy inputs. Any effort that took care of these constraints has been successful. Prominent success of the Aga Khan Rural Support Programme in Gilgit, Pakistan, upholds this premise. Under this programme, village organizations and village level banking were started to protect the mountain farmer against risk through an idea of cooperative sharing of loss and profit (Tariq Husain 1990).

Conclusion

The foregoing discussion shows that the various components of the information transfer process must be responsive to the unique characteristics of the mountain areas. Only then the goal of increased agricultural production can be achieved. However, to establish a sustainable basis for agricultural development it is important to be concerned about after effects of the increased production and the resultant extra income. Absence of urge for improvement and lack of investment opportunities have two types of effects; either the

amount of effort and work is reduced to retain the usual level of income or the extra income is spent on non-productive leisure activities. This is endorsed by the findings of the SIRSDP in the Philippines as follows: "It is disappointing to find out that a farmer who profited from his crop enterprise will just lose his money in gambling instead of using his profits to improve the quality of life of his family." (Villamayor et al, 1989)

Because the goal of extension is not only the increased agricultural production but also the economic well-being of the farmers, it leads to the conclusion that agricultural development will not be sustainable if it is not integrated with the general development of the mountain areas.

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A Library Database and Its End Users

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Keywords: database design

ABSTRACT: End-user requirements and database characteristics necessary to fill the needs are discussed. End-users include those who are known, those who are foreseen, and those who are anticipated. The requirements of each group need to be analyzed. Both on-line and paper editions of a database must adapt to a variety of demands. The on-line files software must have the possibility of splitting information into small units, and then the searcher must be able to sort out those units and combine them into such products as demanded.

RESUME: Les besoins de l'utilisateur final et les paramètres d'une base de données sont étudiés dans cet article. Les utilisateurs finals comprennent ceux qui sont connus, ceux que l'on peut prévoir et ceux que l'on anticipe. Les besoins de ces différents groupes doivent être analysés. Les interrogations et les éditions papier d'une base de données doivent s'adapter à la variété des demandes. Le progiciel doit offrir la possibilité de diviser l'information en unités minimales qui doivent pouvoir être triées et combinées par le chercheur en autant de produits que nécessaires.

RESUMEN: Se discuten los requerimientos del usuario y las características de las bases de datos, necesarios para satisfacer las necesidades de información. El grupo de usuarios lo componen los usuarios conocidos, los que se espera utilizarán el servicio y los usuarios potenciales. Es necesario analizar los requerimientos de cada grupo. Las ediciones de una base de datos, tanto en papel como en línea, deben adaptarse a una variedad de necesidades. Los programas en línea deben tener la capacidad de descomponer la información en unidades pequeñas, que luego quien hace la búsqueda debe poder seleccionar y combinar en los productos solicitados.

ZUSAMMENFASSUNG: Es werden die Anforderungen an Eigenschaften von Datenbasen, um den Bedarf der Endbenut-

zer zu erfüllen, diskutiert. Endbenutzer können bekannt, erwartet und erhofft sein. Die Erwartungen jeder Gruppe müssen analysiert werden. Beide, Online-Ausgaben und Ausdrücke aus einer Datenbasis müssen auf eine Vielfalt von Anforderungen ausgerichtet werden. Die Online-Software muß die Möglichkeit besitzen, die Informationen in kleine Einheiten aufzugliedern und der Suchende muß in der Lage sein, diese Einheiten auszusortieren und zusammenzufügen zu solchen Produkten, die verlangt werden.

My paper is about parameterization of a database, not on-line bibliographic databases such as *C.A.B. Abstracts*, for those databases are already parameterized and you can only try to do your best when searching them. I will focus on the system you create by using a micro or a minicomputer and a software package to make up bibliographic files describing your own collections. The software has the potential but you must make your database fit both your documentation resources and the requirements of the people who will use it.

End users want easy access to complete information. They want to obtain, through a simple question, as many details as required and nothing further. Librarians want as little work as possible to give the largest amount of information...Are those targets compatible?

Who are the end users we have been speaking about? They are many and various, and so are their needs. The end users are students who regularly come to the library to call for simple and up-to-date references that allow an immediate access to the books or the magazines. That requires a comfortably interfaced microcomputer with information retrieval aids. The main search keys would be the key words, the author names, and the

significant words of the title. Nevertheless, unique approaches such as subject are rather frequent. An example of this comes from a neighboring university. Students who are studying "Applied Foreign Languages" will ask for the specific language. Other products may be of great help, such as a "topographical" card catalog. These are catalogs built according to call numbers such as the Universal Decimal Classification, which gives the subject of the book together with its place on the shelves. This is a traditional library catalog that can be easily obtained from a computer held file.

Usually teachers, lecturers and researchers do not come as often to the central library but need to be brought up-to-date on new titles the librarians have acquired. Whatever the medium, it must be rather cheap and easily distributed, the "cards" must be printed in a clear and convenient way, listed under subject headings, possibly accompanied by key words and an author index.

Senior students who are starting on a thesis or a PhD, researchers who are tackling a new subject, or teachers who are building a new lecture want a complete review of any bibliographical resources the library may offer them. They will demand a professional documentalist to help them with their questions; to transform their free language into key words using Boolean algebra. As they will be the main user of the references, they are also particular about their presentation.

Administrative staff are the most particular end user you will encounter. On the one hand, they ask you to produce proof that their money has been used properly, which for example can be done by the means of an

inventory register. On the other hand they want to give other schools, and the "outer world" evidence that their people do a good job, which requires different products, such as beautiful tables displaying the thesis, reports and other internal publications. Both inventory registers and displays require special indexes.

Some old teachers, and new ones as well, cannot do without the traditional paper card catalogs they've been using successfully for years. The same documentary software package cannot give you standard ISO paper cards along with a proper database management. Nevertheless, you can get quite satisfying cards without any extra data inputting.

Standards are the crux of the problem. Whether you upload or download files, on which basis will the exchanges be settled? Even standards fail us. There are standards, indeed too many standards, but the struggle for a real international normalization is a necessity, and I hope we will soon be able to rely on universally accepted standards. In the meantime, you must go on working and, when urged by the necessity of designing your database, which format will you choose, US MARC, CAN MARC, INTER MARC, UNI MARC? Once you have chosen you must be able to transfer information according to other standards.

The solution depends first on documentary reasoning, then on the possibilities the data processing offers you. You must keep in mind four main rules:

- Information must be sorted and split up to the smallest sense unit,
- Every major piece of information must be able to serve as an indexing term,
- Information should be input only once,
- Software must allow you various final products.

Whatever your previous way of working, you must ignore it. The information available from a book, or any other document, will not change, but you will change the selection and

ordering of the various pieces of information.

Any piece of information must be scrutinized and its usefulness analyzed. To whom will it be useful? What purpose will it serve? Your criterion will then be the requirements of your end users, such as those expounded above; the needs they have already expressed; the needs you may foresee and the developments you plan for your library.

Define your top priorities, for you will have to choose the possibilities in order to develop to the full the ones you keep. Not to select certain pieces of information may be fraught with consequences for it means that you decide that your database will never be able to answer the corresponding questions. Unlike card catalogs or paper abstract reviews, one cannot leaf through a computerized bibliographic file, unless it is printed entirely, which will rapidly verge on impossibility. On the other hand, you cannot overload your "cards" with every piece of information just in case it may be useful one day. Building a database doesn't mean incorporating the greatest amount of information or the greatest amount of units such as thousands of records or millions of bits. You must be able to organize the information you've selected so it can answer a variety of demands.

To organize information in a database means first and foremost to be able to have access to any piece of information regardless of the others. If you use "glory-holes" you will freeze your database according to predetermined aims. On the contrary, if you consider every sense unit as an entity, you will be able to sort the diverse components of your "cards" and gather them together in many different ways, so as to serve the wide variety of goals we have just had a reviewed.

Serial access to information is obsolete because it takes a long time to search. As your database gets larger, many of your search keys become useless and it deprives you of any possibility of using search keys. Every

documentary software package worthy of its name offers you random access to key words, dates, and author names but that is not enough if you want to satisfy the variety of demands already mentioned. Every major piece of information must be able to serve, continually or exceptionally, as an indexing term, that is to be the "pivot" of a special product. You should be able to search the call numbers, or the language, or the inventory numbers or even the height of the books if you deal with archives.

Every information piece you will store in your database will cost you a lot of time, increase the frequency of mistakes, and use memory storage. It is quite necessary to be able to keyboard data once and use them as you need them.

First, you must spot the pieces of information you keep repeating, for example, the titles and localization of the periodicals you analyze, which are often very long and complicated. Then your software must afford you the possibilities of using those data several times, either by adding, correcting, copying or substituting automatically, which will save you time and errors, but no memory; or by storing those data apart from each other in different files, and chaining the whole or part of the information contained in these files. The choice will depend on your needs. For example, in our school and research center, we have 28 libraries, each of them with a long name and code (for example "Station de Physiologie et d'Ecologie des Poissons" is known as "HYCEHR"), an address, the name of the documentalist, a phone number, the opening hours, and the services it offers. This information constitutes a file in itself which is worthy of printing as a reader's guide to documentation. On the other hand it may be chained with part of the information contained in the book file so the location of the books is known, and in the periodical file, so the list of the magazines to which those documentations subscribe can be obtained. The periodical file can give the address of the publisher, and

various other data that will help you with subscription renewals. It also gives you the full title and the shortened form of the periodicals in which articles are selected. It is easy to get lost among all those chaining potentialities, and one must keep in mind that documentary reasoning must precede parameterization.

All those transformations are more

or less easy and comfortable depending on your software and on the products you aim at. They will cost you a lot of time, so if you are repeating them several times, they must be put into memory and called into execution as often as needed. That is why your software must afford you a range of ready-made documentary and printing products whether it is the repeti-

tion of a succession of orders, or a real programming language that will allow you to "tailor make" your own products.

When so parameterized, a database will not be able to answer all questions and satisfy all kinds of end users, but you will reach as wide an audience as possible.

Planning, Forecasting and Simulation Models in Agricultural Advisory Work

Anton Mangstl, Valentin Troll, and Jürgen C. Vogels

Keywords: fertilizers; herbicides; computer simulation

ABSTRACT: Agricultural advisory work and farming practices are increasingly confronted with discussions of the effects on the environment. The interest in planning, forecasting and simulation models in the agricultural sector is increasing. The actual stage of development is illustrated by four systems:

- Estimated fertilizer requirements on the basis of the balancing method (DUENGEPLAN).
- Simulation model to describe the nitrogen dynamics in soil profiles.
- EIPPRE (Prediction and control of diseases in winter wheat).
- Expert system as a tool for the choice of herbicides (HERB-OPT).

RÉSUMÉ: La consultation agricole et les pratiques culturales affrontent de plus en plus des discussions sur les effets sur l'environnement. Il y a un intérêt croissant pour la planification, la prévision et les modèles de simulation dans le secteur agricole. L'actuel stage de développement est illustré par quatre systèmes :

- estimation des besoins en engrais avec la méthode de la balance (DUENGEPLAN)
- modèle de simulation pour décrire les dynamiques de l'azote dans des profils de sols
- EIPPRE (Prévision et contrôle des maladies pour le blé d'hiver)—système d'expert utilisé pour le choix des herbicides (HERB-OPT).

RESUMEN: El trabajo de consultoría y las prácticas agrícolas se confrontan cada vez más con discusiones sobre los efectos en el medio ambiente. En el sector agrícola, el interés en los modelos de planeación, proyección y simulación está aumentando. Se ilustra el estado actual de desarrollo mediante cuatro sistemas: 1) Estimación de los requerimientos de fertilizante con base en el método del equilibrio (DUENGEPLAN); 2) modelo de simulación para de-

scribir la dinámica del nitrógeno en los perfiles del suelo; 3) EIPPRE (Predicción y control de enfermedades en el trigo de invierno); 4) el sistema experto como herramienta para seleccionar herbicidas (HERB-OPT).

ZUSAMMENFASSUNG: Die landwirtschaftliche Beratung und Praxis wird mehr und mehr mit der Diskussion über die Auswirkungen ihrer Tätigkeit auf die Umwelt konfrontiert. Damit steigt auch ihr Interesse an Planungs-, Prognose- und Simulationsmodellen im landwirtschaftlichen Bereich. Der aktuelle Stand der Entwicklung wird exemplarisch am Beispiel der vier folgenden Systeme vorgestellt:

- Düngevoranschlag auf der Basis des Bilanzierungsverfahrens (DUENGEPLAN)
- Simulationsmodell zur Beschreibung der Stickstoffdynamik im Bodenprofil
- EIPPRE (Vorhersage und Bekämpfung von Krankheiten an Winterweizen)
- Expertensystem zur Auswahl von Herbiziden (HERB-OPT).

Estimated Fertilizer Requirements Based on the Balancing Method

Automation and rationalization in agriculture have made progress in recent years. Intensive livestock farming produces great amounts of animal wastes as solid and liquid manure, or semi-liquid manure to be spread on the crop areas¹. High intensities of manuring can impact the environment with increased nitrate content of the ground water and deteriorated quality of drinking water; eutrophication of surface waters by phosphate leaching; and reduction in constituents and biological value of field crops due to excessive nitrogen fertilizing.

The computer program DUENGEPLAN was prepared by the "Lehrinheit Ackerbau und Versuchswesen" at the "Technische Universität

München-Weihenstephan". The first version was carried out on a large-capacity computer but access was possible with videotex. Another version of DUENGEPLAN was prepared on the PC. The aim of the program is to advise farmers on the mineral fertilizers required. The nutrient needs stand for the specific crop yield goal on one hand, the mineral fertilizer demand of a selected field on the other minus the nutrients from previous crop residues and minus the nutrient supply with farm manures². The balance of the nutrient requirements of all the fields under view shows the mineral fertilizer demand of the farm.

On principle, the fertilizing case of one season is considered and balanced and fertilizing schemes are improved based on last year's data. The program will then balance the differences between the nutrients as calculated and required for the crop yield and the amounts of fertilizers applied. These differences will be considered in the fertilizing scheme for the coming year, if required. The comparison between nominal and actual data serves as a basis for fertilizing balance over several years. When keeping a field file, the use of the data will increase the efficiency of the program. In order to calculate the nutrient balance over several years, the DUENGEPLAN has the option to plan the application of mineral fertilizers for up to five years. This enables the farmer to optimize the number of spreading applications and to balance the nutrients.

The practical use of DUENGEPLAN as a PC version has shown that many of these farmers have vague

ideas of the demand for farm manures. The program will be helpful in calculating the amounts to be applied; also the quantity and time of spreading farm manures. Data are provided about the slurry produced and about the nutrient content. The program-controlled evaluation of the input data enables the user to simulate the various fertilizing situations of his farm with variable calculations. The "In case" option will be useful in training.

The program is user friendly because of the central selection menu and the subordinate terms can be selected with pull down menus. Orientation within the single subprograms is eased by guiding the user back into the central selection menu.

The data processing screen is divided into the headline with screen heading that is identical with the carry-over address from the main menu; the input line; the space reflecting all the data collected on the remaining fields; and the line referring to the use of functions. The program is likewise easy to use and requires only the cursor, escape and return keys. This program can be used with a mouse.

To enlarge the application, an interface to the relational data bank system Oracle was developed. Oracle ranges among the most efficient databases on the PC level. Oracle is especially suitable for multi-farm analysis because of its Structured Query Language (SQL), its interface to the professional statistical programs as the Statistical Analysis System (SAS) and its facility of data transfer to comparative data banks on large data processors.

Simulation Model to Describe the Nitrogen Dynamics in Soil Profiles

The availability of nitrogen in the soil in a form utilizable by plants (N_{\min}) has considerable influence on the crop growth. In consideration of the preceding crop and of organic manures applied, the extent of winter nitrogen leaching and the soil and weather-dependent nitrogen mobili-

zation in early spring should be calculated when estimating the amount of nitrogen required in spring. For this purpose the mineral nitrogen content is determined in the soil³. The analysis shows the plant-available nitrogen in kg/ha and can be considered in calculating the demand for spring fertilizing. The whole amount required is oriented to the customary site-specific nominal value minus the N_{\min} -content of the soil under view.

Problems are involved in the necessity of sampling for the N_{\min} -analysis after the preceding crop either in late summer or in autumn. The data can be used as starting values for computer simulation over the winter season in order to estimate the nitrogen required in spring. Daily weather updates must be available for model simulations of water regime and nitrogen balance in the soil. Soil characteristics should be included in the calculations^{4,5,6,7}. Data collected at different sites serve as indicators for controlled nitrogen fertilizing.

A nitrogen simulation model is described in the following: the original model version had been prepared by GODWIN and was adopted by the "Lehreinheit Ackerbau und Versuchswesen" at the "Technische Universität München-Weihenstephan". The program represents an approach to optimized nitrogen fertilizing and is divided into the following subprograms⁷:

- The translocation of nitrates in the soil profiles is dependent on the conveyance of water. The model is concerned with the balancing of soil water based on field capacity and on daily measuring of precipitation and evaporation. The nitrate translocation is calculated from the soil layers as accessible by plant roots for water absorption.

- The simulation model is focused on the evaluation of nitrogen transformation processes. Mineralization (plant-available N) and immobilization (plant-unavailable N) are balanced in dependence on soil temperature, C/N ratio of the organic matter and on the soil water regime.

- In addition, processes as nitrifi-

cation and denitrification are considered in dependence on the NH_4 and NO_3 concentrations in the soil solution.

The nitrogen uptake by plants constitutes the final part in the calculations. In practice the model is to be applied to estimate the mineralization and nitrification of soil nitrogen and of the nitrogen in organic manure; especially when the nitrogen can be used by plants only in part and thus is exposed to leaching⁸.

The GODWIN Nitrogen Simulation Model is integrated into the growth model CERES-WHEAT. The model was prepared to evaluate the wheat growth anywhere in the world, at any time, and without any limitation of nitrogen supply under suitable soil-water conditions and cultivation measures. The whole vegetation period is covered to the ripeness of wheat. Other aspects of yield formation as such weeds, diseases, pests and deficiency in nutrients are ignored in the model⁹.

The model is of great practical use since it is easy to apply and promises reliability and accuracy. Although based on factual data, a careful mechanistic model as the GODWIN model on the PC is suitable to provide simulations that can help in part, to do without expensive soil analyses¹⁰. At present, there are three ways to calculate the plant availability of nutrients: soil analysis, plant analysis; and pilot calculation of interactions between soil and plant. The benefit of pilot calculations is to include weather data dynamically, to describe the soil/plant inter-relationship and to balance the site-specific characteristics⁹.

Not only the N_{\min} -value in spring is problematic in relation to estimation of nitrogen fertilizing, pilot calculations are likewise concerned with the problem of forecasting the future meteorological course of the vegetation period based on many years experience. Simulations can likewise be helpful and ensure fertilizing measures from the previous growth processes.

EPIPRe (EPIdeemics, PRE-diction and PREvention)

Chemical pesticides will go on to be required. Modern integrated plant protection will not do without reliable economic threshold values of pests for accurate application. The EPIPRe program¹¹ for prediction and control of diseases in winter wheat will help the farmer to make decisions on measures of control.

Decision proposals are calculated based on information data as cost/benefit relationship. The expenses consist of active substance cost and spreading cost and also of the injuries arising from machinery driven over the crop stand. The benefit of a treatment varies from field to field, since not only the extent of pest attack, but also the yield goal—as envisaged by the farmer—is varying. Wheat diseases included are mildew, leaf rust, brown rust, yellow rust, glume blotch (*Septoria nodorum*), and *Septoria* leaf blotch.

Half an hour is calculated for determining the infestation in a wheat crop. The general data about the crop are stored in the computer, as variety, soil type, yield goal, dispersion volume of field sprayer, working cost, cost of pesticides and nitrogen fertilizing. The farmer will make his observations across the field and show which stage of growth has been reached and show the extent of infestation in figures. The data will be transmitted per call, videotex or postal card. He will then will receive per computer a proposal for control with adequate pesticides or the recommendation to ignore control measures because of the irrelevance of attack.

While the postal transmission of data will take time, the information on videotex is available immediately. The user is in direct contact with the program. The program, although very easy to operate, requires profound knowledge of subjects for the input of necessary data so the idea is not yet flexible enough to be practical. In spite of comprehensive amendments certain alterations in the

source code will be needed for data updating. In order to enable a more universal application of the system (all grain species, all varieties, all fungicides, etc), quite a different program structure will be required for forecasting purposes than in the original program.

Besides the basic data collected during the vegetation period, data are stored into the data field about crop stand, as fertilization data, pest control measures, and other crop observations. The documentation of the crop growth can be completed.

EPIPRe can be used via a large computer or videotex in the Netherlands, Switzerland and in the Federal Republic of Germany. EPIPRe can be used on the microcomputer in a decentralized environment because of modern developments. Using the database-oriented method the crop growth will be observed dynamically in the future. The further development of functional forecasting, monitoring and information services will go on to be an important prerequisite for integrated pest control. EPIPRe is an approach to this aim.

The preparation of the program pack HORDEPROG in Switzerland is done on similar principles but HORDEPROG applies to barley. The field tests are done by experts in several European countries and are very promising.

The HERB-OPT Expert System is Helpful in the Choice of Herbicides

The conventional soil working and management systems were often helpful in weed control. Today they are not cost effective so weeds are controlled with herbicides. However there is a great number of agents and active substances that protect crop plants selectively and kill at least the predominant weed species.

HERB-OPT¹² is a computer-aided expert system and includes about 200 herbicides in use in the Federal Republic of Germany. The System is to help in choice, application and economic appraisal of herbicides. No

special search language is necessary as it operates with a menu. The complete product information can be searched about each herbicide, such as trade name, infringements for environmental protection, controllable weeds, etc. The efficiency analysis is possible because of economic threshold values and admits the comparison of prices of different herbicides applicable to a certain spectrum of weeds.

Since several herbicides for control of a selected weed population have been shown with the menu control, HERB-OPT shows the price levels in relation to the spectrum of effects so that the user can restrict the choice to the major weeds to be controlled. The HERB-OPT expert system is appropriate as well for farmers and advisers as for the agricultural commodities trade¹³. One problem yet to be solved is the continual adjustment of herbicide data to the changes in marketing. This updating is still difficult in using the programming language (PROLOG). It is advisable to update in a central computer and to deliver the data in print for current public awareness.

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Addressing the Information Needs of Farmers and the Extension Services: The Malaysian Experience

Isahak Ailin Ton

Keywords: rural extension; mass media; technology transfer

ABSTRACT: The mid-term review of the Fifth Malaysia Plan (1986–1990) has stated that emphasis will be placed on accelerating transfer of technology to small holders to improve their productivity and efficiency. Technology transfer can be achieved through publications, newspapers, radio and television networks and interpersonal methods as exemplified by the Agricultural Information Dissemination Programme launched in 1983 by the Ministry of Agriculture which has contributed to increased farmers' awareness of new agricultural technologies. Communication through the printed media can be tailored to specific clientele needs if their demography, psychological response, literacy and real information demands are understood. The advent of information technology has benefited Malaysia in the transfer of technology by reducing costs in terms of time. This is seen in the rapidity with which information can be mass produced for dissemination by using desktop publishing which further allows information transfer through the printed media to be expedited, thus bringing to the farmers new information quickly. This approach to publication is not only more cost effective but faster.

RÉSUMÉ: L'examen à mi-parcours du Cinquième Plan malais (1986–1990) a révélé qu'une plus grande importance devrait être accordée à un transfert de technologie plus accéléré au bénéfice des petits exploitants afin qu'ils améliorent leur productivité et leur compétitivité. Le transfert de technologie peut se réaliser au moyen de publications, de journaux, de réseaux radiophoniques et télévisuels et de méthodes interpersonnelles; à cet égard le Programme de Diffusion de l'Information agricole lancé en 1983 par le Ministre de l'Agriculture qui a contribué à accroître

la prise de conscience des agriculteurs sur l'importance des nouvelles technologies agricoles en est un exemple. La communication écrite peut être adaptée aux besoins spécifiques des groupes cibles à condition que leur démographie, leur psychologie, leur savoir et leurs demandes réelles d'information soient compris. L'avènement de la technologie de l'information a bénéficié la Malaisie dans le domaine du transfert de technologie en réduisant les coûts en termes de temps. Cela est évident si l'on voit la rapidité avec laquelle l'information peut être produite en masse en utilisant la publication Desktop qui permet, en outre, le transfert de l'information par l'expédition des médias écrits, livrant ainsi aux agriculteurs toute nouvelle information dans des délais très courts. Cette approche de la publication n'est pas seulement plus économique mais aussi plus rapide.

RESUMEN: La evaluación parcial del Plan Quinquenal de Malaysia (1986–1990) consideró importante acelerar la transferencia de tecnología a los pequeños agricultores, para mejorar su productividad y eficiencia. La transferencia de tecnología se puede lograr a través de publicaciones, periódicos, radio y redes de televisión, y mediante métodos interpersonales como el Programa Agrícola de Diseminación de Información, lanzado en 1983 por el Ministerio de Agricultura, que ha contribuido a crear conciencia entre los agricultores acerca de las nuevas tecnologías agrícolas. A través de los medios impresos, la comunicación se puede adaptar a las necesidades específicas de los usuarios, si se comprenden su demografía, su respuesta psicológica, su grado de alfabetismo y sus necesidades reales de información. El advenimiento de la tecnología de la información ha beneficiado a Malaysia en la transferencia de tecnología, reduciendo los costos en términos de tiempo. Esto se ve en la rapidez con la cual se puede producir masivamente información para difusión, utilizando programas de auto-

edición, que además permiten acelerar la transferencia de información a través de los medios impresos, haciendo llegar rápidamente la nueva información a los agricultores. Este enfoque de publicación es no sólo más rápido sino más efectivo en términos de costos.

ZUSAMMENFASSUNG: Im Zwischenbericht über den malaysischen Fünfjahresplan (1986–1990) ist dargelegt worden, daß mit Nachdruck der beschleunigte Technologietransfer zu Kleinbauern verfolgt werden soll, um deren Produktivität und Effizienz zu verbessern. Technologietransfer kann durch Veröffentlichungen, Zeitungen, Radio und Fernsehen sowie interpersonelle Methoden erreicht werden, wie sie das Agricultural Information Dissemination Programme exemplifiziert, das im Jahre 1983 vom Ministry of Agriculture begonnen wurde und zu einer verstärkten Information der Landwirte über neue Technologien beigetragen hat. Mitteilungen durch gedruckte Medien können auf besondere Bedürfnisse der Kunden zugeschnitten werden, wenn deren Demographie, psychologische Reaktion, Fähigkeit zu lesen und zu schreiben und deren wahre Informationsbedürfnisse verstanden werden. Die neue Informationstechnologie hat Malaysia durch Kostensenkung im Technologietransfer im Laufe der Zeit Nutzen gebracht. Man merkt es an der Schnelligkeit, mit der Informationen für eine Massenverbreitung mit Hilfe eines Desktop produziert werden können, der darüber hinaus auch den Informationstransfer durch gedruckte Medien zu befördern erlaubt und damit den Landwirt schnell informiert. Diese Art von Veröffentlichungen ist nicht nur kostengünstiger, sondern auch schneller.

Introduction

The information industry is a creature of the information explosion (Garfield, 1977). The world today is

confronted by an information glut, a state attributed to rising standards of literacy, education and knowledge, the proliferation of information producing organizations, and increasingly sophisticated means of communication. Relevant processed information to sustain food production to feed the world's population is necessary for our survival into the next century. The importance of information to increase agricultural productivity is a challenging issue that is demanding the world's attention.

The Malaysian Experience

The agricultural sector, though recently out-paced by the manufacturing sector, increased its contribution to Malaysia's Gross Domestic Product to Malaysian Ringgit \$13,935 million and provided employment for 1.9 million people in 1988 (Anon., 1989). The agricultural industry has varying information needs and is heavily dependent on an efficient flow of information between and within its various sectors for its smooth operation (Blackie & Dent, 1979).

Information Needs of Farmers

The agricultural sector in Malaysia is divided into the estate sector, government sponsored land schemes and the small farmers owning patches of less than two hectares of land. This dichotomy of agriculture has caused a major difference in their information needs. The differences centre on the types and forms of information produced for the estate sector, the land schemes and the small holders. The estate sector is well organized and manned by well trained agriculturalists. It has its own information generation and development capabilities. They have to their advantage, large tracts of land that through good management has made Malaysia one of the world's leading exporters of rubber, palm oil and cocoa. Their information needs are more easily responded to. However, there is still a necessity to tailor scientific

information to meet their specific technical needs and to process and package it to allow easy sifting and transformation into value-added information. The farmers involved in land schemes organized through the Ministry of Rural and Land Development are more structured than the normal small holders. They get their information inputs from the extension agencies and research organizations channeled through the Federal Land Development Authority (Felda) and the Federal Land Consolidation and Rehabilitation Authority (Felcra). The rest of the farmers are made up of small holders growing rice, fruits, vegetables and miscellaneous crops. These farmers, though scattered, are encouraged to form farmers associations which are registered by the Farmers Organization Board. Their commercial activities are taken care of by the National Farmers Organization. To date, there are 272 Farmers Associations involving 308,000 farmers (personal communication, Gan Wan Yee, Farmers Organization Board, 1990). The information needs of these small holders are more diverse and demanding of the information designer and processor. Farmers require up-to-date information on new crops, fertilizers, pest control methods, labour/time saving devices, new farming systems, preharvest and postharvest methods/management, water management/irrigation methods, yield-increasing approaches, marketing, and guidance on downstream activities. Their needs are more complicated because of the changing socio-economic conditions surrounding them. In addition, their psychological make-up has changed because of increasing literacy and academic exposure. Information materials directed to farmers must therefore be accordingly revised from time to time. Farmers in Malaysia depend on interpersonal communication with the extension agents and to some extent the research workers and the Information Ministry for their information needs. Other information sources include the chemical companies that sell their fertilizers and pesticides accom-

panied by information leaflets and briefings.

Information Needs of the Extension Services

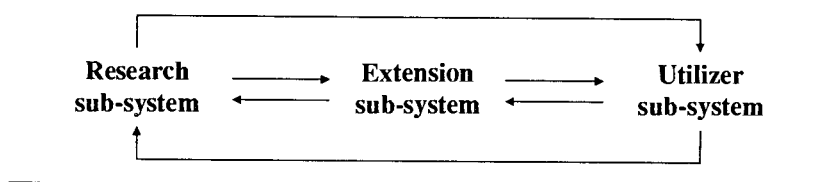
Dissemination means 'to seed' and for simple technology 'seeding' is all that is needed (McDermott, 1987). For more complex technologies a variety of approaches are employed. Extension agencies play a crucial role in technology dissemination. This involves informing farmers of new technologies and helping them to figure out how to fit the technologies into their systems of farming. Agricultural extension in Malaysia is handled by the Department of Agriculture, the Department of Veterinary Services, the Department of Fisheries, the Forestry Department, the Rubber Industry Smallholders Development Authority (RISDA) and the Malaysian Agricultural Research and Development Institute (MARDI, concerning downstream and postharvest handling activities of the food industry), the Federal Agricultural Marketing Authority (FAMA, marketing aspects) and the Information Ministry. The extension agents, mostly certificate/diploma and degree holders, are stationed all over the nation right up to the districts. Work boundaries for extension workers determine their information needs. Physical aspects (location), work assignment (technical duties), reporting relationship (to agricultural officer), professional training and goals (prompt and accurate work results) are important features that influence their information requirements. They, like the farmers, need to know the latest technologies and the latest teaching methods to enable them to transfer information to farmers before the cropping season begins. Extension agents require constant training and retraining to sharpen their skills to increase their credibility with the farmers. They require good reference materials to refer when required, and easy to understand instruction manuals and handouts to help them when dealing with farmers' problems. When introducing

new crops or techniques, they require teaching aids like information leaflets, sound slide shows/video cassettes or filmlets wherever possible. Extension agencies like the Department of Agriculture and RISDA get their information from primary information generators like MARDI, Rubber Research Institute Malaysia (RRIM), Palm Oil Research Institute Malaysia (PORIM) and Forest Research Institute Malaysia (FRIM). Information from these research institutes is obtained via their publications, seminars/conferences/workshops, training courses, field days, pilot projects, meetings, dialogues and direct consultations. The information is processed, packaged and transformed into easy to read manuals, instruction and information leaflets by the extension agencies. The communications sections of the extension agencies produce thousands of different types of simple information leaflets, posters, brochures and flyers for the extension agents and farmers. Sound-slide and video programmes based on 'how to' plots are prepared as support and teaching aids for extension agents.

The Information Bridge

Information provision to farmers and the extension services in the appropriate form remains dismally inadequate even though more than five ministries are involved in information generation and dissemination. According to Mohamad Yusof, the process of technology development and transfer has not been fully effective because of compartmentalization of research, extension and development agencies. The apparent lack of coordination has led to information generated by research being not specifically tailored to the needs of the extension agencies. Extension agencies themselves in conducting their functions are not fully equipped with the latest know how or advancements achieved by research (Mohamad Yusof, 1983). This is supported by Azizal in 1986, who found that extension workers in Malaysia are

Figure 1 – Agricultural Information System (Roling, 1988)



hungry for information and that they had constraints getting access to information because of poor means of exchanging and disseminating information by the information generation agencies. Many attempts have been made to marry the needs of the information users to the production efforts of the technology and information generators. Realising that the information float requires proper capturing, processing, packaging and rechanneling, the Ministry of Agriculture in 1982 formulated an Agricultural Information Dissemination Programme in cooperation with the Ministry of Information and the mass media (Sarji & Ailin Ton, 1983). Priorities for the following year were identified in October of each year, and the 12 agencies under its purview were directed to organize programmes on radio, television and feature articles in newspapers accordingly. This planned and sustained effort towards information dissemination was so successful at the federal level that states were directed to organize jointly similar programmes aired on radio in their respective local dialects to reach out to the farming audience. The positive response to this programme was that other agencies from various ministries joined in to carry out programmes at the state level.

Information Packaging and Dissemination

Research organizations like MARDI, have geared their information generation, processing and transforming machinery to face the agricultural sector's information demand with pragmatism. Information must be disseminated widely, timely, and in an appropriate form to be useful to the intended audience. Feed-

back from the farmers and extension agents necessary to make the information package significant is continually being accommodated into the technology packages. The now outdated top down information flow has given way to the two way communication practiced for more efficient information now as in Figure 1.

Information engineering will play a bigger role with the advent of computer technology and electronic publishing. Communication through the printed and virtual media can be tailored to farmers' and extension agents' needs, if their demography, psychological response/needs, literacy level and real information demands are understood and considered when preparing information packages. The information designer and processor must be sensitive to their clientele's changing information needs. The communication pathway can be shortened and effective technology transfer can be achieved. The enormous strides made by information technology, the availability of the CD-ROM and electronic publishing have benefited Malaysia's effort towards effective technology transfer through reduced costs in terms of time and money spent on the information packages. Desktop publishing has enabled information leaflets to be mass produced rapidly and cheaply for wide dissemination. Computers have enabled agricultural scientists to update and give value-added information to the agricultural sector in a shorter time span thus bringing to the farmers new information quickly at less cost.

Information Through Training

The extension agencies regularly train their agents and farmers to inject new information and technologies.

Training is also provided by MARDI and other research institutions to these agents and farmers associations when they release new technologies. The extension arm of MARDI through its Food Technology Division has adoption schemes where fledging food enterprises are given guidance and technological know how until they are ready to go on their own. Training courses are also provided to farmers organization groups and entrepreneurs interested in starting business in the food and crop industries. The staff of MARDI, PORIM, FRIM, and RRIM, through their association with PEPET, (The Committee of Higher Learning and Scientific Publishers), through the PEPET-IDRC (International Development Research Centre, Canada) Programme have received training on writing, editing, financial procedures, designing, marketing and publishing of various information prototypes for their respective audiences. This particular programme has benefited Malaysia through injection of expertise from Canada to train scientists on various aspects of publishing, cost effective information dissemination and marketing.

Conclusion

The impact of the increasing role

of the farming and extension communities information needs is great on the information generating institutions. These institutions will have to use the latest information technology to fulfill these needs by providing appropriate information packages to the demanding and dynamic agricultural sector. Information dissemination that has more meaning and greater impetus for technology transfer is now envisaged to accelerate farm productivity by the turn of the century.

Acknowledgements

I would like to thank my former director Dr. Tay Tian Hock for his invaluable assistance in the preparation of this paper. I am also grateful to the International Development Research Centre, Canada for funding my trip to this congress. My appreciation also goes to Siti Petimah Hj. Hassan and Dr. Mohammad Fadzilah Kamsah for reading the manuscript and offering constructive criticism.

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Ten Years of Agricultural Documentation Services in Denmark

Inger Mathiesen

Keywords: library services; scientific and technical information.

ABSTRACT: In 1979 the Danish Veterinary and Agricultural Documentation Center was founded as a research project and was financed by the Ministry of Agriculture and the Danish Agricultural and Veterinary Research Council. In 1984 the Center became permanently financed on the national budget. The Center has the following objectives: to function as the Danish AGRIS input center; to supply qualified on-line searching in international agricultural and related databases for private agricultural clients, research institutions and students; to teach on-line searching techniques; and to supply document delivery for search customers. During the past 10 years the Documentation Center has become an important part of the information network in Denmark. Demonstrations of on-line searching are a natural part of the regular library information course at the Royal Veterinary and Agricultural University because the Center is a department of the library. The placement of the Documentation Center is a great help for scientists at the University who are starting on new projects. Master's degree students are offered a free on-line search for use in writing their thesis. Research institutions belonging to the Ministry of Agriculture, food science and drug companies, and private veterinarians are some of the Center's most frequent users outside of the University. The Danish Veterinary and Agricultural Library supplies close to 50% of the literature ordered based on the on-line searches. The remainder is obtained through AGLINET.

RÉSUMÉ: En 1979 a été créé un programme de recherche, le Centre de Documentation Agricole et Vétérinaire Danois, financé par le Ministère de l'Agriculture et le Conseil de Recherche Agricole et Vétérinaire Danois. Depuis 1984 et à titre permanent, le Centre est totalement financé sur le budget national. Les objectifs du Centre sont les suivants : un fonctionnement à l'image du centre AGRIS danois; des recherches spécialisées en liaison directe avec l'ordinateur de bases de données agricoles destinées à des clients privés évoluant dans le domaine agricole, des institutions de recherche et des étudiants; l'enseignement des techniques de recherche en-ligne; et la fourniture de documents aux clients qui effectuent des recherches. Dans les dix dernières années, le centre de documentation est devenue une partie importante du réseau d'information danois. Des démonstrations de recherche en-ligne constituent un volet du cours de bibliothéconomie qui a lieu régulièrement à l'Université Royale Vétérinaire et Agricole, le Centre étant un département de cette bibliothèque. L'emplacement de ce Centre de documentation est d'un grand apport pour les scientifiques de l'Université qui démarrent de nouveaux projets. Les étudiants en troisième cycle bénéficient d'une recherche en-ligne utile pour écrire leur thèse. Les instituts de recherche appartenant au Ministère de l'Agriculture, les compagnies de produits alimentaires ou pharmaceutiques ainsi que les vétérinaires privés sont quelques uns des utilisateurs les plus assidus hormis le personnel de l'Université. La Bibliothèque Vétérinaire et Agricole Danoise offre approximativement 50% de la documentation demandée à la suite des recherches en-ligne. Le reste s'effectue au travers d'AGLINET.

RESUMEN: En 1979, se fundó el Centro Danés de Documentación Agrícola y Veterinaria, como proyecto de investigación, financiado por el Ministerio de Agricultura y el Consejo Danés de Investigación Agrícola y Veterinaria. En 1984, el Centro logró financiación permanentemente como parte del presupuesto nacional. Los objetivos del Centro son 1) actuar como el centro de insumo a AGRIS para Dinamarca; 2) suministrar un servicio calificado de búsqueda en línea en bases de datos agrícolas internacionales y en bases de datos relacionadas, a usuarios privados, instituciones de investigación y estudiantes del sector agrícola; 3) enseñar las técnicas para la realización de búsquedas en línea; y 4) enviar documentos a los solicitantes de las búsquedas. Durante los últimos 10 años, el centro de Documentación se ha convertido en una parte importante de la red de información de Dinamarca. En la Royal Veterinary and Agricultural University, se hacen demostraciones de las búsquedas en línea como un procedimiento rutinario del curso de inducción al uso de la biblioteca, ya que el Centro es una dependencia de la misma. La ubicación del Centro de Documentación es de gran ayuda para los científicos de la Universidad que inician nuevos proyectos. El servicio de búsqueda en línea se ofrece gratuitamente a los estudiantes de maestría que están escribiendo su tesis. Algunos de los usuarios externos más frecuentes del Centro son las instituciones de investigación que pertenecen al Ministerio de Agricultura, las que investigan en ciencias de la alimentación, las empresas productoras de medicamentos y los veterinarios que ejercen práctica privada. Aproximadamente 50 por ciento de la literatura solicitada a la Danish Veterinary and Agricultural Library se sumin-

istra mediante búsquedas en línea. El resto se obtiene a través de AGLINET.

ZUSAMMENFASSUNG: 1979 wurde das Danish Veterinary and Agricultural Documentation Center als ein Forschungsprojekt gegründet und vom Ministry of Agriculture and the Danish Agricultural and Veterinary Research Council finanziert. Seit 1984 wird das Zentrum aus dem nationalen Budget finanziert. Das Zentrum hat die folgenden Ziele: als das Dänische AGRIS Input Center zu funktionieren, qualifizierte Online-Recherchen in internationalen landwirtschaftlichen und verwandten Datenbasen für private Kunden aus der Landwirtschaft zu liefern, Forschungsanstalten und Studenten zu unterstützen; die Technik des Online-Suchens zu unterrichten und Dokumente und Lieferungen für Kunden bereitzustellen. Während der letzten 10 Jahre ist das Dokumentations-Zentrum ein wichtiger Teil des Informationsnetzes in Dänemark geworden. Demonstrationen von Online-Retrieval sind ein selbstverständlicher Teil der regulären Bibliotheksausbildung an der Veterinär- und landwirtschaftlichen Universität, da das Zentrum eine Abteilung der Bibliothek ist. Das Dokumentationszentrum ist für die Wissenschaftler der Universität bei der Vorbereitung neuer Projekte sehr hilfreich. Studenten höherer Semester wird zur Erstellung ihrer Dissertation eine kostenfreie Online-Suche angeboten. Forschungsinstitutionen am Ministerium für Landwirtschaft, die Ernährungswissenschaften und Chemie-Konzerne, ebenso wie private Veterinäre sind einige der häufigsten regelmäßigen Benutzer des Zentrums außerhalb der Universität. Die Danish Veterinary and Agricultural Library beschafft ungefähr 50% der angeforderten Literatur auf dem Weg der Online-Recherche. Der Restbestand wird über AGLINET erworben.

The title of this paper was inspired by the tenth anniversary, in 1989, of the Danish Veterinary and Agricultural Documentation Center. For the last five years, the Center has been a permanent department of the Danish Veterinary and Agricultural Library (DVAL) at the Royal Veterinary and Agricultural University in Copenhagen.

With the establishment of the Documentation Center, a new era in the history of the institution began, and the ten years since then have brought DVAL into the age of information technology, with all its advantages and disadvantages. That the Docu-

mentation Center was associated with the national resource library for the agricultural sciences was not a coincidence, but the result of a philosophy that holds that searching for literature should be connected with document delivery, and who could fulfill that better than the library with its collections and its membership of the international interlibrary loan system.

Status of the Danish Registration of Agricultural Research

ALBA—All documents acquired by DVAL are registered in the library's database, which is part of ALBA, the common on-line catalogue of the Danish research libraries, stored at the Danish Computer Center for Research and Education, UNI*C. The database for DVAL contains the literature acquired from 1980; since 1986, when the card catalogue was terminated, the users have had access to the database from equipment in the lending area of the library. Monographs are registered in the Dan-Marc format, following AACR2, and AGROVOC terms are added in Danish and English. Periodicals are entered at the title level with stock information.

AGRIS—The Documentation Center is the national input center for AGRIS, and reports that part of the library's accession that meets the conditions for acceptance by AGRIS. Monographs are catalogued both for the library's own catalogue and for AGRIS, but under different rules and in different formats. An index is made of articles from a selection of Danish periodicals, and it forms a valuable supplement to the registration done by the library itself. For internal use only, the Danish input to AGRIS is stored on a local, PC-based system.

AGREP—Active research projects are reported to the EEC's research database AGREP at Datacentralen in Copenhagen. The information is collected by the Ministry of Agriculture, based on reports from the research institutions of the Ministry and from the Royal Veterinary and Agricul-

tural University. DVAL has no part in the work with AGREP, even though it would have been natural to place it here.

DANDOK—At present, the Danish Committee for Scientific and Technical Information and Documentation (DANDOK) is building a national database, the DANDOK database, with the goal of registering all public and industrial research. Projects with aspects of agricultural interest are reported by bodies such as the Danish Agricultural and Veterinary Research Council when they support these projects financially. No agreement has yet been made to transfer records from AGREP to DANDOK. An on-line search in the DANDOK base is possible through ALBA on UNI*C.

Communicating the Results of Research to Users in the Agricultural Sector

The communication of information to the agricultural sector, including veterinaries and research and industry in the areas of agriculture and food production, is handled primarily by the Danish Veterinary and Agricultural Documentation Center and DVAL. The Documentation Center does on-line searches in the relevant databases, mainly through DIALOG and DIMDI. The charge for the searches takes into account the number of references printed above a pre-set limit. A standard search includes 100 references, and each reference beyond that must be paid for. The result of the search is sent to the requester with no further editing. Any documents needed after a search are delivered usually as photocopies. Roughly half of the documents are available in DVAL, the rest are obtained through AGLINET or from other libraries.

The library offers free access to its catalogue database in ALBA from its own terminals, and instruction in the use of printed bibliographies. The research librarians answer subject queries mostly with the aid of the library's catalogue but other databases, mainly AGRIS, are used when required. External users have to pay

to get access to ALBA but the library hopes to get local storage for the database at some time within the next few years, so that it will be possible to offer free access to all users.

Instruction in the use of databases

As the main library of the Royal Veterinary and Agricultural University, DVAL has an obligation to provide the students with instruction in literature searching and library use. Each semester, the course schedule of the university includes a library course, which consists of seven times to choose from. The course is three hours with a final exam. During the course, on-line searching in external databases is demonstrated, and the use of the library's own on-line catalogue is taught. The course is not compulsory, but it is taken by many students before they start work on their thesis. Employees of the Documentation Center also demonstrate on-line searching to internal and external users groups. These demon-

strations can be held at the users' location, using portable equipment.

CD-ROM

Neither the library nor the documentation center have started to use the CD-ROM technology. We have not had the necessary resources to purchase the equipment, and we do not think that CD-ROM will be able to improve the daily user service until it is offered as a multi-user facility in a computer network. We hope this possibility is not too far away.

Future Visions

A new library building for the Royal Veterinary and Agricultural University has been planned for many years. Because of political disagreement over whether the university is to be moved to another location in Denmark, these plans have not yet been realized. When that happens, we expect to obtain computer facilities, including a local area network with a connection to the Danish university network. We are planning an

integrated library system with access to other libraries and databases, inside and outside Denmark. We hope to be able to coordinate input to ALBA, AGRIS, AGREP and DANDOK, so that the existing Danish tradition of registering agricultural research projects and results can be continued in a rational and efficient way.

This year, the Royal Veterinary and Agricultural University has celebrated the 250th anniversary of the birth of P. C. Abildgaard, founder of the first veterinary college in Denmark. His library was the start of DVAL and Abildgaard's handwritten catalogue documents the world view that formed the background for his life's work. His thoughts and ideas are still of interest even though they are not stored in a computer. Let us not forget, in all our enthusiasm for the new media and technologies, that much wisdom may be found in the old handwritten catalogues. Our world view becomes poor if we cut it off at the start of the on-line age. Perhaps we will be saved by retrospective input, but that is a tale for another day.

Meeting the User's Need: The Most Important Task of the Information Specialist

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*Keywords: user needs (information);
information seeking*

Abstract: The information specialist must know two fundamental facts as starting points: no one is aware that he does not possess adequate information, only the changes of the circumstances make him or her realize it; in most cases the user does not know exactly the kind of information he or she wants. The users need help in the formulation of their requirements presented and not be supplied only with the information requested, but with the information wanted. The personality and abilities of the user must be considered. Information requirements of the individual users are formed under the influence of several objective and subjective aspects. From the aspects determining the user's need of information the most important features in determining information needs are detailed.

RÉSUMÉ: Le spécialiste de l'information doit, tout d'abord, connaître deux facteurs fondamentaux : premièrement, personne n'est conscient du fait qu'il n'est pas en possession de l'information demandée, seuls les changements des circonstances l'en rendent conscient ; deuxièmement, dans la plupart des cas, l'utilisateur ne sait pas exactement ce qu'il veut. Les utilisateurs ont besoin d'aide pour la formulation de leurs demandes, mais l'information fournie ne doit pas seulement répondre à ce qui est demandée, mais aussi à ce qui est désirée. De plus, il faut prendre en considération la personnalité et les capacités de l'utilisateur. Les demandes d'information des usagers individuels sont formulées sous l'influence de plusieurs facteurs objectifs et subjectifs. On présente les facteurs les plus importants qui déterminent les besoins en information des utilisateurs.

RESUMEN: Como punto de partida, el especialista en información debe saber dos cosas fundamentales: 1) nadie es consciente de que no posee la información

adecuada, ya que sólo los cambios de circunstancias hacen que se comprenda este hecho; y 2) en la mayoría de los casos, el usuario no sabe exactamente qué tipo de información desea. Los usuarios requieren ayuda en la formulación de sus necesidades y que se les proporcione no sólo la información solicitada sino la información deseada. También hay que tener en cuenta la personalidad y las capacidades del usuario. Los requerimientos de información de los usuarios se determinan en respuesta a varios factores objetivos y subjetivos. Se describen en detalle los principales factores que determinan las necesidades de información del usuario.

ZUSAMMENFASSUNG: Der Informationsspezialist muß zwei grundlegende Fakten als Ausgangspunkt wissen: keiner ist vor der Tatsache sicher, daß er nicht im Besitz adäquater Informationen ist, nur das Wechseln der Umstände läßen es ihn erkennen. In den meisten Fällen weiß der Benutzer nicht genau, welche Art von Informationen er erwartet. Der Benutzer benötigt Hilfe bei der Formulierung seiner Fragen und muß nicht nur mit der erfragten, sondern mit der benötigten Information versorgt werden. Die Persönlichkeit und die Fähigkeiten des Benutzers müssen dabei berücksichtigt werden. Informationswünsche der individuellen Benutzer sind unter dem Einfluß von verschiedenen objektiven und subjektiven Faktoren geformt. Von diesen Faktoren ist der Informationsbedarf des Benutzers abhängig, die wichtigsten sind ausführlich dargestellt.

To realize the tasks of the society, groups and individuals need adequate information. A precondition to giving adequate information is knowledge of the user's needs in a special field, or of the person to be supplied. Similarly, the development of new information services, or the reorganization of the existing ones requires the knowledge of the demands of the potential or future users. In addition,

it is useful to know the opinion of those for which the already existing services are made and who uses them.

One method, but not the only one in getting information needs, is the organized public opinion research. The results of this give particulars to the organizers of new services. These particulars and data, complete with the detailed experiences, are useful in the planning and development of the new services.

The analysis of the data gives important aspects to the development of the information methods to meet the given requirements. For proper information, the answers given only to the questions are insufficient. Information has to cover what is necessary, especially in the new fields of knowledge and we must not rely only upon the questions formulated by the users.

We must consider that information requirements do not grow as quickly and to the extent as quantity and quality of knowledge and information methods do. The users are not familiar with the recent results, events, methods, opportunities, environmental changes. They sometimes insist on old, perhaps dated information, instead of the recent up-to-date achievements.

The information specialist must know two fundamental facts as starting points: users are not aware that they are not in the possession of adequate information, only the changes of the circumstances make them realize it; in most cases the users do not know exactly the kind of information they want. The users need help in the delimitation and exact formulation of their requirements presented often uncertainly in obscure questions and

urgent requests. In other words, users must not be supplied only with the information requested, but with the information actually wanted.

Despite that in theory the need of the information requested starts from the requirements of society and of the group involved, in practice people are to be provided with information. For this reason, the personality and abilities of the user must be considered as well. Information requirements of the individual users are formed under the influence of several objective and subjective facts.

The most important aspects are:

- Information requirements of a special group, or a person depend on the individual capabilities (e.g. composition of the group, education and qualification, awareness, knowledge of languages.)

- Information requirements depend on the character of the work. There is a great difference whether the work to be done belongs to production, research, management, education, or to another field.

- Information requirements are influenced by the speciality of the user's work. The narrower the field concerned, or the unit examined, the greater the variability in information requirements. In the narrower, partial fields of science and technology essential and revolutionary changes are more frequent than in comprehensive, broader fields. For this reason, the analysis of the information requirements is necessary by branches, specialities, institutions and concrete enterprises.

- There are differences in the extent and character of the information requirements in the various scientific and technical fields as well. The time spent studying the information is different by specialities.

- Even information scattered in various sources is different by specialities. For example, the average chemist finds an important part of the work needed for his speciality concentrated in a few institutes and publications. On the other hand, the biochemist gathers the new information from di-

verse sources, and the zoologist from even more scattered fields. The information interesting to the research worker active in a special field of agriculture and food industry are to be found not only in publications about these branches, but also in other ones.

- There are earlier achievements forgotten by the public opinion, but important when found in former information sources. Some information published in the past evokes interest later. The repeated publication of information is reasonable, in order to avoid its falling out of the flow of information.

- The following, perhaps often neglected features, have an important influence on the acceptance of the information and on the formation or alteration of the user's opinion. These include the prestige of the source or person and the appreciation of the librarian or information officer by the user; the knowledge of the contrary opinion; the confusion or uncertainty of the user; and the well established motivation of the information, and the detailed presentation of the facts.

- For the user, special literature is important not only for orientations, or decisions, but also as primary sources raising creative ideas. For this reason, the use of data banks does not make the continuous study of the original literature and other media unnecessary.

- Because of development, information requirements continuously transform. The greater extent of the research work, the rise of new fields of knowledge, the formation of new relations with the neighbouring fields, the extended demands for quality of products, the education and professional development of the individuals and special groups raise new requirements even in information or put an end to other ones. Up-to-date information has to adapt itself continuously to the changes.

- The work of the information officer requires the knowledge of his (or her) field and the information market. He has to search the require-

ments in order to develop information services in form and content needed, and to supply all necessary information, not more and not less than required.

- In awakening the user's needs and meeting them, a very important thing is the easy availability of the information.

Everybody present in this room is also an information user. Did you already ask the question: why do you use special information?

We can say, that the use of information by the user is generally motivated by two fundamental feelings: fear and convenience. The fear of being unsuccessful without the necessary information motivates users but they want the information convenient to obtain with the least possible input from the information officers and user friendly services. The requirements can be met only by competent information specialists just like the members of IAALD. I see here a growing importance of IAALD: members have to establish rapid contacts by mail, telephone and all other possible means, in order to demand and receive materials to the solution of a recently emerged problem or for a difficult task, personally from each other. Furthermore, we should establish such contacts even with more and more colleagues who have not joined IAALD.

We shall have in mind that here we are in possession not only of the information present in our institution, in our country, but also of the information possessed by our colleagues, and available exclusively by informal manners.

The free, rapid and strong flow of information is especially important. In some regions and countries enormous changes are in progress and there is no cooperation and development without the mutual exchange of information. In my opinion, to use the possibilities of such an informal, casual cooperation would be one of the most important tasks of IAALD.

The Popularization of Scientific Information in Malaysia: the Role of Intermediaries

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Keywords: scientific and technical information; science and society; scientific literacy

ABSTRACT: The problem of popularization of scientific information particularly agricultural information in Malaysia, which has an agricultural-based economy, is discussed. Scientists write to generate scholastic knowledge and for the well being of mankind. Scientific information appears to be the monopoly or preserve of scientists and researchers themselves because scientists and researchers direct much of their writings towards their peers. They write because they want recognition from their peers. It is argued that scientists will continue to concentrate on peer-reviewed work largely with their career in mind and the work is very difficult for the layman to comprehend. In the dissemination of and access to scientific information, the picture is the same. Most of the databases and format of scientific information resources are directed towards the scientists. What options remain then for popularizing scientific information? The role of intermediaries such as editors, journalists, documentalists, librarians, and extension agents in popularizing scientific information are examined. These intermediaries will have to take on the role of 'idea distillers' to link the scientist with the layman. They will have to distill ideas and repackage information so that it is easily comprehensible. These intermediaries cannot work in isolation—they must work in harmony with the scientists. Together with the scientists, the government machinery and mass media, they must launch a pervasive program of popularization. It must be a concerted effort, targeted at both adults and children and indefinite in its time frame.

RÉSUMÉ: Le problème de la vulgarisation de l'information scientifique, et en particulier de l'information agricole en Malaisie, dont l'économie est basée sur

l'agriculture, est discuté. Des scientifiques écrivent pour la production de connaissance scolaire, et le bien-être humain. Cependant l'information scientifique semble être le monopole ou le territoire des scientifiques et chercheurs, car ceux-ci, en écrivant, visent surtout leurs pairs et veulent être reconnus par ces derniers. On prétend que les scientifiques, ayant à l'esprit leur carrière, vont continuer à se concentrer sur le travail révisé par leurs pairs, et ce travail est extrêmement difficile à comprendre pour le profane. Il en est de même en ce qui concerne la distribution et l'accès à l'information scientifique. La plupart des bases de données et des formats de ressources d'information scientifique sont destinés aux scientifiques. Quelles options restent alors pour vulgariser l'information scientifique? Le rôle des intermédiaires tels qu'éditeurs, journalistes, documentalistes, bibliothécaires, et vulgarisateurs dans la vulgarisation de l'information scientifique est examiné. Ces intermédiaires doivent prendre le rôle de "distillateurs d'idées" pour faire le lien entre les scientifiques et le profane. Ils devront distiller des idées et rendre l'information plus compréhensible. Ils ne peuvent pas travailler seuls, mais en harmonie avec les scientifiques. Ensemble avec les scientifiques, le gouvernement et les massmedia doivent lancer un programme de vulgarisation, et cet effort doit être concerté, dirigé vers les adultes et les enfants, et non limité dans le temps.

RESUMEN: Se discute el problema de la diseminación de información científica, particularmente de información agrícola, en el contexto de Malaysia, que posee una economía basada en la agricultura. Aunque los científicos escriben para generar conocimiento académico y por el bienestar del género humano, la información científica, al parecer, constituye el monopolio o el dominio de los científicos e investigadores, ya que ellos dirigen gran parte de sus escritos a sus colegas. Los científicos escriben porque desean el reconocimiento de sus colegas. Se argumenta que los científicos continuarán concentrándose en el trabajo revisado por sus colegas, en gran parte pensando en su

carrera y debido a que el contenido de los trabajos resulta extremadamente difícil de comprender para un lego en la materia. Lo mismo ocurre en la diseminación y en el acceso a la información científica. Si la mayoría de las bases de datos y el formato de los recursos de información científica se dirigen hacia los científicos, qué alternativas quedan entonces para diseminar la información científica? Se examina el papel de intermediarios como los editores, los periodistas, los documentalistas, los bibliotecarios y los agentes de extensión, en la diseminación de información científica. Estos intermediarios tendrán que asumir el papel de 'condensadores de ideas' para crear un vínculo entre el científico y el lego, y tendrán que condensar las ideas y reempacar la información para que ésta sea fácilmente comprensible. Los intermediarios de la información no pueden trabajar aisladamente sino en conjunto con los científicos. Junto con ellos, con la maquinaria del gobierno y con los medios de comunicación, deben lanzar un programa generalizado de diseminación, el cual debe ser un esfuerzo concertado y a término indefinido, dirigido a adultos y a niños.

ZUSAMMENFASSUNG: Das Problem der allgemeinen Verbreitung wissenschaftlicher Informationen, insbesondere landwirtschaftlicher Informationen im Zusammenhang mit Malaysia, das eine auf Landwirtschaft basierende Wirtschaft hat, wird diskutiert. Wissenschaftler schreiben für die Entwicklung des scholastischen Wissens und für das Wohlergehen der Menschheit. Jedoch scheint wissenschaftliche Information das Monopol oder Reservat der Wissenschaftler und Forscher selbst zu sein, da Wissenschaftler und Forscher ihre Schriften an ihresgleichen richten. Sie schreiben, weil sie von ihresgleichen Anerkennung wünschen. Es wird argumentiert, daß Wissenschaftler fortfahren werden, sich auf Arbeiten zu konzentrieren, die von ihresgleichen rezensiert werden und bei denen sie ihre Karriere im Hinterkopf haben und daß diese Arbeiten ausgesprochen schwer für Laien zu verstehen sind. Sowohl bei der Verbreitung als auch beim Zugang zu wissenschaftlichen

Informationen ist das Bild gleich. Die meisten Datenbasen und das Format wissenschaftlicher Informationsressourcen richten sich an Wissenschaftler. Welche Möglichkeiten bleiben dann für die allgemeine Verbreitung wissenschaftlicher Informationen? Die Rolle der Vermittler wie z.B. Herausgeber, Journalisten, Dokumentare, Bibliothekare und Berater bei der allgemeinen Verbreitung wissenschaftlicher Informationen wird überprüft. Diese Vermittler werden die Rolle als "Ideen-Destillator" weiter übernehmen müssen als Glied zwischen Wissenschaftlern und Laien. Sie müssen die Ideen so destillieren und die Informationen so verpacken, daß sie leicht verständlich sind. Diese Vermittler können nicht isoliert arbeiten—sie müssen mit den Wissenschaftlern in Harmonie zusammenarbeiten. Zusammen mit den Wissenschaftlern, der Regierungsmaschinerie und den Massenmedien müssen sie ein universelles Popularisierungsprogramm starten. Es muß eine konzentrierte Anstrengung sein, die sowohl Erwachsene als auch Kinder zum Ziel hat und die in ihrem Zeitrahmen unbegrenzt ist.

Introduction

The popularization of scientific information is not an important concern in Malaysia. A possible reason could be that science as a topic has not always been very attractive to the lay public. Most people are aware that we have a small group of individuals called the 'scientific community' just as they are aware that there are politicians, and teachers. They vaguely know that the material produced by the scientific community is very often beyond their comprehension. Most of their scientific information needs are fulfilled by the mass media when columns are devoted to scientific findings and research activities. It is only of late that the mass media has begun reporting on significant scientific research. The scientific community is now beginning to ask questions, "Should the mass media cover their activities?" "If the mass media does not, how will the public know about their activities?"

Why Popularize Scientific Information?

Although the extent of our research and scientific contributions is small

by the standards of the developed countries, there are several compelling reasons we should begin to take concrete measures towards the popularization of scientific information. One of the major reasons that comes to mind is that the political will and well-being of a country is dependent on a citizenry that can participate effectively in making policies that are increasingly scientific or technically based. If we agree that scientific information should be popularized, who should take a lead role in this move? Should it be the journalists of the mass media, the information and extension officers of the various government ministries, the librarians and the documentalists, the editors and communication personnel of the various universities and research bodies, or the scientists themselves? If we think it should be the scientists, do we know enough of the information seeking and use behaviour of the scientists in our country, to assign them this important function as well?

Popularization of Scientific Information in the West

Let us briefly review the process of popularization of scientific information in the West. Perhaps we can emulate or at least adopt some of the measures that can meet our own needs and objectives.

By the middle of the nineteenth century, the scientific community in the United States and England had evolved a ponderous, passive style of writing that allowed them to communicate only with their peers, thus they became a special community, set apart from other people. They developed their own reward system that appeared to be made up of two halves (Gaston, 1978). The first half was the scientist's contribution. The second was the appreciation accorded by other scientists in using and acknowledging that contribution. The larger community of lay persons did not come into play at all in their reward system. As a result, popular writing came to be regarded as a waste of time and a risk to their rep-

utation. Sociologists describe a powerful system of social control that discourages peripheral activities such as writing at the popular level. (Hagstrom, 1965) According to the scientist, peer recognition is the prime motive for scientific writing and contributions to the public appear to reduce a scientist's prestige within science. Merton also talks of this 'ethos of science' demands that results of research should first be made public to the scientific community and that citation of their work by peers should be the main reward of a job done well. (Merton, 1976)

Though this feeling prevailed, popular science magazines began to be published. One of the first to be published was the *Scientific American* (1845); this was followed by *Science* in 1880. *Science News* (1921) and *Science Digest* (1937) were two other popular science magazines initiated in the 20th century. In the 1950's, a decision was made in the United States that it was "absolutely essential that science—the results of science, the nature and importance of basic research, the methods of science, the spirit of science be better understood by government officials, by businessmen and by all the people." (Rogers, 1981)

It was about this time too that more scientists began to write for the mass media. Two reasons may be given for their action: one is that the issue in question is of such public interest that the findings have to be announced in the mass media or second that the mass media is doing such a poor job of discussing the issue that the scientist righteously steps into the picture as he is the only person competent enough to give the correct information.

Goodell has conducted research on several scientists who became popular through the mass media either by writing or appearing on television. She found these scientists to have certain salient characteristics such as 'controversial', 'articulate', and 'colourful' which made them visible. She conceded that they were not necessarily known in their professional

fields. However, Szarina Abdullah who carried out a citation study recently on the topic of Acid Rain in the United States found that the scientific community accords credits to scientists' scholarly publications regardless of whether they give testimony or write for the public. She found that their involvement with the public did not affect the recognition due to their scientific contributions as measured by citations. From this study, we may imply that the scientific community has been fair to its members, giving credit to those who have made useful scientific contributions regardless of their other activities. This finding should make the scientist less inhibited about popularizing science.

The Scientific Community in Malaysia

This is the scenario in the west. Can we expect our scientists to popularize science for us? We must remember that the most of our scientists have had their training in the west. They too would have been inculcated with the "ethos of science" that has been developed in the west. They also adhere to a scientific, ponderous style of writing that sets them apart from the lay people. They have inhibitions about writing in a popular style or involving the mass media in their research activities. They are just beginning to enjoy the status that goes along with the tag 'scientific community'. When they have set themselves apart from the rest of the community, would they empathise with the information needs of the public?

Most of our scientists are attached to research institutes and universities where the roles they perform are very often demanding and conflicting. Particularly in the universities, besides the teaching function, quite a few of them also have administrative functions to fulfill. Moreover, in a developing country where most things are still being developed, many of them will be involved in curricular and institutional development. Coupled with this is the 'publish or per-

ish' philosophy on which salary adjustments and promotions are based. Under these conditions, most scientists prefer to write articles for refereed journals as only these are considered for promotion. We thus find that we have about 123 journals in Malaysia with about 44 emanating from universities, 50 from professional associations, 8 from research institutes and the rest from ministries, museums, councils etc. (Pillai, 1989). The scientists are also the contributors to the journals of the professional associations.

Besides writing for scientific journals, our scientists are also heavily committed towards intellectualizing the national language. Many of them are involved in terminology planning and coining of terms particularly in the various branches of science. They also undertake the translation of college level basic texts into Bahasa Malaysia. The translation of a college text of 350 pages may take anywhere between 9-18 months and some very serious time commitments are required of the academic staff involved in the translation programme.

The scientific community in our country is now involved with several issues. It is fighting for better rewards and remuneration for its members; it is fighting for more governmental support for Research and Development (R & D). It is still trying to inject dynamism among its members so that the volume of research activities is enhanced.

While engrossed in these activities; should they be involved in the popularization of scientific information as well? Popularization of science will not be a priority item for them. So far, even those scientists and researchers concerned with extension activities have been involved only minimally in writing and publishing for farmers. Much of the extension material in agriculture and agriculture related activities has been the work of a cadre of information disseminators and communicators such as editors, librarians and field and information officers. They carry out the important function of not only

disseminating relevant information to the farmers but also transferring the information needs of these farmers back to the resource persons. This channel of communication must be effective in order for the scientist to carry out research on real rather than imaginary problems.

Popularization of Scientific Information for All

When we talk of popularization of scientific information in Malaysia, the emphasis has been on farmers and peasants. It is the contention of the writers of this paper that scientific information dissemination should not only be directed towards the farmers and peasants. It must be a concerted effort by the government, the scientists, librarians, documentalists, information handlers and communicators and directed at the populace at large. Scientific information must be located, read, distilled and rewritten in a form that is easily understood by various categories of users so that it can result in an intended action. If necessary, new information sources that consider the information needs of a developing country need to be designed. In the information dissemination process, the information handlers or the intermediaries, while working closely with the scientists and the researchers, will have to take on the bulk of the actual work. The scientist and researchers will have to be assigned the role of fact providers.

Measures toward the Popularization of Scientific Information

What measures can we take to popularize scientific information? First is the need for the government to participate more effectively in the science and technological activities of the country. In a developing country the public sector has to take the lead as the input from the private sector is likely to be minimal. For instance, in Malaysia, there are several Inter-agency Planning Groups (IAPG) about several important areas

but, we do not have an IAPG on Science and Development. Recently several committees and councils related to Science and Technology have been set up. These include the Agricultural Science Committee, Medical Sciences Committee, and Expert Group on Biotechnology. It was only in 1985 that the Cabinet deemed it necessary to appoint a Scientific Advisor to the Prime Minister and Universiti Pertanian Malaysia is proud to note that this privilege was accorded to a senior academic staff of the university.

The universities and research bodies must be more consistent in publishing semi-technical bulletins that disseminate information about their research activities. We must remember that it is the politicians, policy makers and senior government officials who very often decide the allocation of funds towards R & D activities in the country. It is therefore important that this group of people are given information on scientific activities that is distilled and makes for easy reading. The editors and documentalists attached to these institutions must be trained and equipped with skills to collect, distill and repackage scientific information in a form that is easily comprehensible. Most universities and research bodies are now publishing semi-technical bulletins on their research activities for dissemination to politicians, government officials and the management of large private sector firms. The timeliness and consistency of these publications have to be looked into.

Now that universities and research bodies are already taking measures to popularize science for the benefit of the policy makers and politicians, what measures can we take to popularize scientific information for other groups of people who need to know about science? For the lay people, can science be popularized by the mass media? According to statistics compiled by Radio, Television Malaysia (RTM), there are over 2.03 million televisions and 1.96 million radio sets in the country that has a population of about 16 million. Considering

these figures, this media will be a good channel for the dissemination of information.

However, a review of the objectives of the mass media—television, radio and the newspapers—finds them to be fragmented. The National Television Network has several national objectives of which popularization of scientific information is not a priority. According to officials of the Research Unit of RTM, science programmes per se are not popular with the people. Hence scientific information has to be interwoven with other popular broad based programmes in order to reach the public. Sometimes, important medical and scientific findings are part of the news coverage or presented as documentaries. However, the time allotted for documentaries may be brief and the programme may be aired very early in the evening or late in the night, thus shutting out large sections of the population. Then there is the educational science programmes on TV, directed towards school children. The main set back of this programme is that it is in the late morning when most of the children are in school and unable to view it. There is also a 15 minute programme on radio entitled “Science and the Public” aired on certain evenings of which most people do not seem to be aware. There is therefore a need for a more realistic timing so that the programmes can be more beneficial to the intended audience.

Where newspapers are concerned, there are several language dailies that cater to the needs of specific language speaking groups. It is quite difficult to plan a cohesive programme from the top involving the various dailies. Science columns do not form regular features of the various newspapers. When there is scientific news of human interest particularly foreign news, it is covered but there does not appear to be definite columns designed as roving reports on the research activities of universities and research institutes.

For the mass media to play a more concerted role in developing science acumen among the people, there must

be political will. This political will must descend from the politicians to the constituencies and subsequently diffuse among the people. It must be remembered that it is the political will of the people that decides the agenda of the mass media. As people become more familiar with science as a topic, they are likely to understand what they read and thus seek more knowledge.

According to Kriehbaum “Those who have begun to analyse and critique the process (popularization of scientific information) have focused their attention mainly on either television or newspaper. Such attention is well justified given the size of the audience involved. However, the results of such analyses lead to the general conclusion that the function and intrinsic capabilities of these media are largely confined to that of arousing interest—not providing much substantive information, much less real knowledge. By default and by what appears to be virtually common consent, the main role of informal adult education on scientific and technical topics is thereby assigned to books and magazines. If such an assignment is correct, the relative neglect of the latter should be promptly repaired.” (Kriehbaum, 1967)

If the mass media can only succeed in arousing interest, it is all the more important that these messages aired over TV/radio or written for the newspapers be so designed that they attract the attention of the lay public. If books and magazines play the important role of educating adults, this media will be the next choice for most people. In Malaysia, we do not have the likes of popular level science magazines such as *Science 80*, *Science News*, *Scientific American*, *Science Digest*, *New Scientist* and the latest, *Omni*. Nor can we initiate popular level science magazines for several reasons.

These popular science magazines in the United States and Britain have large circulations, with a subscriber list drawn from many countries. For instance, the *Scientific American*, the grandfather of popular science ma-

gazines enjoys a circulation of over one million and the respect of science educators and researchers worldwide. The average reader holds 1.5 degrees and is a lay person in fields outside his own. *Science News* has a subscriber list of over 170,000 from over 80 countries. More than 77% of its readers are college graduates. Another popular science magazine, the *Science Digest* has a circulation of 540,000 with most of its readers being young and college educated. The *New Scientist*, a popular science magazine in Britain, covers a wide area of scientific and technical events with humour. It enjoys sales of over 85,000 and a readership of over 500,000. Even science teachers in Britain use this magazine, because it is simple.

Malaysia does not have either the resources or the expertise needed to retrieve scientific information efficiently and quickly so that it can be repackaged to suit the format of a popular science magazine. In Malaysia, the scientific community is very small, and those with college education may constitute perhaps less than 0.8 percent of the population. If we were to cover only local research findings, we may not have sufficient material for the publishing of these magazines. If we were to depend on foreign science news, we may be outdated in our coverage. Thus even if a popular science magazine is initiated, there may not be a good market for it. It may be more practical to import these foreign popular science magazines rather than attempting to publish on our own.

Future Plans

Realizing that scientific prowess and scientific mindedness constitute the key to advancement, the government has been increasingly concerned about technological development. Under the Sixth Malaysia Plan, a goal has been set to spend 1.0% of the GNP on Research and Development (R & D), an improvement of 0.2% over the present allocation. Next year, the Science, Technology and Environment Ministry has asked for an allo-

cation of over \$157.8 million for R & D. The government is also setting up a National Science Centre (NSC) costing \$140 million, scheduled for completion in 1992. The NSC will be designed to display interactive exhibits, including thematic exhibitions, and exhibits on life sciences, physical science, environment, industrial technology and aviation. A heartening move in the right direction is the setting up of a Discovery Centre for pre-school children in the NSC. The NSC will have a comprehensive, up-to-date science and technological reference library accessible to the public. Another move that is being planned is the structuring of the curriculum that is now 40% in favour of science subjects and 60% art subjects to one that is 70% science and 30% arts.

As more allocations are extended to R & D, the volume of scientific and research activities will be enhanced leading to greater public participation. With the government's commitment towards educating the public about science, there will be greater clamour for popular level scientific information. Therefore, the efforts of the public and private sectors, the information people and the scientific community have to be targeted at both adults and children with the programme of popularization being indefinite in its time frame. Only then can science be within the grasp and understanding of as many people as possible.

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The CTA and International Cooperation in the Training of Agricultural Librarians and Documentalists

Maria-Josée Jehl

Keywords: professional development; training; information management

ABSTRACT: The Technical Centre for Agricultural and Rural Cooperation (CTA), an organization under the ACP-EEC Lomé Convention, organizes and supports training workshops for agricultural documentalists and librarians. Being aware that a greater collaboration between organizations is necessary, CTA carried out a study of a coordination training program PROGEFIA (General Programme for Training in Agricultural Information), which is presented in this paper. It invites a combination of efforts to establish a long term master plan for education in agricultural information in the developing countries that should be progressively transformed into a standing offer of programmes.

RÉSUMÉ: Le Centre Technique de Coopération Agricole et Rurale (CTA), établi sous la Convention CEE/ACP de Lomé, organise et soutient des stages de formation pour des documentalistes et bibliothécaires agricoles. Conscient de la nécessité d'une plus grande collaboration entre les organisations, le CTA a réalisé une étude sur un programme de coordination en formation appelé PROGEFIA (Programme Générale de Formation en Information Agricole) présenté dans ce texte. Il invite à unir les efforts afin d'établir un plan directeur à long-terme pour l'éducation en information agricole dans les pays en développement, qui se transformerait progressivement en offre permanente de programme.

RESUMEN: El Centro Técnico para la Cooperación Agrícola y Rural (CTA), una organización bajo el auspicio de la ACP-CEE Lomé Convention, organiza y apoya talleres de capacitación para documentalistas y bibliotecarios agrícolas. Consciente de la necesidad de una mayor

colaboración entre las organizaciones, el CTA realizó un estudio sobre un programa de coordinación en capacitación, PROGEFIA (Programa General de Capacitación en Información Agrícola), que se presenta en este trabajo. El proyecto exhorta a unir esfuerzos para establecer en los países en desarrollo un plan maestro, a largo plazo, de capacitación en información agrícola, que se convierta con el tiempo en un ofrecimiento permanente del Programa.

ZUSAMMENFASSUNG: Das Technical Centre for Agricultural and Rural Cooperation (CTA), eine Organisation unter der ACP-EEC Lomé Konvention, organisiert und unterstützt Schulungsseminare für landwirtschaftliche Dokumentare und Bibliothekare. Eingedenk der Tatsache, daß eine größere Zusammenarbeit zwischen den Organisationen notwendig ist, führte CTA eine Studie über ein koordiniertes Schulungsprogramm PROGEFIA (General Programme for Training in Agricultural Information) durch, das in diesem Aufsatz vorgestellt wird. Es lädt zu gemeinsamen Anstrengungen ein, einen Langzeitlehrplan für die Ausbildung in landwirtschaftlicher Information in den Entwicklungsländern aufzustellen, der stufenweise in ein Dauerangebot des Programms umgewandelt werden sollte.

CTA's Role in the Training of Agricultural Librarians and Documentalists in ACP Countries

The effective use of information is a fundamental requirement for sustaining the development of the rural sector in the less developed countries, especially African, Caribbean and Pacific (ACP) countries. CTA, which was created in 1979 within the context of the ACP-EEC Lomé Convention,

contributes to agricultural and rural development by providing the African, Caribbean and Pacific countries with better access to scientific and technical information on agricultural research and rural development.

In view of the limitations of the agricultural information services in ACP countries, CTA's work aims at improving the quality of the services given by the ACP information centres, enabling them to answer requests and encouraging the use of information in these countries. Its aim is to develop the capacity of ACP countries to produce, acquire and transfer agricultural, scientific and technical information. To achieve this the Centre relies on a regional and national decentralized information network that is steadily being established. The development of such a network requires a greater investment in the training of agricultural information specialists.

In the past, CTA was involved in the organization of several training seminars and workshops for agricultural documentalists in order to enable ACP countries to handle the available and appropriate information sources effectively.

CTA sought an approach that would cover the problems and the specific needs of each region. Several workshops on "Agricultural Information Sources" have been held since 1986:

Dakar, Senegal, for the French speaking countries in Africa in December of 1986; Lilongwe, Malawi, for the English speaking countries in

Africa, in June 1987; Trinidad, West Indies, for the Caribbean countries in November of 1988.

They are aimed at developing the participants' capacity to manage the various aspects of documentation (research, collection, processing and dissemination) and to give them a better understanding of their role as conveyors of information.

Since 1988, following the recommendations of Harry East's (FID) evaluation report of CTA courses for their further improvements, CTA has, or will, organize courses on "Management of Agricultural Information Services" (Lusaka, Zambia for English speaking countries in Africa in July, 1989; Jamaica for the Caribbean countries in September, 1990).

They are aimed at developing management techniques, abilities to justify and implement a development programme of the users services or required organizational changes.

The recommendations of CTA's training workshops stress the need for continuing education of information specialists. To offer complementary individual training, CTA participates in the courses on "Information on Agriculture" organized by CAB International (CABI) and in the "Training Courses for Staff from Documentation Centres and Small Agricultural Libraries" organized by the *École Internationale de Bordeaux* (EIB) supported by the French Agence de Coopération Culturelle et Technique (ACCT). Like many other institutions, CTA considers that there is a need to restructure the 'supply' of training so that it meets the demands for training from ACP countries, avoids redundancies and uses the available resources in a rational way.

The meeting on international cooperation in the training of agricultural librarians and documentalists, held in Rome on 7 June 1988 at the invitation of the Technical Centre for Agricultural and Rural Cooperation, recommended the preparation of a general programme for education in agricultural information that could serve as a platform for a collective effort aimed at overcoming these obstacles.

The General Programme For Training in Agricultural Information—PROGEFIA

In agreement with the recommendations of this meeting, CTA carried out a study of a coordination training programme, called the "General Programme for Training in Agricultural Information—PROGEFIA". This programme proposes a long-term master plan for education in agricultural information in the developing countries, especially in ACP countries.

The provision of specialized education for the various categories of personnel that contribute to the agricultural information activities in these countries is limited and its efficiency suffers from many drawbacks. To solve these problems PROGEFIA offers a plan of action.

The main sets of information functions have been identified for the various categories of staff in three major groups: information producers/users, computer specialists and information specialists. Fourteen general education tracks whose objectives, levels and contents are outlined, have been defined: five are about management of information services and resources, six are about organization processing and utilization of information and three are about computer applications. A track for the training of trainers is also proposed. Five tracks, including the one for the training of trainers, and some of the specific modules spread among various tracks, will be given priority in view of the needs that are known to be the most pressing ones for the national agricultural information systems.

The procedures and the resources required to offer this type of education should rely as soon as and as much as possible upon distance learning methods.

Most parts of the training should be directly related to the implementation of regular activities performed on duty. Admission should be linked with 'education-insertions' agreements, associating the participants, the organizations to which they be-

long and the organizations offering the education, with a view to ensure both the stability of the personnel and the availability of minimum conditions for putting the acquired skills into practice by carrying out previously specified works in the framework of the development of agricultural information systems.

The implementation in successive steps of PROGEFIA will require the setting up of a consortium of educational institutions specialized in agricultural information and centres for practical training willing to cooperate in order to develop their activities by the orientation provided by PROGEFIA. A central liaison-body should allow exchanges between parties via, *inter alia*, a liaison bulletin and follow-up of the trainees.

A background document presenting a tentative design of the programme was distributed to more than 250 organizations and institutions involved in training. Their comments led to a draft programme and an action plan that were submitted to those interested in the system and to an expert consultation in Libreville in December 1989.

The action plan for the establishment of PROGEFIA devised for 1990–92 covers the following areas:

- Priority will be given to short specialized courses on microcomputing and management.
- Survey of information needs: The Consultation recommends that all relevant institutions define their information needs and examine ways of participating in the plan at national and regional levels.
- Production of teaching materials: The Consultation recommends that teaching aids be produced in support of training in agricultural information.
- Support for the establishment of regular academic programmes in agricultural information.
- Contributors meeting: A significant portion of the resources to support these activities already exist, but the latter, however, do not always result from specific, permanent and fixed commitments, partly because

the provision of educational opportunities is not steady itself. Additional resources, will however be required in order begin the interaction mechanisms among the partners and for the development of new courses and methods of instruction.

To disseminate news of the programme, IAALD has generously offered to make its bulletin available to PROGEFIA. IAALD has also been invited by the Consultation to consider the possibility of translating its information bulletin into other languages. Some international organizations such as ACCT are interested in supporting this effort.

PROGEFIA can only be done in successive steps over a period of 8 to 10 years, and should itself disappear in the long term, at least as a mechanism for delivering courses, as courses developed under this programme should progressively be integrated into the regular curriculum of educational systems. Its usefulness as a tool for interaction and support of joint services should, however, continue.

Since the Libreville meeting in December 1989 and within the framework of PROGEFIA, the Centre has already planned several actions:

Two courses this year on micro-computing called "Micro-informatique documentaire pour la gestion de l'information agricole" with EIB and "Workshop on Microcomputing" in Southern and Eastern Africa in collaboration with SACCAR will be held. They are split into two modules

of 4 weeks each that will allow the participants to put their knowledge into practice in the field and to acquire the practical experience that is crucial to any approach to database management. In September 1990, a course on "Management of Agricultural Information Services" will take place in Jamaica, in the Caribbean. Another workshop on management called "Gestion des services d'information" will be organized in Yaoundé, Cameroun in 1991. The lusophone countries expressed their wish to have a course on organization and processing of agricultural information and on the basic processing and handling of documents, during a meeting in Maputo, Mozambique in December 1989.

The production of a series of teaching manuals has been one of CTA's main preoccupations. Authors and potential publishers have already been contacted. These manuals will provide practical answers to questions raised by the community of information professionals.

The University of Botswana has decided to begin a programme leading to a certificate in agricultural information within the implementation of PROGEFIA. Negotiations with CTA are taking place.

A meeting of potential donor agencies will be organized in October 1990 at CTA in order to invite them to contribute to the success of the programme.

PROGEFIA offers as we have seen

an innovative approach which will restructure the availability of training to the real needs of those seeking it. For the period 1990-1992, CTA is responsible for follow-up on PROGEFIA and invites all other associates and institutions interested to provide such assistance as is needed to ensure that the mechanisms for follow-up on the programme functions effectively.

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Improving the Accessibility and Availability of Information in the Agricultural Library and Information System of China

Qiaoqiao Zhang

Keywords: information networks; shared library resources; library collection development

ABSTRACT: The design of a Cooperative Acquisition Programme (CAP) for a regional network—ZALINET—in China is discussed. The model is presented both descriptively and quantitatively for the purpose of design and planning. The types of participating libraries and potential network users are identified in the following sectors: research, education, production, government department, and marketing. A descriptive model has been worked out for the distribution of information resources. The assignment of responsibility for collection and allocation of information resources should be based on: the assessment of the collection strength and subject biases of the libraries and information centres; the identification of geographical characteristics of information resource distribution; the differentiation of sector characteristics of information resource distribution; the identification of the resources already available, both human and material and estimation of future potential. In the descriptive model, the important elements of the design issues of CAP in ZALINET are proposed. The mathematical model intends to work out the optimum solution about total network coverage, overlapping degree of titles among libraries, and duplication of titles within the libraries. The CEB model should be able to help the network manager decide how to carry out the cooperative acquisition program cost-effectively.

RÉSUMÉ: La conception du Programme d'Acquisition Coopérative (CAP) pour un réseau régional—ZALINET—en Chine est examinée. Le modèle est présenté tant sur le plan descriptif que qualitatif aux fins de sa conception et de sa planification. Les types de bibliothèques impliquées et

d'utilisateurs potentiels du réseau sont identifiés dans les secteurs suivants : recherche, éducation, production, département gouvernemental et marketing. Un modèle descriptif a été exécuté pour la distribution des sources d'information. L'attribution des responsabilités en ce qui concerne la collecte et la diffusion des sources d'information devrait se baser sur : l'évaluation de l'importance de la collecte et l'identification de sujets des bibliothèques et centres d'information; l'identification des caractéristiques géographiques dans la distribution des sources d'information; la différenciation des caractéristiques sectorielles dans la répartition des sources d'information; l'identification des ressources déjà disponibles, tant humaines que matérielles et l'estimation des possibilités futures. Dans le modèle descriptif, sont proposés les principaux éléments des problèmes de la conception du CAP dans ZALINET. Le modèle mathématique essaye de dégager une solution optimale sur la couverture totale du réseau, le pourcentage de titres en commun parmi les bibliothèques et la duplication des titres au sein de celles-ci. Le modèle CEB pourrait aider le responsable du réseau à décider comment effectuer un programme d'acquisition coopérative à un coût effectif.

RESUMEN: Se discute el diseño de un Programa Cooperativo de Adquisición (PCA) de una red regional (ZALINET) en China. Para fines de diseño y planeación, se presenta el modelo cualitativa y cuantitativamente. Se identifican los tipos de bibliotecas participantes y los usuarios potenciales de la red en los siguientes sectores: investigación, educación, producción, departamentos gubernamentales y mercadeo. Se elaboró un modelo descriptivo para la distribución de los recursos de información. La asignación de responsabilidades para la recolección y asignación de recursos de información se debe basar en: 1) la evaluación de la fortaleza de la colección y los sesgos temáticos de las bibliotecas y centros de información;

2) la identificación de las características geográficas de distribución de los recursos de información; 3) la diferenciación de las características sectoriales en cuanto a la distribución de los recursos de información; 4) la identificación de recursos físicos y humanos actualmente disponibles y 5) la estimación de las posibilidades futuras. En el modelo descriptivo, se proponen los elementos importantes del diseño del PCA de ZALINET. El modelo matemático pretende elaborar una solución óptima en lo que concierne a la cobertura total de la red y al grado de duplicación de títulos entre las bibliotecas y dentro de ellas. El modelo CEB debe estar en capacidad de ayudar al administrador de la red a decidir cómo implementar efectivamente el programa cooperativo de adquisición en términos de costos.

ZUSAMMENFASSUNG: Der Entwurf des Cooperative Acquisition Programme (CAP) für das regionale Netz—Zalinet—in China wird diskutiert. Das Modell wird sowohl deskriptiv als auch quantitativ für Entwurfs- und Planungszwecke dargestellt. Die Typen partizipierender Bibliotheken und möglicher Netzbenutzer werden in den folgenden Sektoren identifiziert: Forschung, Ausbildung, Produktion, amtliche Stellen und Marketing. Ein deskriptives Modell ist für die Verteilung von Informationsquellen ausgearbeitet worden. Die Zuweisung von Verantwortung für Sammlungen und die Zuordnung zu Informationsquellen sollte auf folgendem basieren: Schätzung der Bestandsgröße und Fachrichtung der Bibliotheken und Informationszentren; Identifikation der geographischen Merkmale der Informationsquellung; Differenzierung der Sektorenmerkmale der Informationsquellenverteilung; Identifizierung der schon verfügbaren Quellen sowohl hinsichtlich Menschen als auch Material und Schätzung der künftigen Möglichkeiten. Im deskriptiven Modell werden die wichtigen Elemente des CAP-Entwurfs in ZALINET vorgeschlagen. Das mathematische Modell bezweckt, die Ma-

Table 1 – Number of Agricultural Research, Education and Information Services

Agricultural Universities and Colleges	59
Agricultural Schools	359
Agricultural Research Institutes and Divisions (Over County Level) ..	2,145
Agricultural Librarian, Documentalists and Information Officers ...	20,000
Agricultural Sci-tech Personnel	328,000
Agricultural Books Published (since 1949)	2,000
Agricultural Periodicals	2,291

Figure 1 – Vertical Sectors of the Chinese Information System.

- Research: the libraries or information divisions in the academies of agricultural science, or agricultural research institutes.
- Education: the libraries and information divisions at agricultural university and agricultural schools.
- Administrative: the libraries and archive centres in governmental agricultural departments.
- Production: the libraries or reading rooms in farms and villages.
- Others: e.g. marketing and farmer run enterprises.

ximallösung für die Gesamtnetzdicke, den Überlappungsgrad von Titeln zwischen den Bibliotheken und Titelduplikationen innerhalb der Bibliotheken auszuarbeiten. Das CEB-Modell sollte in der Lage sein, den Netzmanagern bei der Entscheidung zu helfen, wie sie das kooperative Beschaffungsprogramm kosteneffektiv ausführen können.

Introduction

As an agricultural country, China has been relying on agriculture to develop its economy. The development and achievement can be seen in China's agricultural research, education, and library and information services during last decades, which have laid a solid foundation for modernisation of agriculture. Table 1 gives a general picture of China's agricultural education, research and information services and the major groups of users.

However, it has been admitted that China is one of the developing countries. Certain unfavourable conditions, such as the large population (1.03 billion), low rate of planted land per capita, together with some historical and political reasons have led to an underdeveloped economy, which further impair the development of agricultural library and information services. The multidisciplinary nature of agriculture and multiple administration have complicated the structure of the agricultural information system. The

system is hierarchical with four levels (central, provincial, prefecture and county) horizontally and five sectors vertically. The links between those various information services are difficult. The orientation of agricultural libraries and information centres in China is characterised by their patrons or parent organisations. They can be classified into five sectors as described in Figure 1. The major groups of users are the employees of the five sectors.

In China, the following problems have been identified:

- Low total coverage of information resources;
- Unnecessary duplication and serious budget wasting;
- Over concentration of agricultural information resources in cities, in universities and research institutions at higher levels, but a serious shortage of information resource at the county level;
- Over development of information resources at the research level at the cost of resources at practical level;
- The under development of the information industry and the low utilisation of information resources.

It is of vital importance for China to set up a system with sufficient information resources accessible to all types of users; a scientific allocation of information resources, effective dissemination and services so

that a long-term and stable development of the agricultural economy can be guaranteed with the aid of science and technology. To realise such an objective, one of the most effective ways is establishing networks with the unified goal, of coordination and resource sharing. As with most countries, the impetus of resource sharing and cooperative acquisition in China is to provide improved library and information services more economically by pooling resources, which is based on two principles: one is that no single library can be wholly self-sufficient in the face of demand for a broad spread of bibliographic requirements in support of research needs; the other is the impossibility of funding a multitude of libraries duplicating much of their effort.

Models for Distribution of Agricultural Information Resources (Cooperative Acquisitions)

The broad term "cooperative acquisition" refers to joint action in acquiring and utilising of information resources. Beginning with the preliminary stages of selection, organisations come together in a network for the actual purchase of materials, resulting in joint ownership and use. The idea of cooperative collection development can be described as information resource allocation (distribution); cooperative (coordinated) collection development; and cooperative acquisitions. To some extent, they can be regarded as synonyms. Both non-quantitative descriptive analysis and quantitative approaches, such as operations research, are needed. The former describes and analyses social, political, psychological and behavioural problems, which can not be quantified, while the latter uses scientific methods to study the construction, testing and manipulation of symbolic model to aid in decision making.

Descriptive Analysis

Agricultural Information Resource Distribution Nation Wide and Pro-

Figure 2 – Factors to Consider in Assigning Collection and Allocation of Information Resources

- The assessment of the collection strength and subject bias of the libraries and information centres.
 - The identification of geographical characteristics of information resource distribution.
 - The differentiation of sectoral characteristics of information resource distribution.
 - The identification of the resources already available, both human and material and future possibility.
-

Figure 3 – Objectives of CAP

- To acquire the largest possible network collection on agriculture to satisfy its various types of users in their various locations.
 - To provide all users with access to a wider range of material and services and increasing user request satisfaction at different levels.
 - To reduce the duplicates of lesser-used resource sharing the expenses of expensive items, and avoiding omission in acquisition.
 - To allow individual libraries increased specialisation to meet the primary needs of their local users.
-

vince Wide – Nation wide distribution of information resources is advocated because of the distinguishing geographical characteristics in agricultural production. Information resources should be distributed according to the following principles:

- treat a region (or area) as a basis
- coordinate among different professional systems
- manage in a centralised mode

Such principles are expected to promote the development of regional (provincial) distribution of agricultural information resources by suiting measures to local conditions. The idea of treating the area as a basis, is based on the geographical characteristics of agricultural production, research, education and marketing and the distribution pattern of agricultural production forces. For example the locations of the different agricultural research institutes show the distinct geographical characteristics. The research institutes of rice, silkworm and tea science, affiliated with the Chinese Academy of Agricultural Science, are situated in the Yangtse River area, which is the major production area of rice, silkworm and tea. The characteristics and subject biases of agricultural universities, especially the key universities in China,

also reflect the agricultural production of the locality.

On a regional or province scale, the existing pattern of agricultural information resources already has laid a reasonably solid basis. Furthermore, the formation of an integrated management system for agricultural libraries and information services is also under way. Therefore, it is practical and reasonable to put the emphasis on the geographical characteristics in the distribution of agricultural information resources, and develop an agricultural information system based mainly on the regions.

Agricultural Information Resources scientifically distributed among geographical regions does not necessarily imply a uniform distribution among the areas. Historical and present conditions; developmental trends in terms of economy, culture, education and science; and the existing resource situation of libraries and information services must all be taken into account and plan accordingly so that a network for the distribution of the agricultural information resource with largest possible coverage can be expected. In the case of Zhejiang province, the first step is to allocate information resources to the seven cities and the capital towns of four prefectures. In assigning responsibil-

ity for collection and allocation of information resources, four factors should be taken into account and they are listed in Figure 2.

Brief Description of Cooperative Acquisition Program in ZALINET – ZALINET stands for Zhejiang Agricultural Library and Information Network, which is the example of the regional (provincial) network being modeled by the author. The Cooperative Acquisition Program (CAP) in ZALINET has been considered as one of the major functions to fit the network. Its vital importance to resource sharing network, and its supporting role to other functions should be thoroughly understood by participating member libraries, network administrators, parent organisations and governmental bodies. The major elements of CAP are: objectives; coordinated body; funding; commitment; interlibrary communication and physical access; and standardisation. The objectives of CAP in ZALINET are listed in Figure 3.

Coordination is essential; a subordinated body (governing authority) under the network Governance Body needs to be established to assume the role of coordinating efforts and to set priorities. This central authority would receive annual and periodic reports from participating members to monitor the implementation of cooperative acquisitions plans.

CAP will be funded mainly by the network's own members. Extra funding from provincial, prefectural or even county governments is necessary and would give incentives to the network. Activities to be supported should be considered and prioritised and a formula for funding must be carefully drawn. CAP should be funded for a sufficient period of years to become ingrained in every library's budget process.

Commitment is important; a formal agreement with legal responsibilities should be discussed in the meeting of those participating member libraries. Once the agreement is approved and worked out, a firm and long-term commitment should be complied with by the individual libraries.

Figure 4 – Communication Types Necessary to Support CAP

- Exchange management information about library acquisitions and circulation.
- Communication between libraries to locate bibliographical holdings and status. A Union catalogue, especially a union list of series, should be considered.
- Communication between libraries to transmit ILL requests.
- Easy and fast physical access to the material by designing a system aimed at moving both material and people around.

Communication among members is vital. The types of communication necessary to support CAP are listed in Figure 4. Standard classification should be considered; for example, a standard list of collection subject areas needs to be promoted by the network.

Operations Research

Defining Performance Criteria – In any mathematical modeling processes the objectives need to be quantified. Performance criteria usually reflect the objectives to be fulfilled and the problems to be solved. Therefore, the identification and definition of performance criteria is the first stage of modeling. If we review our objectives of CAP, we can find that they may entail the following major aspects: a comprehensive and largest possible network collection; minimum duplication; and specialisation in collections.

Four performance criteria have been identified to describe how well the CAP will operate. They are: network material accessibility, cost-effectiveness of ILL from other systems, geographical accessibility, and local availability. The four criteria will allow the network administrator to work out a reasonable acquisition program with optimum collection size; optimum rules for acquiring or borrowing; optimum allocation of limited

funds between collection size and duplicated copies both among libraries and within libraries; and optimum allocation of collection among network nodes and subjects.

The Usefulness of Single Objective Function – Following the planning cycle, there are two important stages, cost analysis and trade-off, in which sound techniques are needed. The single objective functions as the mathematical expression of the individual performance (effectiveness) criteria, can be useful objective tools for cost analysis and trade-off. They can serve two main purposes: helping determine the cost requirements of each objective (activity) by setting desired goals (objective measures), thus achieving analytical solutions; then taking the allocation results (after cost-effective-benefit analysis (CEB) and trade-off between cost requirement and budget level) to achieve optimum solutions of those effectiveness measures.

Generation of Alternatives – After data are collected, alternatives that are feasible in terms of the constraints are generated and evaluated for their impact on the objectives. A preferred alternative is selected by decision makers through a political selection process. In the final steps, the chosen alternatives is implemented.

Discussion and Conclusion

The development of China's agricultural library and information system has been hindered by various unfavourable conditions. The profile of the system structure is complicated, but its configuration is basically hierarchical.

The problems which exist, such as low coverage, unnecessary duplication and low utilisation of information resources; bias of information resource distribution and information dissemination all point to the need for networking. A unified goal of cooperative collection development will bring out the largest possible overall coverage with a reasonable allocation of information resource and minimum unnecessary duplication. The present situation calls for formal coordinating organisations, policies, commitment and standards. It is a long-term goal.

Acknowledgements

I would like to thank Professor B.C. Brookes and Professor S.E. Robertson for their patience and guidance.

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The United States Agricultural Information Network (USAIN): Providing Information to the End User

John W. Beecher

Keywords: information networking

ABSTRACT: The United States Agricultural Information Network (USAIN) is the first organization developed specifically to provide a national forum through which U.S. agricultural librarians might address many issues associated with the collection, access and delivery of agricultural information. The objectives of the network include: to provide a forum for discussion of agricultural information issues; to take a leadership role in the formation of a national information policy as related to agriculture; and to make recommendations to the National Agricultural Library on agricultural information matters. The network promotes and assists efforts by the cooperating agencies to: determine the availability and location of resources; develop and implement resource sharing agreements; explore the potentials of shared collection development programs; and maintain and preserve present and future resources. USAIN strives to ensure the fullest possible sharing of information and library materials in the most cost-effective manner. The success of these efforts will help to ensure equality of access and availability of resources for agricultural information users throughout the United States.

RÉSUMÉ: Le réseau d'information agricole des Etats-Unis (USAIN) est la première organisation développée spécialement, pour fournir un forum national où les bibliothécaires agricoles américaines peuvent adresser les nombreuses questions associées à la collection, l'accès et la diffusion de l'information agricole. Les objectifs de ce réseau sont : fournir un forum pour discuter des problèmes en information agricole, devenir un leader dans la création d'une politique d'information nationale apparentée à l'agriculture, et faire des recommandations à la Bibliothèque

Nationale (NAL) sur des questions d'information agricole. Le réseau par les agences coopératives, encourage et soutient les efforts pour déterminer la disponibilité et la location des ressources, développer et appliquer les accords de partage des ressources, explorer les potentiels de programmes de développement de collection partagée, maintenir et préserver les ressources présentes et futures. USAIN s'efforce d'assurer, à bon marché, le partage de l'information et de matériels de bibliothèque. Le succès de ces efforts aidera à assurer aux utilisateurs de l'information agricole, l'égalité d'accès et de disponibilité des ressources à travers les Etats Unis.

RESUMEN: La Red de Información Agrícola de los Estados Unidos (USAIN) es la primera organización desarrollada específicamente para proporcionar un foro nacional a través del cual los bibliotecarios agrícolas de los Estados Unidos pueden abordar los muchos temas relacionados con la recolección, el acceso y el envío de información agrícola. Los objetivos de la red son: 1) proporcionar un foro para la discusión de temas de información agrícola; 2) asumir el liderazgo en la determinación de una política nacional de información en relación con la agricultura; y 3) hacer recomendaciones a la National Agricultural Library sobre diversos aspectos relacionados con la información agrícola. La red promueve y apoya los esfuerzos de las agencias colaboradoras para a) determinar la disponibilidad y localización de los recursos; b) desarrollar e implementar convenios para compartir recursos; c) explorar el potencial de los programas de desarrollo de colecciones compartidas; y e) mantener y conservar los recursos actuales y futuros. USAIN se preocupa por garantizar que se comparta la mayor cantidad posible de información y de materiales de uso en las bibliotecas, de la manera más efectiva en términos de costos. El éxito de este trabajo permitirá garantizar la igualdad de

acceso y la disponibilidad de recursos de los usuarios de la información agrícola en los Estados Unidos.

ZUSAMMENFASSUNG: Das United States Agricultural Information Network (USAIN) ist die erste Organisation, die speziell dafür entwickelt wurde, ein nationales Forum zu beliefern, an die landwirtschaftliche Bibliothekare der USA viele Themen im Zusammenhang mit der Sammlung, dem Zugang und der Lieferung landwirtschaftlicher Information richten können. Die Ziele der Organisation umfassen: Vorbereitung eines Forums auf Diskussionen landwirtschaftlicher Informationsthemen, Übernahme einer Führungsrolle bei der Gestaltung einer nationalen landwirtschaftlichen Informationspolitik, Erarbeitung von Empfehlungen an die National Agricultural Library zu landwirtschaftlichen Informationsthemen. Die Organisation fördert und unterstützt Bemühungen der kooperierenden Stellen, die Verfügbarkeit und den Standort von Ressourcen zu bestimmen, Abkommen zur gemeinsamen Nutzung der Ressourcen zu entwickeln und zu implementieren, die Möglichkeiten von Entwicklungsprogrammen für eine gemeinsame Nutzung von Sammlungen zu erforschen und gegenwärtige und künftige Ressourcen zu erhalten und zu bewahren. USAIN ist bemüht, die höchstmögliche gemeinsame Nutzung des Informations- und Bibliotheksmaterials in der kostengünstigsten Weise zu sichern. Der Erfolg dieser Bemühungen wird helfen, die Gleichheit des Zugangs und die Verfügbarkeit von Ressourcen für landwirtschaftliche Informationsbenutzer in den Vereinigten Staaten zu garantieren.

The United States Agricultural Information Network (USAIN) is the first organization developed specifically to provide a national forum through which agricultural librarians

and other information specialists in the United States might address together many issues associated with the collection, access, and delivery of agricultural information in the 1990s. Though the need for such an organization has long been acknowledged, previous attempts to form a network or some other vehicle for cooperative action have not proved successful. Then, in the early 1980s a Blue Ribbon Panel convened by the National Agricultural Library (NAL) provided the impetus for reconsideration of the idea of an agricultural information network. In its report the Panel, comprised of leaders from the library and information fields and from the United States Department of Agriculture, strongly recommended the NAL "Coordinate a national network of public and private agricultural libraries and information centers, including libraries of land grant colleges and universities, and other public and private sector organizations involved in agricultural information."¹ The NAL, under the leadership of Director Joseph H. Howard, responded enthusiastically, initiating projects and agreements, and holding a series of meetings that brought together interested agricultural librarians to discuss the proposal and methods to implement it. Not surprisingly, there were many different perspectives on the nature of the proposed organization. On the other hand, there was total agreement that the establishment of such an organization was essential.

Assuming its role as network coordinator, the NAL tapped leaders in the land-grant community to serve on a nominating committee. A slate of candidates was produced and elected by mail ballot in June, 1988. These officers, still serving, are: president (currently past president), Nancy Eaton, Director of Libraries, University of Vermont (now at Iowa State University); vice-president, president-elect (currently president), John W. Beecher, Director, North Dakota State University Libraries; secretary, Carol Boast, Agriculture Librarian, University of Illinois; and treasurer, Melvin George,

Director of Libraries, Oregon State University.

Today, the United States Agricultural Information Network, USAIN, barely two years old, remains a developing organization with a charter membership of over 170 individuals and 36 institution members. It is being formed by individuals and institutions dedicated to the goal set for it in an early planning document: "...to assist all potential users in accessing and utilizing agriculturally-related information, through the provision of comprehensive, effective, and efficient library and information products, while minimizing wasteful duplication of effort and resources."² To accomplish this objective, USAIN will take a leadership role in issues related to cooperative collection development and access; in providing a forum for discussion of agricultural information issues; in the formation of a national information policy as related to agriculture; and in making recommendations to the National Agriculture Library on agricultural information matters.

In the effort to achieve these objectives the network, more specifically, promotes and assists efforts by the cooperating agencies to determine the availability and location of resources, to develop and implement resource sharing agreements, to explore the potentials of shared collection development programs, and to maintain and preserve present and future resources. Although access to the growing national agricultural information resources base may be greatly enhanced by modern telecommunication systems, it is important to understand that the USAIN concept of networking involves more than the application of modern technologies to the delivery of requested information. Improved communications among the membership is a primary concern. The potential of networking, as viewed by those of us directly involved in establishing USAIN, includes shared collection development commitments, shared responsibilities for organization and storage of information, collaborative projects using

new technologies, the training necessary to use most effectively these technologies, and shared responsibilities for providing effective access to the total body of information resources.

Significant steps have already been taken to achieve these goals. The "Blue Ribbon Panel" report of 1982 noted that "NAL has not developed an overall network plan and, for the most part, efforts to establish a network structure and programs have been fragmented."³ It recommended that "additional resources be provided to develop a national network from which services can be increased and resources shared."⁴ Since the time of the Panel report, the administration of the NAL has initiated, developed and expanded a large number of cooperative programs. For example, the National Library of Medicine (NLM) has been actively engaged in cooperative efforts for many years and provides networking prototypes that will undoubtedly serve as useful working models for USAIN to study and adapt soon. The National Agricultural Library has negotiated cooperative collection development agreements with the NLM in the fields of veterinary science and nutrition, and is negotiating similar agreements in biotechnology and animal welfare. Such cooperative collection development agreements provide users optimal access to information in a particular field or subfield of study, but avoid unnecessary duplication of expensive resources and the associated bibliographic organization and storage costs.

Other current examples of cooperative agreements and projects include: cataloging arrangements with over 30 land-grant libraries; indexing programs with the University of Arizona Arid Lands Information Center and the University of Georgia; document delivery for USDA employees; training and internship programs; preparation of information products; and research on information technology applications. Examples of this latter endeavor include a telefacsimile study, plus the use of laser media for storage and retrieval of full text databases, and a significant

project, to which 42 land-grant libraries have committed funding, for digitizing page images and coding of full-text printed agricultural publications.

From the beginning, those instrumental in the formation of USAIN have agreed that the term "agricultural literature" must be given the broadest possible interpretation. Besides the fields usually associated with the term, it must include fields of study such as human nutrition, biotechnology, ecology, rural development, natural resources—in fact, all disciplines connected in any way with agriculture. As a corollary, it was agreed that membership should be open to all interested individuals and organizations, whether from the fields of education or business (such as food and feed industries), research or government, be they private or public, large or small. Many of the small specialized libraries associated with agri-business and industry cover their fields in depth. Oftentimes, their specialized collections and collection emphasis cannot be matched in any other library. The contribution that they can make to the larger agricultural infor-

mation community through USAIN is enormous.

For those who may be interested in knowing more about the details of USAIN, Sarah E. Thomas, writing in the Spring 1989 issue of *Special Libraries*, provides a history of its development. Her summary of the organization's objectives would be difficult to improve on: "As with any new organization, it is expected the United States Agricultural Information Network (USAIN) will be a dynamic association that will evolve and change as it matures. Initially, those involved in its creation are trying to keep its structure as simple and flexible as possible. Their foremost concern is to maintain a forum for the discussion of agricultural information issues. The network's goal is to promote and facilitate access to agricultural information for those who use and need this information. Essential for the completion of this goal is cooperation; by working together, libraries and information centers can accomplish far more than they can do as separate entities. By sharing resources, joining in cooperative programs for collection development,

cataloging, indexing, participating in joint endeavors exploring new technologies, and using their collective talents and strengths creatively, a strong agricultural information community can be bonded together to better serve and assist all agricultural information professionals."⁵

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Probleme bei der Einrichtung eines Dokumentenverwaltungs- und Dokumentations-systems auf einem Personalcomputer mit besonderer Berücksichtigung von MICRO-CDS/ISIS

Problems Relating to the Set Up of a Documentation System and Document Management with Personal Computers: MICRO-CDS/ISIS

Wilfried Lang

Keywords: database design; microcomputers; indexing; gateway systems

ABSTRACT: An overview of setting up a document management system with a personal computer is presented. The overview includes the minimum requirements of documentation software including variable field and record length; creation of a search language; response time on searches; field definition and input screens; index setup; use of symbols of other languages; sorting problems; data structure protection; and transfer of structured records. Questions relating to formal document description are also discussed and the Common Communication Format of the UNISIST (CCF) is presented as well as its structural affinity to MICRO-CDS/ISIS. Solutions in the field of subject indexing are presented and the possibilities and limits of MICRO-CDS/ISIS are discussed. The paper concludes with a discussion of the integration of functions for the administration of smaller documentation systems and questions on the design of the user interface.

RÉSUMÉ: La création d'un système informatisé de gestion des documents est passée en revue. Cet article inclut les conditions minimums d'un logiciel docu-

mentaire : champs variable et longueur de la notice, création d'un langage de recherche, temps de réponse, définition du champs et grilles de saisie, création d'index, utilisation de symboles d'autres langages, problèmes de tri, protection de la structure des données et transfert des références structurées. On étudie les question sur la description formelle des documents et on présente le Format commun de la communication (CCF) de l'UNISIST, ainsi que son affinité de structure avec Micro-CDS/ISIS. On avance des solutions dans le domaine de l'indexation thématique et étudie les possibilités et les limites de Micro-CDS/ISIS. Cet article se termine par une discussion sur l'intégration des fonctions pour la gestion des systèmes documentaires plus petits, et des questions sur le modèle de l'interface utilisateur.

RESUMEN Se resume el proceso de instalación de un sistema de manejo de documentos en microcomputador. El resumen incluye los requerimientos mínimos de un programa de documentación que posee campos y longitud de registro variables, la creación de un lenguaje de búsqueda, el tiempo de respuesta de las búsquedas, la definición de los campos y las pantallas de insumo, la creación del índice, el uso de símbolos de otros lenguajes, la resolución de problemas, la protección de las estructuras de datos y

la transferencia de registros estructurados. También se discuten interrogantes en relación con la descripción formal de los documentos y se presentan el Formato Común de Comunicación de UNISIST (CCF) y su afinidad estructural con MICRO-CDS/ISIS. Se dan soluciones en el campo de la asignación de descriptores y se discuten las posibilidades y limitaciones de MICRO-CDS/ISIS. El trabajo concluye con una discusión sobre la integración de funciones en la administración de sistemas de documentación más pequeños y preguntas sobre el diseño de la interfase con el usuario.

ZUSAMMENFASSUNG: Als Mindestanforderungen an eine gute Software sind folgende Punkte zu berücksichtigen: Die Verwaltung variabler Feld- und Satzlängen; eine auf Text zugeschnittene Suchsprache mit dem Einsatz von mindestens Bool'schen Operatoren und einer Trunkierung; eine Suchroutine, die auch bei großen Datenbeständen und komplexen Fragestellungen nicht wesentlich langsamer wird; möglichst große Gestaltungsfreiheit bei der Einrichtung von Feldstrukturen und Masken, zumindest keine Zwangsfelder, Gestaltungsmöglichkeiten beim Indexaufbau; Möglichkeit mehrsprachiger Sonderzeichen; Lösungsmöglichkeit der wichtigsten Sortierprobleme (z.B. zweistellige Sortierung); ein gewisses

Mindestmaß an bearbeiterseitiger Relationalität (Interaktion mit schon aufgenommenen Daten); einigermanßen stabile strukturelle Absicherung der Daten; ein Transfer strukturierter variabler Sätze sollte die Norm ISO 2709 einhalten können. Für die formale Dokumentbeschreibung ist ein möglichst "analytisches" Format auszuwählen, das auch den Strukturen bibliographischer Informationen folgt und bibliographische Ebenen berücksichtigt (z.B. Common Communication Format der UNISIST (CCF)). Für die Inhaltserschließung ist die enge Verbindung mit der Suchkomponente zu beachten; Aufgliederung strukturell unterschiedlicher Kategorien in eigene Felder (z.B. Geographika, Zeitangaben, Formalbezeichnungen), um Normungen zu nutzen; der Einsatz von semantischen Kategorien und von Syntax; Einsatz von Schlagwortlisten und Thesauri; die Handhabung hierarchischer Verknüpfungen. Die Integration von Verwaltungsabläufen kleinerer Dokumentationssysteme setzt eine Entscheidung über Art und Ausmaß von Funktionen im Geschäftsgang und Entlehnung voraus. Die Möglichkeiten und Beschränkungen (z.B. bei der Gestaltung der Benutzeroberfläche) bei MICRO-CDS/ISIS werden diskutiert.

1. Grundsätzliche Überlegungen zu den Anforderungen an die Datenbanksoftware, mit der eine Dokumentation gestaltet werden soll.

Die Forderung nach variablen Feld- und Satzlängen in der Literaturdokumentation hat zwei Hauptgründe: Zum einen können sinntragende sprachliche Strings wie z.B. der Titel stark in der Länge variieren; zum anderen weisen die beschreibwichtigen Teile von Zitaten entsprechend den Literaturformen beträchtliche Strukturunterschiede auf, die sich nur durch die Anlage einer großen Feldanzahl bei deren konkret geringerer Auslastung entsprechend verarbeiten lassen.

Was bei den Anwendern von PC-Datenbanken vielleicht noch wenig beachtet wurde, ist die Konzentration auf einen gewissen Standard an Suchmöglichkeiten. Hier gibt es die Entscheidung Volltextsuche versus Indexbildung. Auch Programme mit Volltextsuche lassen zum Teil ganz brauchbare Fragegestaltungen zu, etwa Bool'sche Operatoren UND, ODER, NICHT, Maskierung, Trunkierung usw.

Als Nachteil muß gelten, daß die Volltextsuche das vollständige Know-How der Stringextraktion dem Suchenden zuschanzt, da ja das System selbst keine Vorauswahl durch Indexbildung (oder solches nur als zusätzlichen Umweg) anbietet. Außerdem ist damit zu rechnen, daß vor allem bei komplexeren Suchfragen ein System mit guter Indexbildung ab einer gewissen Datenmenge Vorteile bei der Suchgeschwindigkeit bringen wird. Dazu sind offenbar keine genaueren Tests veröffentlicht. Wird mit Indexbildung gearbeitet (wie es MICRO-ISIS tut), müßte das System jedoch in der Gestaltung des Index sehr variabel sein, da gerade hier sehr unterschiedliche lokale und fachbesogene Bedürfnisse bestehen. Zugleich ist die interne Gestaltung eines leistungsfähigen und mächtigen Indexmoduls auch programmtechnisch sehr aufwendig. Hierbei spielt MICRO-ISIS wohl deswegen seine größten Vorteile aus, weil es ursprünglich am Mainframe entwickelt worden ist.

Programme, die als Anwendungsgestaltungen nicht nur Literaturdokumentation, sondern auch ein wenig Verwaltung der Dokumente, wenn auch nur für kleine Standorte und Mengen, im Auge haben, arbeiten oft mit einer Vorfixierung, die spätestens dann unangenehm wird, wenn in der Dokumentation "literarische Ebenen" (selbständige Literatur, unselbständige Literatur, begrenzte und unbegrenzte Sammelwerke) zur Herstellung der Zitierformate beachtet werden sollen. Es gibt z.B. einige **fix definierte Zwangsfelder** wie Autor, Titel etc., bei denen nicht mehr unterschieden werden kann, ob ein Titel Primärschlüssel eines selbständigen oder unselbständigen Werkes ist. Das wiederum schränkt die Freiheit in der Bildung von verschiedenen Zitierformen ziemlich ein. Außerdem hat es einen deutlichen Einfluß auf die Behandlung der Relationalität auf der Ebene der Literaturfassung: Muß ein Titel mehrfach abgespeichert werden, der in einem Datensatz die Rolle des Werktitels (Monographie), in einigen an-

deren (unselbständigen) die Rolle der Quellenangabe spielt?

Davon zu unterscheiden ist die **Relationalität**, die eine Software bietet (diese kann man natürlich nur nutzen, wenn auch die freie Felddefinition die Berücksichtigung der obenerwähnten literaturbedingten Relationalitäten erlaubt); am besten ist natürlich "volle Relationalität", d.h. Echtzeitsynchronbearbeitung aller durch Links verknüpften Daten und Dateien. Da aber bei der Datenerfassung aus ergonomischen Gründen die Geschwindigkeit nicht so wichtig ist wie bei der Suche, kann man hier auch mit quasirelationalen Systemen auskommen, die Links nur für gewünschte Prozeduren "abarbeiten", z.B. bei der Zitaterzeugung wird die Quellenangabe aus einem "alternativen Datensatz" geholt (wie es z.B. MICRO-ISIS vorsieht); oder bei einer Suche wird eine Liste aller gelinkten Datensätze ausgegeben (z.B. alle erfaßten Artikel eines Kongreßbandes) usw. Umgekehrt ist auch zu bedenken, daß eine zu weit vorangetriebene Relationalität unter Umständen den Datentransfer dadurch behindern kann, daß die konkret zu exportierenden Datensätze erst mit großem Aufwand "zusammengesetzt" werden müssen, um für sich (ohne die mit ihnen durch Links intern verknüpften Informationen) abgerundete Information zu bieten.

Für den **Transfer** strukturierter Datensätze mit variabler Feld- und Satzlänge gibt es die ISO-Norm 2709. Am besten wäre es, wenn eine Software Import und Export in dieser Form bereits eingebaut hätte. Mindestvoraussetzung ist jedoch, daß eine Programmiersprache zur Verfügung steht, die die Erzeugung eines Imports bzw. Exports nach ISO 2709 ermöglicht. Scheinbar spielen beim Transfer die Volltextprogramme einen Vorteil aus: bei diesen kann man ohne Norm die Downloadings in seine Daten integrieren. Der Preis ist jedoch, daß man entweder unstrukturierte oder sehr unterschiedlich strukturierte Daten sammelt, bei denen man auch schon nach kurzer Zeit keine Suchfragen mehr abschicken kann, die

nur ein einigermaßen relevantes Ergebnis bringen. Das mag in relative kleinen Datenmengen (wobei 1000 Zitate sicher noch als kleine Menge anzusehen sind) nicht allzusehr stören. Je mehr aber ein "Volltext" anwächst (und das wird er bei der Leichtigkeit, mit der man fremde Daten hereinbekommt, sehr schnell tun), ein desto undurchsichtigeres Gestrüpp wird er für Fragestellungen. Auf Dauer lohnt sich der Verzicht auf die Struktur nicht.

Schließlich ist noch eine Anmerkung zum Zeichensatz zu machen. Sehr verlockend sind Programme, die vielfach erweiterte Zeichensätze bieten. Dabei ist jedoch zu beachten, daß damit auch zusätzliche Sortier- und Transferprobleme auftreten. Es wird daher vorteilhaft sein, sich möglichst mit dem ASCII-Zeichensatz zu begnügen und die Sortierwerte so zu regeln, wie es auch die ISO vorsieht: akzentuierte Zeichen sortieren gleich (!) wie die Grundlaute, als z.B. ä wie a (Damit ist es eher nicht sinnvoll, die zweiwertige Sortierung der deutschen Sonderzeichen (ä - ae) anzuwenden: auch die gängigen Lexika tun das nicht!). Eine Ausnahme bildet jedoch der Sortierwert des "ß", der immer "ss", also zweiwertig ist! ISIS bietet hier die Möglichkeit, mit den Daten zusätzlich Sortierinformation abzulegen, die beim Zitat unterdrückt wird, etwa "Stra<ß=ss>e", das dann als "Strabe" ausgedruckt, aber als "Strasse" sortiert wird. Der String <ß=ss> kann auch auf eine Funktionstaste gelegt werden, die anstelle von "ß" zur Eingabe benutzt wird.

2. Konkrete Entscheidungen, die bei der Anwendungsgestaltung ATISIS durch den Autor getroffen wurden.

2.1 Als Feldformat wurde das "Common Communication Format" (CCF) der UNISIST in Paris ausgewählt. Im CCF werden die Strukturen vieler bestehender Großdatenbanksysteme und maschinenlesbarer Datenaustauschformate berücksichtigt und verallgemeinernd zusammengeführt. Ein weiterer Grund für diese Wahl ist, daß beide, MICRO-ISIS und CCF in engem Konnex zueinander entwickelt worden sind. So arbeiten beide

mit den Unterstrukturen "wiederholbare Felder" und "Teilfelder". Gegenüber der CCF waren folgende Erweiterungen nötig: die Felder wurden auf die bibliographischen Ebenen aufgeteilt, da MICRO-ISIS in der vorliegenden Form die Segmentierung in bibliographische Ebenen nicht kennt. Es wurden zur Inhaltserschließung und zu einfachen Verwaltungsabläufen zusätzliche Felder geschaffen. Insgesamt erweist sich gerade die starke Analytik von CCF als besonders flexibles Datenorganisationsinstrument.

2.2 Bei der Inhaltserschließung (Indexierung) wurde zunächst darauf geachtet, daß durch die Einrichtung eigener Felder (Teilfelder) Personenschlagwörter, Geographika, Zeitangaben, Numerische Angaben und Formalangaben von der Sachbeschreibung getrennt werden, um strukturell unterschiedlich mit diesen Schlüsseln arbeiten zu können. Ein eigenes Feld gibt es auch für codierte Klassierungssysteme. Bei allen Feldern ist Wiederholbarkeit für die überall sinnvolle Mehrfachzuordnung vorgesehen. Die Teilfelder sind überall dazu benutzt, nach Bedarf kennzeichnen zu können, wenn bestimmte Beschlagwortsregeln und -systeme bzw. Klassierungssysteme verwendet werden sollen (die somit auch unterscheidbar sind!). Die automatische Indexierung der verbalen Inhaltserschließungsfelder arbeitet mit der Indexierungstechnik 4, die der codierten Felder mit 1. Die Zusammenführung der Mehrwortbegriffe kann bei der Größenordnung von kleineren Dokumentationen ruhig der Suchmöglichkeit der Umfeldoperatoren überlassen werden. Bei der Erstellung der Auswahltable für den automatischen Index wurde auch ein Set von Suchnummern zusammengestellt, das sinnvoll Informationsgruppen zusammenfaßt. Prinzipiell läßt sich mit MICRO-ISIS auch ein ONLINE-THESAURUS interaktiv verwalten, allerdings nur mit einem zusätzlichen PASCAL-Programm, für das die ausgelieferte Version bloß ein ganz einfaches Beispiel bietet. Auch der Einsatz von STOPWORD- und ANY-Files wurde genutzt.

2.3 In der Anwendung wurden auch kleinere Verwaltungsabläufe integriert. Im Bereich des Geschäftsgangs wird nur mit der Ablage von Daten gearbeitet (Preis, Lieferant usw.), die sich durch einfache Befehle aufsummieren lassen etc. Eine volle Verrechnung lohnt nur, wenn eine Möglichkeit zur Integration in andere Verrechnungssysteme gegeben ist. Hilfreich wird in jedem Fall die Verknüpfung mit Rechnungs- und Lieferscheinnummern sein, sowie eine relative genaue Statusinformation über verwaltbare Einheiten. Die Relation "Bibliographischer Datensatz—Verwaltbare Einheit" bedarf insgesamt doch eine sehr präzise Regelung in einem System, das nicht nur bibliographisch arbeiten, sondern auch Verwaltungsinformationen handhaben können soll. Bei der Entlehnung hängt eine Mitführung sehr von der Entlehnfrequenz ab. Die einfachste Form, nämlich einen Entlehnvermerk an den Datensatz zu hängen, sieht die vorliegende Anwendung vor. Weitere Automatisierungen, die mit Zusatzprogrammen vorstellbar wären, wie eine Automatisierung von Mahnungen etc., sind erst ab einer gewissen Anzahl der Entlehnfälle sinnvoll. Auch die Hefteverwaltung bei Fortsetzungen läßt sich in einfacher Form im Feld "Bestandsangaben" durchführen. Dazu müssen natürlich für alle Fortsetzungen eigene Datensätze angelegt werden.

2.4 Die Gestaltung der *Benutzeroberfläche* ist in der vorliegenden ISIS-Anwendung am wenigsten entwickelt. Darum sollen hier nur Wünsche zur Weiterentwicklung genannt werden. Zum Einsatz verschiedener "Arbeitsblätter" (worksheets), die eine grundsätzliche Benutzerführung darstellen, ist zu wünschen, da bei der Bearbeitung eines vorhandenen Datensatzes eine automatische Umstellung des Arbeitsblattes nach der Literaturart möglich wird. Darüber hinaus ist ein "quasi-interaktives" Arbeiten, d.h. die Einblendung von Fenstern zu vorhandener Information bei gleichzeitigem Verbleib im aktiven Datensatz, äußerst wünschenswert. Schließlich wäre auch noch der mit

der Funktion "ref" durchaus mögliche Einsatz von Relationalität sinnvoll, d.h. die nur einmal in einem Datensatz abgespeicherte Angabe von Quellenwerken und Gesamttiteln. Insgesamt könnte das Display der Arbeitsblätter mittels Pascalprogrammen mit mehr Hilfstexten und Dialogelementen versehen werden. So ließen sich sogar wahlweise sehr verschie-

dene Benutzeroberflächen für Laien bis Experten implementieren. In der beschriebenen Anwendung wurde von der Möglichkeit, auch den Systemdialog in die eigene Sprache zu übersetzen, Gebrauch gemacht und eine deutsche Version von MICRO-ISIS unter Einsatz möglichst aller terminologischen Normungen auf diesem Gebiet hergestellt.

3. *Abschluß.*

Dieser Erfahrungsbericht beruht auf der konkreten Arbeit mit einer MICRO-ISIS-Anwendung für kleine Institute an der Universität für Bodenkultur. Zahlreiche zusätzliche Details und Fragen, die bei der Anwendung auftauchen, können vom Autor bzw. von Nutzern der Anwendung erfragt werden.

Do Specialized Literature Information Services Still Have a Chance in Agricultural Information?

Wolfrudolf Laux

Keywords: database producers; user needs (information); database

ABSTRACT: The market for literature information services is ruled by supra-professional services, a part of them being produced in the framework of international cooperation. Specialized services are still offered with an increasing tendency. These services aim at certain needs of certain groups of users or certain fields. The question is discussed how such services can win recognition on a market with growing competition? What are their advantages and disadvantages? What conditions have to be fulfilled to be accepted by the user? What marketing problems do these databases have? The database PHYTOMED, which is a specialized database on phytomedicine, serves as an example.

RÉSUMÉ: Le marché pour les services d'information est régenté par des services supra-professionnels, dont une partie est produite dans le cadre de la coopération internationale. Des services spécialisés sont toujours offerts avec une tendance croissante. Ces services visent à combler certains besoins de certains groupes d'usagers ou de certains secteurs spéciaux. On étudie comment ces services peuvent être reconnus sur un marché où la compétition est de plus en plus importante. Quels sont leurs avantages et inconvénients? Quelles sont les conditions à remplir pour être acceptés par l'utilisateur? Quels sont les problèmes de marketing de ces bases de données? La base de données PHYTOMED spécialisée en phytomédecine est un exemple.

RESUMEN: El mercado de los servicios de información bibliográfica está regulado por servicios supraprofesionales, una parte de los cuales se produce en el campo de la cooperación internacional. Todavía se ofrecen servicios especializados, siendo

cada vez mayor la tendencia a ofrecerlos. Estos servicios se orientan a ciertas necesidades de determinados grupos de usuarios o de ciertos campos especiales. Se discute cómo dichos servicios pueden ganar reconocimiento en un mercado de creciente competencia. ¿Cuáles son sus ventajas y desventajas? ¿Qué condiciones deben cumplirse para ser aceptado por el usuario? ¿Qué problemas de mercadeo presentan estas bases de datos? Se utiliza como ejemplo la base de datos PHYTOMED, la cual se especializa en fitomedicina.

ZUSAMMENFASSUNG: Der Markt für Literaturinformationsdienste wird von fachübergreifenden Diensten regiert, ein Teil davon wird im Rahmen der internationalen Zusammenarbeit erstellt. Spezialisierte Dienste werden noch mit einer steigenden Tendenz angeboten. Diese Dienste zielen auf bestimmte Bedürfnisse von bestimmten Benutzergruppen oder auf bestimmte Spezialgebiete. Die Frage wird diskutiert, wie solche Dienste Anerkennung auf einem Markt mit wachsender Konkurrenz gewinnen können. Was sind ihre vor- und Nachteile? Welche Bedingungen müssen erfüllt sein, um vom Benutzer akzeptiert zu werden? Welche Marktprobleme haben diese Datenbasen? Die Datenbasis PHYTOMED, die in Phytomedizin spezialisiert ist, dient als ein Beispiel.

At the "VIIIth IAALD World Congress" Deselaers from the Federal Republic of Germany generated an extensive discussion when he, based on the publications of Koenig, demonstrated the overlapping of the large agricultural information and documentation services. The discussion resulted in a resolution of the IAALD members' meeting calling the three large services AGRIS, AGRICOLA

and CAB to actions aiming at cooperation and concentration.

It's not my job to give an account of whether such actions were taken and, if so, what results were achieved. I would rather reflect on the question of what part the large number of small agricultural information and documentation services, whose range of activities are worldwide, in many different specialization such as languages, regions or science specialism, would play if there was a closer cooperation between the three large services.

Two possibilities seemed to be likely for these services. The first possibility is that the comprehensive information base of the large services, especially when operating jointly leaves no room for further activities of smaller and economically less efficient information services. The second possibility is that a joint supranational information base of the three large services results in a leveling with respect to languages and subjects or in high costs which put them out of reach for many users. This may lead to a completely new and possibly even an increasing demand for specialized services providing a certain information standard within their particular specialization. Today, five years after Ottawa, we can state that the information readiness concerning the three large services hasn't changed much. So the conclusion seems likely that this also applies to the smaller services.

The first point that I think is worthy of note is that the number of smaller services decreased. This can

be substantiated after a careful check of the *World Directory*, issued by IAALD. Anyone working in agricultural libraries or documentation centres will confirm this impression. The decisive criterion whether a small service can survive seems to be whether the service, due to its capacity, its financial background and to its frequency of use, is able to offer a retrievable database, additionally or alternatively to the printed service. Certainly, we are the world over and still to far away to use databases online extensively. Even in the Federal Republic of Germany recent figures state that 97% of the services offered are printed services with an increase, however, of 6% whereas the electronic services still have a market share of about 3% but with the yearly increase of 25%. The figures show that in spite of the present wide use of printed services the use of databases will acquire growing importance and that only the so offered databases will have a chance to survive in the long run.

Such a prognosis, however, states nothing about the chances of small and specialized services surviving. The reason is that international networks or the access to international networks are not available in many countries of the world. This is because the funds for the technical devices as well as for using such facilities are not available in all countries. It is likely that funds needed to use the large databases operating internationally will be a serious obstacle to many countries in the future as well. In these countries, national services printed or offered as databases and open to the national currency will have prospects.

Another trend has been manifesting in the information and documentation market worldwide during the last few years that had been ignored initially in the discussion on the large and small services. This is the rise of network independent data processing on a PC by individuals and institutions. The rapid developing technology and its considerable storage capacities have been raising the ex-

pectation to be able to design and to operate their own databases for individual requirements. Many people believe the time is passed when individuals or small institutes had most inefficiently produced their own data collections in file form, since the large databases have been providing large and ever ready amount of data in an efficient manner, will have to rethink the matter. There will be, of course, no longer such things like inefficient index card systems but the private storage device, the disk with the industriously collected data, presents an admittedly more efficient procedure that in principle doesn't vary from the old index card system.

The question is, however, where the industrious PC operators derive their data from. The most obvious solution is, of course, the downloading of searches performed in large databases or the display of certain search parts. Have the suppliers of the large international databases sufficiently thought over the consequences resulting from this trend? Will they tolerate these developments without doing anything? Will they try to take legal proceedings that are according to experiences less effective? Will they try to exert a regulative influence over their prices? Or will they wait inactively in the not unrealistic expectation that the individual PC operators won't last?

Whatever the trend will be, new aspects will follow for the relationship between the large databases and the specialized small databases. PC owners will select from the large services whether under points of time, languages, regions or particular subject areas. These offerings are and will be the domain of the smaller and specialized services. They will surely react to new trends where it can not be ruled out that they, due to their smaller equipment, will be quicker and more flexible than the large systems.

Another trend whose consequences could not be foreseen five years ago is the CD-ROM medium that plays a large part in using databases. The advantages resulting from their uncomplicated use at any location are

immense and the competitive advantage of the large databases in this medium is indisputable because of the necessary investments. We must wait and see whether their obvious advantages will balance the disadvantages such as the limited topic and whether it will soon be possible to reduce their production costs in such a manner that the high subsidies can fall away which are today spent to supply the developing countries. These subsidies surely will not be available forever. Even if the technical requirements concerning equipment will no longer hinder its use, the acquisition and updating of CD-ROM is still so expensive that only larger data suppliers and information brokers at libraries and other institutions can use CD-ROM as a quick and easy information source.

The increasing number of online users will, on the contrary, look for other possibilities of use. In any case, I think, the behaviour patterns of the individual user groups in dependence on their information needs and on the qualitative level of their requests are still inadequately observed. These behaviour patterns will likely need more thorough and continuous observations in order to provide the suitable services required by the evolving needs of the user.

A further aspect which isn't sufficiently considered in designing international databases is the original task of information and documentation to put the findings of scientific research into practice. When in agricultural practice, and this is also true also for developing countries, more and more electronic media, whether television or videotext (the latter is playing an increasing role in the Federal Republic of Germany) are used. Classes of society are often excluded such as those who possess insufficient foreign languages skills or those who, due to their education and function, are insufficiently trained to handle scientific literature and even less its surrogates in electronic databases. The future will show whether the large databases will regard it adequate to approach these classes of

population and their information needs or whether here a specific task will arise for services specialized in languages or regions or for services whose data are so simple to search that people less experienced in handling databases and scientific literature are able to use them. The development of expert systems, such as in plant protection and in other subject areas, show the trend.

Up to now there are still complaints, and this concerns highly developed countries, too, that the original literature recorded in databases can't be delivered at all or not quickly enough. When these difficulties can't be removed even in countries with an extensive and highly developed library system, how then is the prob-

lem to be solved in countries where the library situation is insufficient and where "telefax" and "online ordering" as well as the very term "lending service" is a nearly unknown. At present it cannot be denied that just because of legal reasons, reasons concerning literary property, and save for a wide range of technical reasons, only few specialized services can guarantee the quick and complete supply of the original literature cited in the near future. AGLINET established and developed for this task will also cover this demand only to a certain extent.

If the title of this paper had awakened the expectation that a "yes" or "no" answer would be given, then this expectation wasn't answered. It should, however, not be undervalued

in what light the question asked five years ago appears today. I am sure we will again consider and discuss the problem differently after another five years of scientific and technical progress.

I consider it important for anybody working in agricultural information and documentation, whether in large databases or in specialized information services, always to be ready to keep, as impartially as possible, an eye on the information scene that is developing so quickly and so excitingly. Because of the technical changes as well as changes in the users' behaviour, we all of us must be willing to question anything created, organized, and achieved in order to find better solutions.

Technical Books for Agriculture

Publishing and Market Potentials

Csaba Gallyas

Keywords: publishing industry [Hungary]; information dissemination

ABSTRACT: Prior to 1986 there were about 20 publishing houses in Hungary. Today this number is about 400, creating a seller's book-market requiring a change in the publishing structure of technical books for agriculture. To change the structure the state needs to relinquish the publication of these materials as they no longer adequately subsidize them. The high prices and small publication numbers make libraries the main "targets" to purchase because of falling purchasing power. This change is also required because of the structural reorganization of agricultural production. The number of small-scale producers is on the increase and workers on the remaining big farms will not be hired workers. It will be in the producers' best interest to become qualified by expanding their knowledge if they want to run a farm successfully. Publishers and libraries have to make preparations for supplying this huge stratum with technical books. Can we count mainly on private buyers? The relatively cheap books with wide circulation are easy to sell. We do not want the scientific foundation of food-production to suffer increasingly heavier losses. That is why the government and the new organizations of self-administration will have to find ways to bring back the scientific books on special subjects, monographs describing the latest achievements of research, hand-books, works of basic science, and to bring these within the reach of the technical libraries.

RÉSUMÉ: Avant 1986, il y avait 20 maisons d'édition en Hongrie. Aujourd'hui, ce nombre s'élève à 400, créant un marché du livre et exigeant un changement de structure dans l'édition de livres techniques pour l'agriculture. Pour changer la structure, l'état doit céder la publication de ces manuels comme il ne peut plus satisfaire le financement. A cause des prix élevés, du faible tirage et de la baisse du pouvoir d'achat, les bibliothèques deviennent les "cibles" principales comme acheteurs. Ce changement est rendu aussi nécessaire par la réorganisation de la structure de la production agricole. Le

nombre de petits producteurs est en hausse et les salariés agricoles des grandes fermes restantes ne seront plus des salariés. Les producteurs auront intérêt à se spécialiser en améliorant leur connaissances s'ils veulent réussir à gérer une ferme. Les éditeurs et les bibliothèques doivent se préparer à fournir cette multitude de livres techniques. Mais peut-on seulement compter sur les acheteurs privés? Les livres relativement bon marchés avec une large diffusion se vendent facilement. Nous ne voulons pas que la fondation scientifique de la production alimentaire souffre de pertes toujours plus lourdes. C'est pourquoi le gouvernement et les nouvelles organisations d'auto-gestion doivent trouver des solutions pour relancer les livres scientifiques spécialisés, les monographies décrivant les derniers résultats de la recherche, les manuels et ouvrages de science fondamentale, et les mettre à la disposition des bibliothèques techniques.

RESUMEN: Antes de 1986, había cerca de 20 casas editoras en Hungría. Actualmente, esta cifra es de 400 aproximadamente, lo cual le crea al vendedor un mercado de libros que requiere un cambio en la estructura de publicación de libros técnicos para el área agrícola. Para cambiar la estructura, el estado necesita renunciar a la publicación de dichos materiales, debido a que ya no son adecuadamente subsidiados. Los altos costos y el número reducido de publicaciones hacen de las bibliotecas los principales "blancos" de compra, debido al decreciente poder adquisitivo. Otra razón para el cambio es la reorganización estructural de la producción agrícola. El número de productores en pequeña escala está aumentando y las fincas grandes que quedan no contratan trabajadores. Por lo tanto, si desean manejar una finca con éxito, estos trabajadores tendrán mejor acogida entre los productores si mejoran su calificación y amplían sus conocimientos. Los editores y las bibliotecas tienen que prepararse para suministrar libros técnicos a este enorme estrato. Pero, podemos contar principalmente con los compradores privados? Los libros de gran circulación y relativamente baratos son fáciles vender. No se pretende que la base científica de la producción de alimentos sufra pérdidas cada vez más intensas. Por eso, el go-

bierno y las nuevas organizaciones de autoadministración tendrán que encontrar formas de recuperar los libros científicos de temas especiales, las monografías que describen los últimos logros de la investigación, los manuales y los trabajos en ciencias básicas, y ponerlos al alcance de las bibliotecas técnicas.

ZUSAMMENFASSUNG: Vor 1986 gab es in Ungarn ungefähr 20 Verlage. Heute beträgt die Zahl etwa 400 und schafft damit einen Buchmarkt, der einen Wechsel in der Veröffentlichungsstruktur landwirtschaftlich-technischer Bücher notwendig macht. Um die Struktur zu verändern, muß der Staat die Herausgabe solcher Veröffentlichungen aufgeben, da er sie nicht länger angemessen subventioniert. Die hohen Preise und kleinen Auflagen machen die Bibliotheken wegen der fallenden Kaufkraft zu Hauptverkaufszielen. Dieser Wandel ist auch wegen der strukturellen Umorganisation der landwirtschaftlichen Produktion notwendig. Die Zahl der kleinen Hersteller ist im Zunehmen begriffen, wobei die Arbeiter auf den verbleibenden großen Betrieben hierbei nicht mit herangezogen werden. Es wird im größten Interesse der Hersteller liegen, sich durch Erweiterung des Wissens zu qualifizieren, wenn sie einen landwirtschaftlichen Betrieb erfolgreich betreiben wollen. Verlage und Bibliotheken haben für die Versorgung dieser großen Schicht mit technischen Büchern Vorbereitungen zu treffen. Aber können wir auf viele private Käufer zählen? Die relativ preiswerten Bücher mit großer Auflage sind leicht zu verkaufen. Wir wollen nicht Veröffentlichungen über Grundlagenforschung der Nahrungsproduktion, um zunehmend schwerere Verluste zu erleiden. Deshalb müssen die Regierung und die neuen Organisationen der Selbstverwaltung neue Wege suchen, wissenschaftliche Bücher über spezielle Themen, Monographien, die die letzten Errungenschaften der Forschung beschreiben, Handbücher, Arbeiten über Grundlagenforschung neu aufzulegen und diese für technische Bibliotheken erschwinglich zu machen.

[Editor's note: This paper was presented at the conference but not available for publication.]

Der Endbenutzer und der Informationsvermittler: eine Schnittstelle zwischen Datenbank und Suchfrage

The End User and the Intermediary—an Interface between Database and the Search Query

Michael Scholz

Keywords: user needs (information); information retrieval; user satisfaction (information); online searching; search strategies

ABSTRACT: End users are not often familiar with fundamental principles of databanks and cannot formulate their search. The end user and the intermediary do not always adequately discuss the search. A technique for interviewing is necessary to find out the actual need for information and structure the search to provide the necessary information at a relatively low cost. Experiences from practising information services in the Documentation Centre for Phytomedicine of the Federal Biological Research Centre especially in the databank PHYTOMED are discussed.

RÉSUMÉ: Les utilisateurs finals ne sont pas souvent familiarisés avec les principes fondamentaux des banques de données et ne peuvent pas formuler leurs demandes. L'utilisateur final et les intermédiaires n'étudient pas toujours la demande d'une manière satisfaisante. Une technique d'interview est nécessaire afin de découvrir les besoins réels en information, et de structurer la demande pour obtenir l'information nécessaire à un prix très

réduit. On étudie des expériences acquises à travers les services d'information de la banque de données PHYTOMED, offerts par le centre de documentation en phytomédecine du Centre de recherche biologique fédéral.

RESUMEN: En general, los usuarios no están familiarizados con los principios fundamentales de las bases de datos y no pueden formular su búsqueda. El usuario y el intermediario no siempre discuten adecuadamente el procedimiento de búsqueda. Es necesario utilizar una técnica de entrevista para determinar la necesidad real de información y estructurar la búsqueda, para proporcionar la información necesaria a un costo relativamente bajo. Se discuten las experiencias con los servicios de información del Centro de Documentación en Fitomedicina del Centro Federal de Investigación Biológica, especialmente con la base de datos PHYTOMED.

ZUSAMMENFASSUNG: Auch wenn die Anwesenheit eines Benutzers beim Recherchevorgang nur ein leider seltener Idealzustand ist, sollte versucht werden, zu verdeutlichen, von wievielen Faktoren eine optimale Zusammenarbeit zwischen Informationsvermittler und Benutzer abhängig ist. Nicht nur Verständnis und Einsicht in die technischen, nomenklatori-

schen, aber auch finanziellen (!) Voraussetzungen einer Recherche sind notwendig, auch die menschliche Beziehung, der persönliche Kontakt zwischen den beiden am Informationsprozeß beteiligten Partnern mit seinen vielfältigen, auch psychologischen Aspekten trägt entscheidend zum Erfolg der Nutzung von Datenbanken bei.

Eine Schnittstelle ist ein Übergang zwischen zwei Bereichen. Dieser Begriff aus der Datenverarbeitung (8) übernommen, soll andeuten, daß an der Nahtstelle zwischen der Datenbank mit ihren festen Regeln und dem Anfragenden, dem Benutzer mit seinen Wünschen, Anpassungen nötig sind, die auch von psychologischen Gegebenheiten bestimmt sind. Informationsvermittlern und Datenbankherstellern ist es ein Anliegen die Benutzung ihres Angebotes zu fördern. Die Biologische Bundesanstalt für Land- und Forstwirtschaft (BBA) ist Datenbankhersteller und Informationsvermittlungsstelle zugleich. Wir bauen zum Fachgebiet Pflanzen- und Vorratsschutz die Datenbank PHYTOMED (6) auf.

Weil sich die Kosten einer Online-Recherche oft prohibitiv auf die Nachfrage auswirken, ist es besonders wichtig, den Benutzer durch Qualität vom Wert der Online-Recherche zu überzeugen. Eine sorgfältige Bearbeitung der Aufträge schafft zufriedene Benutzer, die den Dienst auch wieder in Anspruch nehmen und zudem weiterempfehlen werden. Im folgenden möchte ich zu der angesprochenen Schnittstelle einige Überlegungen vortragen und diese mit Hinweisen auf die Datenbank PHYTOMED und auf unser Vorgehen verknüpfen. Benutzer sind die Wissenschaftler der Biologischen Bundesanstalt, der Pflanzenschutzämter, der Universitäten sowie Studenten und sonstige Interessierte aus dem Aus- und Inland. Sie finden in der Datenbank PHYTOMED bibliographische Nachweise der Literatur, die weltweit zum Pflanzen und Vorratsschutz erscheint, zurück bis zum Jahre 1965. Die Benutzer lassen sich nach der Art ihrer Anfragen, von der weit gefaßten bis zur ganz speziellen Fragestellung, oder nach ihrem Auftreten unterscheiden. Neben dem fachlichen Wissen bringt der Benutzer seine Persönlichkeit in den Kommunikationsprozeß ein. Wir Informationsvermittler der Biologischen Bundesanstalt sind Fachwissenschaftler und zugleich Spezialisten für Dokumentation, d.h. wir sind mit allem vertraut, was zum Wiederauffinden von Informationen nötig ist. Zudem sind wir gute Kenner der Datenbank PHYTOMED, weil wir die Literatur, es sind dies die Bestände der Bibliotheken der Biologischen Bundesanstalt, selbst indexieren. Auch der Thesaurus wurde von Wissenschaftlern der Biologischen Bundesanstalt entwickelt. Beim Zusammentreffen der Partner im Vorbereitungsgespräch kommt es darauf an, die geeignete Suchfrage zu formulieren. Dazu ist es sinnvoll, den anwesenden Benutzer, der erstmals eine Online-Recherche zur Literatursuche gewählt hat, ein wenig mit den technischen und organisatorischen Gegebenheiten des Retrievals vertraut zu machen, damit er Verständnis für die Möglichkeiten

und Grenzen einer Datenbankrecherche gewinnt. Nach unseren Erfahrungen sind Benutzer zufriedener, wenn sie bei der Recherche anwesend sind und den Verlauf der Suche selbst mitbestimmen können. Der größere Teil der Anfragen an PHYTOMED wird aufgrund schriftlich oder fernmündlich erteilter Aufträge bearbeitet. PHYTOMED ist von Berlin aus über einen DATEX-P Hauptanschluß der Deutschen Bundespost beim Rechenzentrum des "Instituts für medizinische Dokumentation und Information" (DIMDI) in Köln, aber auch über STN in Karlsruhe erreichbar. Der Dialog findet also mit einem 600 km entfernten Rechner statt. Zur Benutzerinformation gehört es auch, zu erklären, mit welchen Kommandos und mit welcher Rahmensoftware gearbeitet wird. Wir benutzen das in der Bundesrepublik Deutschland entwickelte und weit verbreitete Softwarepaket der Firma GENESYS. Dieses bietet Funktionen für die automatische Anwahl des Hosts, zur Vorbereitung von Suchfragen, die auch während des Dialoges aufgebaut und geändert werden können, sowie solche zur Speicherung und Bearbeitung der Suchergebnisse. Ein Programm zur Bereinigung der gefundenen Dokumente von Doubletten und ein Datenbanksystem (HEUREKA), runden das Programmpaket ab. Erklärungsbedürftig sind die wichtigsten Befehle der bewährten Dialogsprache GRIPS, einer Eigenentwicklung des DIMDI. In diesem Zusammenhang muß einem Anfänger das Prinzip der Boole'schen Logik, das "AND" und "OR" erläutert werden. Aus eigener Erfahrung weiß ich, daß es manchem Benutzer Schwierigkeiten bereitet dieser Logik in seiner Anwendung beim Suchvorgang zu folgen. Wichtig ist es auch, zu erläutern, wie für eine Datenbank indexiert wird. Der PHYTOMED-Thesaurus (3) bestimmt zum Beispiel, daß die in den Texten behandelten biologischen Objekte mit ihren wissenschaftlichen Namen, die Pestizide mit den Namen nach ISO indexiert werden. Darüberhinaus werden etwa 200 Allgemeinbegriffe nach dem Ver-

fahren des "Coordinate Indexing" zum Indexieren benutzt. Diese Hinweise sollen es dem Benutzer erleichtern, die vom Informationsvermittler entwickelt Suchfrageformulierung nachzuvollziehen, dem Ablauf des Geschehens zu folgen, und insbesondere die Inhalte der Felder zu interpretieren. Die bei der Recherche anfallenden Kosten brauchen die Agrardokumentationsstellen des Bundes glücklicherweise nur in Form einer Pauschalgebühr weiterzugeben. PHYTOMED ist im übrigen lizenzgebührenfrei nutzbar.

Für das Vorbereitungs-gespräch haben nicht nur die formalen Fertigkeiten, sondern auch die Fähigkeiten zur Kommunikation ihre Bedeutung. Die psychologischen Aspekte der Gesprächsführung sind in der Literatur über das "reference interview" häufig diskutiert worden. Trotzdem finden sie weniger Beachtung als die technischen Aspekte des Retrieval. Man glaubt sich auf eigene Lebenserfahrung verlassen zu können. Dabei wird vergessen, daß vielleicht der Informationsvermittler selbst einmal bei der Einführung des Computers mit einer gewissen Befangenheit reagiert hat und aus Angst vor der Begegnung und dem Umgang mit technischen Neuerungen in seinem natürlichen Verhalten blockiert war. Ebenso erscheint es mir verständlich, wenn sich ein junger Student einem älteren Informationsvermittler gegenüber unsicher und ängstlich fühlt. Dies ist gewiß dann der Fall, wenn er nicht so recht weiß, was er eigentlich fragen will, wenn er seine Frage nicht ausreichend konkretisieren kann. Manchmal mag auch die Person des Informationsvermittlers so wirken, daß der Benutzer nicht aus sich herauszugehen vermag. Aus dem Unterlegenheits- und Unsicherheitsgefühl kann eine gespannte Atmosphäre entstehen, in der mit dem sogenannten territorialen Verhalten reagiert wird. Eine hochgestochene Sprache oder Arroganz soll den eigenen Status erhöhen, das Gefühl der Unterlegenheit ausgleichen. Über derartige Erfahrungen mit Studenten berichtete Preuss (7) aufgrund seiner Tätigkeit

als Informationsvermittler an einer Universität. Man sollte sich deshalb die Voraussetzungen für eine wirkungsvolle Gesprächsentwicklung bewußt machen. Als Grundbedingungen einer Beratungssituation nennt Rogers (zitiert nach 7) die Variablen Akzeptanz, Empathie und Kongruenz. Der Benutzer soll angenommen werden, eine nicht an Bedingungen gebundene Wertschätzung erfahren, akzeptiert werden. Dies bedeutet, daß über ihn und seine Fragestellung nicht geurteilt wird, auch wenn man anderer Auffassung ist. Ein geduldiges Eingehen auf die Gedankengänge des Gesprächspartners, ein einführendes Verstehen—Empathie—vermittelt diesem das Gefühl verstanden zu werden und mindert solche von Hilflosigkeit und Unterlegenheit. Kongruentes Verhalten meint die Vorstellung, daß eine Atmosphäre fruchtbarer Zusammenarbeit begünstigt wird, wenn der Informationsvermittler dem Benutzer sein jeweiliges Vorgehen erklärt und damit für ihn nachvollziehbar macht. Zum Erfolg von Online-Suche und Gespräch trägt auch die Zufriedenheit mit dem Verlauf des Gespräches bei. Es besteht aus mehr als dem Austausch von Worten. Auch vom Körper gehen Signale, Botschaften aus, die sich vom Gefühl nicht abspalten lassen und somit Teil des Kommunikationsprozesses sind. Wenn man der Auffassung folgt, daß etwa nur ein Drittel der Botschaften eines Gespräches Worte sind (Davis 1971, zitiert nach 5), dann wird verständlich, daß die averbalen auch Gefühle von Abgelehnt- oder Unerwünschtsein hervorrufen können (Swope und Katzer, 1972, zitiert nach 5). Zum Beispiel werden Gesten wie die Bewegung der Augenbrauen, der Blickkontakt oder ein Nicken mit dem Kopf anzeigen, daß das Gesagte verstanden, angenommen worden ist. Besonders in der Reaktion auf die Geste des Lächelns wird deutlich, daß der Mensch dazu neigt, nichtverbales Verhalten des anderen wiederzuspiegeln. So entsteht, bevor überhaupt Worte fallen, Kontakt. Unnahbarkeit wird sicherlich mit Gesten wie zögerndes Unterbrechen einer augenblicklichen

Tätigkeit oder dem Sitzenbleiben auf dem Stuhl signalisiert. Wer mit seinen Fingern auf die Tischplatte trommelt, gibt wahrscheinlich zu verstehen, daß er sich durch den Besucher gestört fühlt. Vielleicht bestätigen auch eigene Erfahrungen, daß nicht immer positive Signale gegeben werden. In einer Untersuchung (5) wurde ermittelt, daß Auskunftspersonal einer Bibliothek nur in der Hälfte der Fälle solche positiven Signale übermittelte und immerhin zu fast 20% negatives Verhalten zeigte. Das Verhalten des Informationsvermittlers kann also zur Zufriedenheit des Benutzers beitragen, wenigstens aber verhindern, daß dieser bei einem unbefriedigenden Verlauf der Online-Recherche die Informationsvermittlungsstelle mit negativen Gefühlen verläßt. Auch davon kann es abhängen, ob es bei einer einmaligen Inanspruchnahme solcher Dienste bleibt, oder ob Online-Recherchen als ein geeignetes Mittel zur rationeller Gewinnung von Informationen weiterhin genutzt werden.

Wir machen häufig die Erfahrung, daß es schwierig ist, herauszufinden, was der Anfrager wirklich will. Eine Anleitung (9) zur Formulierung von Suchaufträgen wird viel zu wenig beachtet. Schon 1897 wurde in einer Veröffentlichung auf dieses Problem hingewiesen. Taylor (1968, zitiert in Auster 1983) hat das Thema untersucht und charakterisiert die Situation etwa so: der Benutzer muß versuchen, etwas zu umschreiben, was er nicht weiß, was ungleich schwerer auszudrücken ist als das, was man weiß. Die Verwendung eines Auftragsformulars, das wir für schriftliche Anfragen entwickelt haben, in dem der Benutzer aufgefordert wird sein Thema ausführlich darzustellen, es einzugrenzen und Stichworte zu geben etc., hat in der aktuellen Sitzung wenig Nutzen. Das Ansinnen, ein solches auszufüllen, muß den Benutzer frustrieren. Während des Vorbereitungsgespräches wird der Informationsvermittler seinerseits Fragen stellen müssen. Sie sollen den Benutzer anregen, sein Anliegen ausführlicher darzulegen. Die sogenannten offenen Fragen, die mit Was, Wer, Wo oder

Wann beginnen, geben dem Antwortenden Spielraum. Hingegen lassen geschlossene Fragen mehr oder weniger nur die Antwort Ja oder Nein zu. Untersuchungen haben gezeigt, daß geschickte Fragen dem Benutzer dazu verhelfen, sich über eine erfolgreicheres Suchergebnis auf die Zufriedenheit mit dem Kommunikationsprozeß auswirkt (1). Die Beobachtung, daß 90% aller Fragen des Informationsvermittlers bei Beratungsgesprächen an den Benutzer geschlossene Fragen waren (Lynch, 1978, zitiert nach 2), macht deutlich, daß Selbstbeobachtung angebracht ist. Wenn es für einen Benutzer schwierig ist, sich verständlich zu machen, ist es, um Mißverständnissen vorzubeugen, vorteilhaft sich zu vergewissern, richtig verstanden zu haben. Die Technik etwas Wort für Wort zu wiederholen oder mit eigenen Worten nochmals zu formulieren, mag simpel klingen, und man mag Hemmungen haben sie anzuwenden, doch sie dient unter Umständen auch dem Benutzer, der nun selbst hört, was er vorgebracht hat. Auch Pausen üben Einfluß aus. Sind sie zu kurz, kann beim Benutzer das Gefühl entstehen, nicht zu Worte zu kommen, dauern Pausen hingegen länger als 10 Sekunden, kann das Gefühl aufkommen, als hätte der Gesprächspartner das Interesse am Benutzer verloren (2).

Ich komme zum Schluß.

Auch wenn die Anwesenheit eines Benutzers beim Recherchevorgang nur ein leider seltener Idealzustand ist, sollte versucht werden, zu verdeutlichen, von wievielen Faktoren eine optimale Zusammenarbeit zwischen Informationsvermittler und Benutzer abhängig ist. Nicht nur Verständnis und Einsicht in die technischen, nomenklatorischen, aber auch finanziellen (!) Voraussetzungen einer Recherche sind notwendig, auch die menschliche Beziehung, der persönliche Kontakt zwischen den beiden am Informationsprozeß beteiligten Partnern mit seinen vielfältigen, auch psychologischen Aspekten trägt entscheidend zum Erfolg der Nutzung von Datenbanken bei.

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Where East Meets West: The Supply and Exchange of Agricultural Information

Colin Ogbourne

Keywords: scientific and technical information; information dissemination; information management

ABSTRACT: CAB International (CABI) activities that enhance the dissemination of agricultural research results to and from Eastern European countries by close co-operation with national agricultural information centres are reviewed. CABI has been distributing abstract journals throughout Eastern Europe for many years and has regularly received direct from Eastern Europe abstracts of the region's agricultural research literature. In 1958, *World Agricultural Economics and Rural Sociology Abstracts* was established with the International Agricultural Economics Association and IAALD, based in Vienna, and most of the abstracts were contributed by a network of people linked to these two organizations. Input to WAERSA and other CABI journals from individual abstracters in Eastern Europe continues to this day. In the early 1980s AGROINFORM, within the Hungarian Ministry of Agriculture, began supplying CABI with abstracts of Hungarian agricultural publications. It acquired CAB ABSTRACTS on magnetic tape several years ago and in January 1990 became the first Eastern European country to acquire the database (1984-90) on CD-ROM. In 1988, Hungary became the first Eastern European country to join CABI, bringing its total membership to 30. In November 1989, CABI signed an agreement with VNIITEI Agroprom, the All-Union Research Institute of Information and Economic Studies of the Agro-industrial Complex, Moscow, with the dual aim of enhancing worldwide knowledge of Soviet agricultural research and access by Soviet researchers to global information sources.

RÉSUMÉ: Les activités du CAB International (CABI) favorisent une plus large diffusion des résultats de la recherche agricole en provenance et à destination des pays de l'Europe de l'Est par une coopération plus étroite avec les centres

d'information agricole nationaux. Pendant de nombreuses années, le CABI a distribué des revues analytiques en Europe de l'Est et a reçu directement de l'Europe de l'Est et de manière régulière des analyses portant sur la recherche agricole de la région. En 1958, le bulletin analytique *World Agricultural Economics and Rural Sociology Abstracts* a été créé de concert avec l'Association économique agricole internationale et l'IAALD, établie à Vienne. Pour la plupart d'entre elles, il s'agit de contributions provenant d'un réseau de personnes engagées dans ces deux organisations. La fourniture de données à WAERSA et à d'autres journaux de CABI provenant de contributeurs privés en Europe de l'Est se poursuit jusqu'à ce jour. Au début des années 80, AGROINFORM, du Ministère de l'Agriculture hongrois, a commencé à fournir au CABI des analyses de publications agricoles hongroises. CAB Abstracts fût acquis sur bande magnétique il y a plusieurs années et en janvier 1990, ce pays fut le premier de l'Europe de l'Est à se doter d'une base de données (1984-90) sur CD-ROM. En 1988, la Hongrie fut le premier Etat de l'Europe de l'Est à se joindre au CABI, portant ainsi le nombre d'adhérents à 30. En novembre 1989, le CABI a signé un accord avec VNIITEI Agroprom, l'Institut de recherches soviétique d'information et d'études économiques du complexe agro-industriel, avec le double objectif d'accroître, à un niveau international, la diffusion de la recherche agricole soviétique et de promouvoir l'accès, pour les chercheurs soviétiques, aux sources d'information globales.

RESUMEN: Se revisan las actividades de CAB Internacional (CABI) para ampliar la diseminación de resultados de investigación agrícola hacia y de países de Europa Oriental, mediante la colaboración cercana con centros nacionales de información agrícola. Durante muchos años, CABI ha estado distribuyendo revistas de resúmenes analíticos en toda Europa Oriental y ha recibido directa y regularmente resúmenes analíticos sobre la literatura en investigación agrícola de esa región. En 1958, se estableció la publicación *World Agricultural Economics and Rural Soci-*

ology Abstracts, conjuntamente con la Agricultural Economics Association e IAALD, con sede en Viena, obteniéndose la mayoría de los resúmenes de una red de personas relacionadas con estas dos organizaciones. Hasta hoy, compendios de Europa Oriental continúan enviando su insumo a WAERSA y a otras publicaciones periódicas de CABI. A comienzos de los 80, AGROINFORM, que pertenece al Ministerio de Agricultura de Hungría, empezó a suministrarle al QB resúmenes analíticos de publicaciones agrícolas de Hungría. Hace varios años, Hungría adquirió CAB ABSTRACTS en medio magnético, y en enero de 1990 se convirtió en el primer país de Europa Oriental en adquirir la base de datos (1984-90) en CD-ROM. En 1988, Hungría fue el primer país de Europa Oriental que se unió a CABI, elevando el número total de miembros a 30. En noviembre de 1989, CABI firmó un convenio con VNIITEI Agroprom, el Instituto Soviético de Investigación en Información y en Estudios Económicos del Complejo Agroindustrial, con sede en Moscú, con el doble objetivo de ampliar el conocimiento mundial sobre la investigación agrícola en la Unión Soviética y el acceso de los investigadores soviéticos a fuentes de información a nivel mundial.

ZUSAMMENFASSUNG: Es wird ein Überblick über die verstärkten Aktivitäten von CAB International (CABI) bei der Verbreitung landwirtschaftlicher Forschungsergebnisse in und aus osteuropäischen Ländern durch enge Zusammenarbeit mit nationalen landwirtschaftlichen Informationszentren gegeben. CABI verbreitet seit vielen Jahren Referateorgane im gesamten östlichen Europa und erhält regelmäßig direkt aus Osteuropa Referateblätter über landwirtschaftliche Forschungsliteratur aus dieser Region. Im Jahre 1958 wurde *World Agricultural Economics and Rural Sociology Abstracts* in Verbindung mit der International Agricultural Economics Association und IAALD gegründet, und die meisten Referate wurden von Menschen beigesteuert, die mit diesen beiden Organisationen verbunden waren. Der Input in WAERSA und in anderen CABI Zeitschriften aus einzelnen Referateorganen

Osteuropas dauert bis zu diesem Tage fort. In den frühen 80er Jahren begann AGROINFORM des ungarischen Landwirtschaftsministeriums CABI mit Referaten ungarischer landwirtschaftlicher Veröffentlichungen zu beliefern. Es erwarb vor mehreren Jahren CAB ABSTRACTS auf Magnetband und war im Januar 1990 das erste osteuropäische Land, das die Datenbasis (1984–90) auf CD-ROM kaufte. Im Jahre 1988 war Ungarn das erste osteuropäische Land, das sich der CABI anschloß und damit seine Gesamtmitgliederzahl auf 30 erhöhte. Im November 1989 unterzeichnete CABI ein Abkommen mit VNIITEI Agroprom, dem Allunions-Forschungsinstitut für Information und ökonomische Studien des agroindustriellen Komplexes in Moskau, mit dem Ziel sowohl weltweit die Kenntnisse über die sowjetische landwirtschaftliche Forschung zu verbreiten als auch den Zugang sowjetischer Forscher zu umfassenden Informationsquellen zu erweitern.

The profound political changes occurring throughout Eastern Europe have brought into focus the importance of access to global sources of scientific and technical information to national reconstruction. In no area is this more crucial than in agriculture, which plays a key role in the economies of all countries of the region. Agricultural development is dependent on a country's capacity to apply the results of agricultural research done elsewhere or to do the original research itself. To benefit from existing knowledge or conduct worthwhile research, both depend on having comprehensive and reliable sources of relevant data. Unfortunately, in Eastern Europe, scientists rarely have access to the full range of books and journals they need, and as a result their ability to contribute to agricultural development may be diminished. CAB International (CABI) has been helping scientists and other professional workers in agriculture gain access to the world's expanding store of agricultural knowledge for over 60 years. Set up originally to help scientists working in British colonies in Africa, CABI has evolved into an intergovernmental organization providing a range of information and scientific services for agriculture that are used all over the world. Al-

Table 1 – CABI's Product Distribution—Data on relative numbers of subscribers to CABI's abstract journals in selected countries of Western and Eastern Europe and in the USA (1988 data) compared with population size

Country	No. of subscriptions (% of total)	Population (millions)
USA	17.8	240
UK	10.3	57
Netherlands	4.7	14
Italy	3.8	57
West Germany	3.6	61
France	3.0	55
Spain	2.5	39
Yugoslavia	1.0	23
Turkey	0.7	49
Poland	0.5	37
USSR	0.5	279
Hungary	0.4	11
Bulgaria	0.3	9
Czechoslovakia	0.2	16
East Germany	0.02	17
Romania	0.01	23

though Eastern European countries make small use of CABI services at present, developments over the last few years suggest that this situation may change. The purpose of this paper is to review the existing relationship between CABI and Eastern European countries as exhibited by the use of CABI information services in individual countries of Eastern Europe; coverage of Eastern European literature by CABI; cooperation between CABI and national agricultural information centres in the region, and opportunities for Eastern European governments to improve access to the whole range of CABI services by becoming members of the organization.

CABI's Information Services

CABI publishes the bibliographic database covering the whole of agriculture, forestry and allied subjects. The database contains abstracts of over 2.3 million items of literature back to 1973; in 1990 it is expected that over 150,000 new items will be added. Before 1973 another 3 million abstracts had been published in printed form, in a range of abstract journals on scientific topics. At the present time, 45 journals are produced from the database that is itself available either whole or in part on

electronic media such as magnetic tape and CD-ROM. The database and associated printed and electronic products are used by scientists and others wishing to keep up-to-date with scientific developments, review past findings, or find answers to practical problems.

Use of CABI Information Services in Eastern Europe

Most subscribers to CABI's abstract journals and other database products are in North America, Western Europe, Japan and Australia. Products are in North America, Western Europe, Japan and Australia. Eastern European countries use CABI data to a much smaller degree, as the data in Table 1 show.

Extrapolating from these data, it can be seen that USSR takes only 3% of the number of subscriptions taken by the USA, a country with a comparable population, only 13% the number taken by Italy and 20% of the number taken by Spain. Of the East European countries, Yugoslavia takes the most (twice as many as the USSR and Poland): East Germany and Romania take few. All the countries of that region have fewer subscriptions than do West European nations of comparable size. As a proportion of world sales of CABI's journals, the

Table 2 – Serials Seen Regularly from East European Countries

Country	% of Total
USSR	31.8
Czechoslovakia	19.3
German Democratic Republic	15.0
Poland	13.6
Yugoslavia	7.1
Hungary	5.2
Romania	3.5

USA has 20.8%, the UK 11.6%. Eastern Europe (excluding the USSR) 2.3%, and the USSR on its own only 0.6%.

This very uneven distribution of agricultural information via CABI cannot be related simply to need, nor to reading knowledge of English, the language in which CABI publishes. The explanation is more likely to be found in the value which decision-makers in each country attach to efficient access to scientific and technical data, their ability or willingness to find the foreign exchange necessary to purchase subscriptions, and the availability of alternative, cheaper sources of relevant data.

Many agricultural institutions in Eastern Europe try to bypass the payment problem by establishing exchange arrangements with overseas publishers, or they look elsewhere for relevant data. This may mean using less expensive (i.e. subsidised) services from abroad or national services, neither of which match the breadth and depth of coverage, high information content, scientific accuracy and indexing quality of the services available from CABI.

CABI's Coverage of Eastern European Literature

CABI's policy is to identify and acquire for abstracting all relevant and significant items of literature published anywhere in the world, in any language. At present around 11,000 scientific periodicals are scanned, along with 5,000 books and other non-serials such as conference proceedings, theses and reports, every year.

At the last count, the number of

serials being seen regularly from Eastern Europe was 866. The source of the 7,222 issues received during 1987–89 are listed in Table 2.

Two-thirds of Eastern European serials are sent to CABI by the publishers on a complimentary basis. Almost 20% are received in exchange for CABI journals and the rest are bought on subscription or borrowed from organizations such as the British Library. The total number of non-serials received from Eastern Europe in 1987–89 was 576, half of them being gifts from publishers keen to have them abstracted. Just over one-half came from the USSR. By sending copies to CABI, publishers in Eastern Europe play a valuable role in ensuring that the information they publish is disseminated worldwide. Often authors who send copies of their books, articles, and other valuable sources of East European literature are freelance abstracters (people who submit abstracts for a fee), or national agricultural information agencies providing input to CABI on contract.

The numbers of abstracts prepared by CABI from East European literature has varied from 5% to 10% of the total over the last 10 years, the average number being around 10,000 per annum. The world's interest in Eastern European agricultural publications is increasing and CABI is

therefore taking steps to improve its coverage of this literature.

Abstracting of Eastern European Literature

To write accurate, informative, clear and concise abstracts, in line with CABI policy, requires a good understanding of the source document, and for non-English material this depends on linguistic expertise as much as subject knowledge. About 30% of the documents abstracted by CABI are not in English and to cope with this material CABI relies upon the wide linguistic expertise of its editorial staff, supplemented by help from outsiders. The prevalence of knowledge of Eastern European languages among CABI staff and freelance abstracters is shown in Table 3. It can be seen that 29 of CABI's approximately 100 information scientists have reading ability in a total of 12 East European languages, principally Russian, Czech, Polish and Rumanian. In addition, 20 freelance abstracters in the UK, many of them ex-staff members, cover a total of 14 languages, again mostly Russian. These are backed up by nine freelancers based in other countries, including Czechoslovakia, Hungary and Poland. CABI has been receiving abstracts from freelancers based overseas for a long time. In 1958, one of CABI's

Table 3 – CAB International—Access to editorial expertise in Eastern European languages

Language	Staff	Freelancers	
		UK	Overseas
Byelorussian	3	3	0
Bulgarian	7	4	1
Czech	11	5	4
Estonian	0	1	0
Hungarian	2	5	3
Lithuanian	0	1	0
Latvian	0	1	0
Macedonian	2	0	0
Polish	10	4	2
Romanian	10	3	1
Russian	22	14	2
Serbo-Croat	7	3	1
Slovak	7	3	2
Slovene	7	3	0
Ukrainian	6	3	0
TOTAL	29	20	9

journals, *World Agricultural Economics and Rural Sociology Abstracts* was established with the International Agricultural Economics Association, based in Vienna, and IAALD, and for some years most of the abstracts were contributed by a network of people, including East Europeans, linked to these two organizations. CABI is constantly on the look out for competent freelancers with foreign language qualifications who, with appropriate training, could strengthen CABI's capacity to process non-English material.

To maintain and enhance its ability to cover non-English literature, CABI's recruitment policy is to lay heavy emphasis on language qualifications. Linguistic abilities are strengthened and extended by encouraging staff to attend evening classes, and in 1989, for the first time, a professional teacher was brought in to run a course in Russian attended by 12 of CABI's Scientific Information Officers who are now putting their knowledge of Russian into practical use.

Most of CABI's editorial staff have always been recruited from the UK labour market but recently a decision was taken to seek employees in Eastern Europe. With help from AGROINFORM, who identified suitable candidates, interviews were held in Hungary early in April for an information scientist with knowledge of Russian and other Eastern European languages plus a good knowledge of English, to join CABI's Bureau of Animal Health. The plan is for the successful candidate to be trained and gain work experience for at least one year in the UK and then return to Budapest, where he will continue working on behalf of the Bureau under the administrative control of AGROINFORM.

Institutional arrangements

Another way in which CABI deals with agricultural literature in non-English, especially the lesser-known languages, is to contract out part of the work to national organizations involved in collating and distributing relevant information within their own countries.

Hungary—This cooperation is most advanced for Hungary and led to its becoming a member of CABI in 1988. This, in turn, has led to even closer cooperation. In the early 1980s, after a training course was given by CABI in Budapest, staff of AGROINFORM began submitting bibliographic details and English abstracts of relevant Hungarian publications. CABI continues to rely on AGROINFORM for some of its Hungarian coverage to this day. A much wider range of cooperative activities is now embodied in a Memorandum of Agreement. For example, AGROINFORM and CABI have agreed to the publication of a Hungarian edition of *Outlook on Agriculture*, a broadly based review journal CABI recently acquired from Pergamon Press that addresses a range of topical issues affecting world agriculture. It is planned that a future issue will be focused on agriculture in Eastern Europe. AGROINFORM is also planning to publish Hungarian editions of some of CABI's new books (CABI has a rapidly expanding book publishing programme), and the possibility of having some titles printed in Hungary is being considered.

AGROINFORM has recently acquired a sector of CABI's database on CD-ROM, the first Eastern European centre to do so, and AGROINFORM's staff is busy demonstrating this new technology, not only to the various interested parties in Hungary, but also to agricultural institutions in neighbouring countries. The first disc containing around 400,000 abstracts input to the database during 1984–86 was brought on the market at the end of 1989 and the second disc covering 1987–89 became available in April 1990.

CD-ROM technology provides a desk-top, interactive search capability and promises to have a significant impact on access to bibliographic databases especially by countries unable, because of poor telecommunications or cost, to search online through international database vendors. Third World countries would feel the most benefit, but CABI is expecting a lot of interest also from Eastern Europe.

Soviet Union—Recently, similar avenues of cooperation have been agreed with the All-Union Research Institute of Information and Technical-Economic Studies of the Agro-Industrial Complex, part of the V I Lenin All-Union Academy of Agricultural Sciences, in Moscow, USSR. A Memorandum of Agreement between CABI and the Institute was signed in the UK in November 1989 with the following objectives: to improve the dissemination worldwide of information on scientific and technical developments in agriculture in the USSR and to improve access within the USSR to information on agricultural research and development in other parts of the world.

To meet the first objective the Institute has undertaken to supplement CABI's existing coverage of the Soviet literature by providing, for a fee, English abstracts of individual articles, and commission and translate into English authoritative review articles by Soviet authors on aspects of agricultural research in the USSR, again for a fee. CABI has agreed to publish the abstracts in its database and associated products, and the reviews in its abstract journals or *Outlook on Agriculture*. In exchange for the abstracts and reviews, CABI will deliver to the Institute CAB products and services equivalent in value to the sums earned.

A one-week training course for the Institute's abstracters and translators was run by two CABI staff in Moscow in October 1989, covering editorial and selection policy, bibliographic citation, and abstracting conventions. Further guidance is being given through editorial feedback on abstracts received, and in May two of the Institute's senior editorial staff were due to spend two weeks gaining further experience working alongside editorial staff in CABI's Bureaux in Wallingford.

To meet the second objective, the Institute has undertaken to assist in promoting knowledge and wider use of CABI services in the USSR, by distributing publicity material, arranging visits by CABI staff to key

agricultural research centres, and stimulating a greater awareness at government level of the benefits CABI services could bring to Soviet agriculture. If little used in the USSR at present, CABI's Information Services are still well known and respected. A successful exhibition was mounted during BRITAGROPROM '87 in Moscow that elicited interest among Soviet administrators and agricultural researchers that attended, and increasing efforts have been made since then to promote CABI and its services to world agriculture. CABI's scientific institutes, especially its Institute of Biological Control, have also been active in establishing working relationships with several Soviet institutes, including the Research Institute of Biological Methods in Plant Protection in Kishinev and the Research Institute for Plant Quarantine in Moscow.

Steps to Membership of CAB International

As the experience with Hungary

has shown, establishing cooperative programmes of these kinds can be an effective way of cementing close relationships between CABI and individual countries, leading to increasing usage of CABI services and eventually to an interest by the government concerned in joining the organization. Since 1987, membership of CABI has been open to all governments and in 1988 Hungary became the first new member to join, bringing the total membership to 29.

In July 1990, CABI will hold its 5-yearly Review Conference of member governments in London, during which the terms and conditions of membership will be reviewed, aimed at making membership more attractive, thereby encouraging other governments to join. If proposals put to the Conference are accepted, in exchange for a small fee, members will receive privileged access to the whole range of CABI services, at privileged prices. These services include not just information on agricultural and related research, but also identification

of pests and diseases by CABI's three biosystematic institutes of mycology, entomology and parasitology, help by CABI's Institute of Biological Control in the application of biological control methods to the management of pests and pathogens, and training programmes in fields of CABI expertise.

The information support and scientific expertise that CABI can apply to the solution of agricultural problems should make membership to the organization attractive to any country and it is hoped, with improvement in the terms of conditions of membership, many more countries, including those of Eastern Europe, will recognize the advantages and decide to join. All the non-member countries in Eastern Europe, and many others, have been invited to be represented as observers at the CABI Review Conference. We hope that they will accept this invitation and will find the conference a useful opportunity to explore opportunities for future cooperation and eventual membership of the organization.

Improved Access to Agricultural Literature Through a Comprehensive, Detailed Agricultural Thesaurus

Sarah E. Thomas

Keywords: vocabulary development; subject index terms; thesauri

ABSTRACT: A detailed, comprehensive, multilingual agricultural thesaurus would provide enhanced access to indexed agricultural literature. At the VIIth World Congress of the International Association of Agricultural Librarians and Documentalists, IAALD President Ernest Mann called for a unified approach to the creation of agricultural databases that would eliminate redundancy. Some progress has been made on this front through the cooperation of the U.S. National Agricultural Library in the elimination of duplicate coverage between AGRICOLA and AGRIS. To obtain a comprehensive bibliography on a particular topic, librarians and researchers must still search at least AGRICOLA, AGRIS, and CAB ABSTRACTS, using two thesauri for descriptors. Access to agricultural publications would be simplified if a unified agricultural thesaurus were employed for assigning descriptors. Indexers could select varying levels of specificity when analyzing documents. Alternately, database searchers could invoke a gateway to navigate the various levels of thesaurus application in particular databases. The gateway would accommodate the use of multiple languages for effective retrieval. In October 1989 several members of the agricultural information community, including representatives from FAO, CAB International, and NAL met in Washington, D.C., U.S.A. at the World Bank to discuss how they might move toward a more consistent access to agricultural information. Out of this discussion has come a proposal for a feasibility study that would suggest effective solutions to the international problem of thesaurus-based access to agricultural information.

RÉSUMÉ: Un thésaurus agricole, multilingue, compréhensif et détaillé pourrait

fournir un meilleur accès à la littérature agricole indexée. A la VII Conférence Mondiale de l'IAALD, son président M. Ernest Mann a demandé une approche unifiée à la création de bases de données agricoles qui éliminerait la redondance. Des progrès ont été faits à ce niveau avec la coopération de la Bibliothèque agricole nationale des Etats Unis, pour éliminer la couverture double entre AGRICOLA et AGRIS. Pour obtenir une bibliographie compréhensive sur un sujet particulier, les bibliothécaires et chercheurs doivent toujours interroger au moins AGRICOLA, AGRIS et CAB ABSTRACTS, utilisant deux thésaurus pour les descripteurs. L'accès aux publications agricoles serait simplifié si un thésaurus agricole unifié était employé pour l'indexation. Les indexeurs pourraient sélectionner des niveaux différents de spécificité lors de l'analyse des documents. Alternativement, les interrogateurs de bases de données pourraient invoquer une entrée pour naviguer dans les différents niveaux d'application du thésaurus, dans des bases de données précises. L'entrée pourrait concilier l'utilisation de langues multiples pour une meilleure recherche. En octobre 1989, plusieurs membres de la communauté de l'information agricole, comprenant des représentants de la FAO, CAB International, et la NAL se sont rencontrés à Washington, D.C., aux Etats Unis, à la Banque Mondiale pour discuter comment ils pourraient accéder à un accès plus cohérent à l'information agricole. On y a proposé de faire une étude de faisabilité qui suggérerait des solutions efficaces au problème international de l'accès à l'information agricole basé sur un thésaurus.

RESUMEN: Un thesaurus agrícola extenso, detallado y multilingue proporcionaría un mejor acceso a literatura agrícola indexada. En el VII Congreso Mundial de la Asociación Internacional de Bibliotecarios y Documentalistas Agrícolas, el Presidente de IAALD, Ernest Mann, planteó la necesidad de un enfoque unificado para

la creación de bases de datos agrícolas, que elimine la redundancia. Se han logrado avances en este campo, gracias a la colaboración de la National Agricultural Library de los Estados Unidos, eliminando la cobertura duplicada entre AGRICOLA y AGRIS. Para obtener una bibliografía extensa en un determinado tema, los bibliotecarios e investigadores deben aún buscar por lo menos en AGRICOLA, AGRIS y CAB ABSTRACTS, utilizando dos tesauros para los descriptores. El acceso a las publicaciones agrícolas se simplificaría si se utilizara un thesaurus agrícola unificado para asignar los descriptores. Así, al analizar los documentos, los confeccionadores de índices podrían seleccionar diferentes niveles de especificidad. De la misma manera, los usuarios de bases de datos podrían tener una vía de acceso a los diversos niveles de aplicación de un thesaurus en bases de datos específicas. Dicha vía de acceso contemplaría el uso de varios idiomas para una recuperación efectiva. En octubre de 1989, varios miembros de la comunidad de información agrícola, incluyendo representantes de la FAO, CAB International y NAL, se reunieron en Washington, D.C., Estados Unidos, en el Banco Mundial, para tratar la transferencia hacia un sistema más consistente de acceso a la información agrícola. De esta discusión surgió una propuesta para un estudio de factibilidad que sugeriría soluciones efectivas al problema internacional del acceso a información agrícola mediante tesauros.

ZUSAMMENFASSUNG: Ein detaillierter, umfassender, mehrsprachiger landwirtschaftlicher Thesaurus würde einen intensivierten Zugang zu indexierter landwirtschaftlicher Literatur liefern. Auf dem 7. Weltkongress der International Association of Agricultural Librarians and Documentalists, IAALD, verlangte Präsident Ernest Mann dringend nach einer vereinheitlichten Verfahrensweise bei der Erstellung landwirtschaftlicher Datenbasen, die ein Übermaß eliminieren würde. Einige

Fortschritte sind in diesem Zusammenhang durch die Kooperation der U.S. National Agricultural Library bei der Eliminierung einer Doppelerfassung zwischen AGRICOLA und AGRIS gemacht worden. Um eine umfassende Bibliographie über ein spezielles Thema zu erhalten, müssen Bibliothekare und Rechercheure noch zumindest in AGRICOLA, AGRIS und CAB ABSTRACTS suchen, indem sie zwei Thesauri für die Deskriptoren benutzen. Der Zugang zu landwirtschaftlichen Publikationen würde erleichtert werden, wenn ein vereinheitlichter Thesaurus zur Zuweisung von Deskriptoren angewendet würde. Indexierer könnten variierende Spezifitätsstufen auswählen, wenn sie die Dokumente auswerten. Alternativ dazu könnten Datenbankrecherchierer um einen Zugang bitten, der die unterschiedlichen Stufen der Thesaurusanwendung in den einzelnen Datenbanken lenkt. Der Zugang würde die mannigfaltigen Codes für ein effektives Retrieval in Übereinstimmung bringen. Im Oktober 1989 trafen sich mehrere Mitglieder der landwirtschaftlichen Informationsgemeinschaft einschließlich Repräsentanten der FAO, CAB International und NAL in Washington, D.C., USA, in der Weltbank, um darüber zu diskutieren, wie man sich auf einen einheitlichen Zugang zu landwirtschaftlicher Information zubewegen könnte. In dieser Diskussion ist eine Eignungsstudie vorgeschlagen worden, die wirksame Lösungen des internationalen Problems des auf Thesauri basierenden Zugangs zur landwirtschaftlichen Information anregen soll.

Five years ago, at the VIIIth World Congress in Ottawa, IAALD President Ernest Mann exhorted producers of the three major agricultural databases to cooperate with each other in the coverage of the world's agricultural literature (Mann, 1986). Dr. Norbert Deselaers, German Federal Ministry of Food, Agriculture and Forestry, presented a paper at the same meeting that estimated the costs of overlap in the creation and maintenance of AGRICOLA, AGRIS, and CAB ABSTRACTS (Deselaers, 1986). He urged integration of the three to reduce time, money, and effort. Although today there still exist three important agricultural databases, the producers of these indexes have made considerable progress in cooperation. The National Agricultural Library (NAL) has virtually eliminated coverage of titles indexed in AGRIS.

Other cooperative ventures have been undertaken, including the generation of the *International Union List of Agricultural Serials* late 1989. This compilation of over 11,000 titles, the result of work done at NAL with the cooperation of AGRIS and CAB International (CABI), allows the user to determine in which database a particular journal is indexed. AGRIS and CABI also have taken into account the direction of each other's vocabulary work in the development of AGROVOC and the *CAB Thesaurus*. NAL functions as an informal liaison between the editors of the two thesauri since NAL staff contribute directly to the *CAB Thesaurus* and serve as representatives of the English mother tongue in the semi-annual AGROVOC review meetings.

Recently there have been developments that hold a great deal of promise for further cooperation and enhancement of access to agricultural information. Over the past year several leaders in the field have renewed discussion about the possibility of an agricultural thesaurus that would answer the needs of a broad constituency of users and eliminate the present duplication of effort and resources. At present, there are two major agricultural thesauri, AGROVOC and the *CAB Thesaurus*, and several additional specialized vocabulary lists. The expense of developing and maintaining these thesauri is great for the organizations supporting them. Those searching databases or indexes using terms from these lists must customize their search strategy accordingly. Although the thesaurus producers have endeavored to harmonize the individual terms and their hierarchies, they have not succeeded in completely excising conflicts.

In an attempt to improve the situation for those constructing and those using various agricultural thesauri, a number of information specialists from around the world have proposed to evaluate the feasibility of creating a universal agricultural thesaurus and gateway. Meeting in Washington, D.C. on October 23, 1989, representatives from AGRIS, CAB Inter-

national, NAL, AGRIS, the Consultative Group in International Agricultural Research (CGIAR), the Centre Technique de Cooperation Agricole et Rurale (CTA), PUDOC, the UK Online Users Group (UKOLUG), the European Online Users Group (EUROLUG), and others delved into the proposition of surmounting present deficiencies in existing structures and the evolution of a system that would significantly improve the lost of information professionals and, most importantly, their agricultural clients.

Out of the debate that took place at the October 1989 meeting emerged two distinct alternatives. First, there could be prepared a single thesaurus that could be used by the producers and users of AGRICOLA, AGRIS, and CAB ABSTRACTS. To satisfy the needs of the different databases the thesaurus might be constructed in a way that allowed for implementation of different levels. For example, the Centro Internacional de la Papa (CIP) might require a highly specific vocabulary to index research on potatoes, but the more general databases and their clients would be satisfied with the term "potato." There would need to be coordination between those whose work necessitated detailed terminology and those overseeing the thesaurus as a whole. Some mechanism for communicating the level of depth at which a particular article had been indexed would need to be established, as well as a means for the general searcher to retrieve materials indexed with a more specific vocabulary.

A second option for resolving the obstacles to retrieval faced by present database searchers focussed on the development of two or more thesauri together with the necessary tools for the automatic conversion of queries from one indexing language to another. The meeting participants noted that with the rapid development of information technology it would be possible to overcome some of the problems faced by earlier generations of thesaurus builders who had to meet the needs of their clientele, sometimes at the expense of consistency.

The ideal thesaurus, as posited by

those attending the meeting, would have the following attributes:

- Classified structure
- Alphabetical display
- Capable of being used to derive microthesauri
- Multilingual
- Inclusion of terms from AGROVOC and the *CAB Thesaurus*, either as descriptors or lead-in terms
- Capability of indicating number of postings in AGRICOLA, AGRIS, or CAB ABSTRACTS
- Distributed input
- Audit trails

The gateway might include the following features:

- Conversion of thesaurus terms from the user's language to that of the database in question
- Conversion of American forms to British and vice versa
- Conversion of current terms to those used previously by the database in question for the appropriate period of its back-file
- Conversion of free language search requests to the appropriate index

terms for the database(s) and period(s) in question

The next step in the development of these ideals will be the execution of a feasibility study. A consultant with expertise in automation and agricultural information will review the present situation and background and confer with thesaurus experts and others with a stake in the outcome of such a project over the next six months. The consultant will be charged with analyzing the effectiveness of the proposal, and the costs and benefits perceived in altering the present landscape. Alternative governance and management structures can be proposed. Depending on the outcome of the study, funding will be sought for the implementation of options embraced by the agricultural information community.

This ambitious project will build on the existing strong platforms provided by AGROVOC and the *CAB Thesaurus*. Each of these thesauri has much to recommend it, but neither fully satisfies the requirements of the

entire user population. The challenge of the next decade is to arrive at a creative solution that will enhance user access to agricultural information and reduce duplicative efforts by agricultural librarians and documentalists around the world. With careful planning, innovative use of technology, and cooperation, these objectives will be achieved.

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Preserving the Literature of Agriculture: A Model for Decision Making

Samuel Demas

Keywords: preservation; library collections; library surveys

ABSTRACT: Using the A.R. Mann Library as a case study, principles applied in structuring a local preservation program and a model for preservation decision-making are discussed. Emphasis is on formulating preservation policies; selection for preservation; and administrative considerations in planning, implementing and operating a preservation program. The formulation of preservation policies is analyzed as a process aimed at assessing preservation needs; examining preservation needs in relation to collection scope and goals of the library; and establishing preservation priorities. Several representative approaches to this process and a summary of actual preservation policies are presented. Strategies for reviewing collections for preservation are summarized and challenges in developing and applying specific criteria for selecting materials for treatment are analyzed. Considerations of scale, the relationship of preservation selection to on going collection management and development and cooperative preservation are discussed. Methods of integrating preservation decision-making into library processes, staff training, and a cost analysis of basic preservation treatments are presented.

RÉSUMÉ: L'exemple de la bibliothèque A.R. Mann de l'Université Cornell, permet d'étudier les principes appliqués dans la structuration d'un programme local de conservation, et d'un modèle de décision pour la conservation. L'accent est mis sur la formulation des politiques de conservation, la sélection pour la conservation, et les considérations administratives dans la planification, la réalisation et l'opération d'un programme de conservation. On analyse la formulation des politiques de conservation comme un processus visant l'évaluation des besoins en conservation, l'examen des besoins en conservation par rapport aux objectifs et aux activités de la bibliothèque, et l'établissement de

priorités pour la conservation. On présente plusieurs approches représentatives pour ce processus ainsi qu'un résumé des politiques de conservation. On fait le résumé des stratégies pour passer en revue des collections destinées à être conservées, et on analyse les défis dans le développement et l'application de critères spécifiques pour la sélection de matériels pour le traitement. On étudie les considérations des échelles, la relation entre la sélection de collection en cours pour la conservation et le développement et la conservation commune. On présente des méthodes d'intégration de la planification de la conservation dans le processus documentaire et la formation du personnel, et une analyse financière des traitements de base en conservation.

RESUMEN: Utilizando la A.R. Mann Library como estudio de caso, se discuten los principios aplicados en la estructuración de un programa local de conservación de literatura y de un modelo para la toma de decisiones sobre conservación. Se enfatizan la formulación de políticas de conservación, la selección con fines de conservación y los aspectos administrativos a considerar en la planeación, implementación y operación de un programa de conservación. Se analiza la formulación de políticas de conservación como un proceso dirigido hacia determinar las necesidades de conservación, evaluar las necesidades de conservación en relación con el alcance de la colección y con los objetivos de la biblioteca, y establecer prioridades de conservación. Se presentan varios enfoques representativos de este proceso y un resumen de políticas actuales de conservación. Se resumen las estrategias para revisar las colecciones con fines de conservación y se analizan los retos que plantean el desarrollo y la aplicación de criterios específicos de selección de material para tratamiento. Se discuten las consideraciones de escala, la relación entre la selección con fines de conservación y el manejo y desarrollo de las colecciones, y el concepto de conservación cooperativa. Se presentan los métodos para integrar la toma de decisiones sobre conservación en los pro-

cesos de las bibliotecas, la capacitación del personal y un análisis de costos de los tratamientos básicos de conservación.

ZUSAMMENFASSUNG: Am Beispiel der A.R. Mann Bibliothek werden Grundsätze diskutiert, die bei der Entwicklung eines örtlichen Aufbewahrungsprogramms und eines Modells zur Entscheidungsfindung für die Aufbewahrung aufgestellt wurden. Der Schwerpunkt liegt auf der Formulierung von Aufbewahrungsmethoden, auf der Auswahl für die Planung, Implementierung und Handhabung eines Aufbewahrungsprogramms. Die Formulierung von Aufbewahrungsmethoden wird als ein Prozeß analysiert, der auf die Bewertung von Aufbewahrungsbedürfnissen und auf die Prüfung der Aufbewahrungsbedürfnisse in Relation zum Sammlungsumfang und den Zielen der Bibliothek sowie auf die Aufstellung von Aufbewahrungsprioritäten abzielt. Mehrere repräsentative Schritte dieses Verfahrens und eine Zusammenfassung der vorliegenden Aufbewahrungsmethode werden dargestellt. Strategien für die Bestandsaufnahme der aufzubewahrenden Sammlungen werden zusammengefaßt und die Notwendigkeit, spezifische Kriterien für die Handhabung des auszuwählenden Materials zu entwickeln und anzuwenden, analysiert. Überlegungen zum Umfang, zur Relation zwischen Aufbewahrungsauswahl und fortlaufenden Sammlungsmanagement, zur Sammlungsentwicklung und zur kooperativen Aufbewahrung werden diskutiert. Methoden der integrierten Aufbewahrungsentscheidungsfindung im Bibliotheksprozeß, Personalschulung und eine Kostenanalyse der grundsätzlichen Aufbewahrungshandhabung werden dargestellt.

Introduction

Responsibility for preserving the literature of agriculture falls squarely on us, the librarians of this generation. There is no need to review here the nature and extent of the problem; preservation is enjoying great popularity in the profession and most of

us are convinced that action must be taken. Meeting this challenge will require an enormous investment of both time, in determining what should be preserved; and money, in performing actual preservation treatments. Since we cannot afford to preserve all brittle and damaged materials, it is essential to establish clear preservation priorities to maximize our individual and collective efforts. In this paper I will outline a simple model for decision making in selection for preservation at the local level.

This model is based on our work in developing a preservation program at the Albert R. Mann Library of Cornell University. It is purposely framed here in very general terms to emphasize its adaptability to different types of libraries.

In structuring a preservation program, there are three basic areas of concern:

Assessing Preservation Needs: How much of the collection is physically in need of preservation treatment, and which titles are deteriorating?

Selection for Preservation: Which individual titles or parts of the collection should be selected for preservation, and on what basis should they receive priority over other materials in the collection?

Selection of treatment options: What are the most effective treatment options for different kinds of publications?

The general considerations in each of these three areas will be reviewed in this paper.

Assessing Preservation Needs

A first step in preservation decision-making is to take a quantitative measure of the size and nature of the preservation problems in the collection as a whole. Collection surveys are used to gather systematically information about the total numbers of deteriorated or damaged volumes in a collection and about the number of volumes requiring various types of preservation treatments. Surveys may be undertaken on a statistically valid

Table 1 – Preservation Survey Results—Cornell University Entomology Library

Category	Stacks	Rare Books	Total	Percent
Items Surveyed	23,913	870	24,783	
Breakdown:				
Brittle	6,214	369	6,583	27%
Repair	737	38	775	3%
Enclose	387	65	452	2%
Conserve	161	100	261	1%
Replace	16	0	16	—
Bind/Rebind	2,140	0	2,140	9%
Total items recommended for review and treatment:				
	9,655	572	10,227	42%

sample of the total collection, on every book in the collection, or on parts of the collection. The survey results provide data for sound financial and programmatic planning.

Collection surveying, in combination with the screening of materials at the point of circulation, is also commonly used to identify the specific titles in a collection that are damaged or deteriorated. An "action" survey is designed to examine books at the shelf and evaluate them in terms of their physical condition, and actions that will secure, replace, protect, or treat books in need of preservation. The recommended action is recorded on a survey card, with one card completed for each volume or title.

As an example of assessing preservation needs, I will present the results of an "action" survey of the collection in Cornell University's 30,000-volume Entomology Library, a branch library of the Mann Library. This is one of the most comprehensive collections of entomological literature in North America. Preservation of this collection is a high priority for the Mann Library preservation effort, and we needed complete data for a proposal to preserve the core literature of the discipline of entomology.

A total of 24,783 volumes in the Entomology Library were individually inspected at the shelf for evidence of damage or brittle paper. The double fold test was used to identify brittle materials. [Editor's note: By folding the corner of a page twice the brittleness can be assessed by the resistance to breaking at the fold.

This is known as the double fold test.] The results of the survey are shown in Table 1.

A total of 6,583 volumes, or 27% of the collection, were found to be too brittle to pass the double fold test. This percentage of brittle materials is comparable with survey results in other U.S. research libraries. Sample surveys in the Mann Library collection have revealed similar results. This large quantity of brittle material has been targeted for a major preservation project, using a selection method that identifies the most important literature for preservation purposes and establishes priorities for a multi year preservation effort.

The other action categories are insignificant in comparison, and preservation treatment is now underway in the following areas: minor repair of 775 volumes, production of protective enclosures for 452 volumes, restorative conservation treatment of 261 volumes, and commercial binding of 2,140 volumes.

The process of surveying the entire Entomology Library collection was labor intensive, involving about 550 hours of staff time. However, it has provided the data necessary to approach systematically the challenge of preserving an entire collection of exceptional research importance.

After identifying materials that are in need of preservation treatment, selection of those that which should be accorded priority is the next step.

Selection for Preservation

The intellectual challenge of preservation lies in deciding which materials will be saved for use by future generations and which will be allowed to deteriorate. The criteria used in selection for preservation are analogous to those used in collection development. Preservation selection is usually carried out by subject specialist librarians, often in consultation with users, and is viewed as an integral part of collection management and development.

Preservation decisions are based on institutional priorities as reflected in the library's collection policy statement. Special emphasis is given to considerations such as current use and future demand, significance for historical research, traditional collection strengths, cooperative agreements, accessibility from other collections, and scarcity of the material. Libraries refine and apply these general criteria according to their own institutional needs, priorities, and resources.

In selection for preservation, materials may be divided into five broad decision categories. After outlining the five preservation decision categories, I will briefly review the selection of treatment options in each action category.

Materials with little or no enduring value—A library will not invest in the preservation of materials that lack relevance to the collection or users, which are obsolete or redundant, or which are of poor intellectual quality. These will be withdrawn from the collection, possibly transferred to another appropriate collection or consciously allowed to deteriorate.

Materials with artifactual value—Individual titles that are unique, scarce, of historical interest, of aesthetic value, or otherwise of high capital value are usually preserved in their original formats.

Special collections—Collections of special depth and significance to scholarship lend themselves to selection decisions on a mass level, i.e. everything in the collection will be preserved. This category may include both intrinsically valuable materials

with high artifactual value to be preserved in original format, and materials of little monetary value but important for their intellectual content.

Materials currently receiving high use—The most heavily used portion of a collection can be easily identified through use studies. Preservation in hard copy is generally preferred. High use materials are often the focus of continuing, routine treatment programs such as minor repair and commercial binding.

Low use materials of future research value—Materials intellectually important to the collection but with no artifactual value are usually replaced, if available in reprint, or reformatted (most often in microform) to preserve their intellectual content, after which the original is usually withdrawn. Identifying and evaluating this largest and difficult category of materials is highly labor intensive and lends itself to cooperative preservation projects.

Through a review process commonly called "curatorial review", deteriorated materials are classified into one of the five categories just described. Next, based on the character of the individual titles and on collection priorities, specific treatment options are selected.

Selection for Treatment Options

Preservation treatment decisions will fall into three broad categories: do not treat, preserve in original format and preserve intellectual content. Within each category a treatment option will be selected according to: the importance of the material to the collection, physical condition, the kind of use it will receive, how long it should last, and the cost effectiveness of treatment options in relation to the total value of the material to the collection. I will briefly outline the options in each category.

Do not treat—Three options exist for out of scope or obsolete materials that are not worth the investment of preservation funds:

- Withdraw from the collection, using the criteria for weeding.

- Transfer to another library with a special collection in the subject area. Transfer of such material to a comprehensive collection will enhance the intellectual value of the individual item by placing it in a more significant collection context, and may result in its preservation by the receiving collection.

- Planned deterioration. Materials with limited research value or of temporary usefulness may be returned to the collection with a conscious decision (usually noted in the book to prevent later duplication of effort) to withdraw them when they have deteriorated beyond use.

Preserve in Original Format—Based on use and value criteria, efforts are made to retain certain categories of materials in the format in which they were originally published. A limited number of options are available for preserving materials in original format.

- Restoration—The expensive process of restoring deteriorated materials with intrinsic value to a stable state is reserved for materials that are: unique (e.g. manuscripts, rare books, and materials with important marginalia); historically valuable (e.g. first appearance of an idea, or of exhibit value); or aesthetically valuable (e.g. fine bindings or plates).

- Repair—When paper condition is good, many damaged books can easily be restored to serviceable condition through inexpensive minor repair treatments. These include paper cleaning and mending, spine replacement, recasing a text block, hinge tightening, re-labeling, and repair of dog-eared corners. Books with good paper that are too far gone for minor repair may be routinely treated through commercial binding.

- Protective enclosure—Unstable formats (e.g. pamphlet collections, unbound serials and newspapers) may be protected with simple boxes or folios. Brittle materials that are not worth the expense of reformatting may have their useful lives ex-

tended considerably by placing them in protective enclosures.

Preserve Intellectual Content Only—Most deteriorated books and journals are primarily important for their intellectual content and have little artifactual value. Such materials, particularly those with brittle paper, do not justify the expense of restoration and may be replaced or reformatted more cost effectively. There are two primary reformatting options widely available: the production of preservation quality photocopies and microforms.

- **Purchase Commercial Reprint**—When available, purchase of a commercial reprint is often the best option for replacing materials of permanent research value. A reprint on good paper provides an exact replacement in the same format; and often at a price significantly lower than that of in-house reformatting. Purchase of reprints is particularly suitable for replacement of high use and often cited monographs; materials where graphics or illustrations are of importance; materials where frequent reference to notes is required; and current reference materials.

- **Preservation Photocopy**—Materials meeting the criteria for replacement by commercial reprint, but for which no reprint is available, may be candidates for preservation photocopying. In-house photocopying generally costs less than microfilming.

- **Purchase Commercial Microform**—When available, purchase of

commercial microforms is the preferred option for low use materials of research value (particularly large sets) or materials where illustrations are not of particular importance. Microforms are particularly desirable when saving space is a consideration.

- **Production of Preservation Microfilm or Microfiche**—For low use materials for which no commercial microform is available, preservation microfilming is the most viable option. Preservation microfilming lends itself to cooperative efforts to preserve deteriorating materials held by many libraries. Only one library needs to film the item, and copies may be made from the master on demand at a low cost, a distinct advantage over preservation photocopying. The current craze in the U.S. for microform reformatting is unfortunate in some ways, as this format is not popular with library users. New technologies hold promise for more user friendly preservation formats.

- **Digital formats**—The use of digital formats for preservation purposes is still in experimental phases, particularly in terms of the durability of the media and cost-effectiveness. The great potential of digital media as preservation formats, besides space savings, is in improved access to the intellectual contents of the stored material. Greatly enhanced retrieval capability will make it possible to reformat materials unsuitable for microform (such as high use reference materials and materials in which graphics are

important). This will involve a costly indexing process as part of the reformatting process. Experiments with digital formats as preservation media are underway in several U.S. libraries, including the U.S. National Agricultural Library and, with funding from the U.S. National Commission on Preservation and Access, the Cornell University Libraries.

Conclusion

My comments today have concerned a simple model for preservation decision-making at the local level. However, in concluding, I hasten to acknowledge that selection for preservation within the confines of one library, while itself a daunting task, is only one level in a hierarchy of preservation decision making. If we are to meet the challenge of rescuing the past for the world of the future, of saving the record of agricultural research and practice for future generations, we will increasingly rely on cooperative preservation efforts.

These cooperative efforts must be based in part on careful assessment of preservation needs and priorities at the local level. I hope my outline of a model for preservation decision making might prove useful to some of you in setting local priorities, and in the larger effort to coordinate preservation action among agricultural libraries for the greater good.

Die Rolle der Zeitschrift *Wirtschaftsfragen der Lebensmittelindustrie* bei der Verbreitung von Ökonomischen Informationen in der Lebensmittelindustrie

Role of the Quarterly Economical Questions of Food Industries in the Economical Information Service of Food Industries

Tibor Bátai

Keywords: serials; editing

ABSTRACT: The special media of the system of information supply to managers of food industrial enterprises and organizations is reviewed. Two main means of surveying information are described: the review and thematic documentation. A detailed outline is given about the editing principles of the periodical dealing with thematic documentation, *Economical Questions of Food Industries*, a quarterly publication of 12 printed sheets issued under the auspices of the Central Food Research Institute in Hungary. A description is given about the stressed thematic objectives of the periodical, prepared from abstracted translations selected from professional papers, by scanning 70 foreign journals. The objectives include informing, systematically and thematically classified, the managers of the food industrial sector about food consumption; raw material production and food industrial transformation; food trade (domestic and foreign sales); and the tendencies of development and the formation of prices for food products on the world market. Ideas to strengthen the documentational character of the publication and the distribution are presented.

RÉSUMÉ: Les médias spéciaux du système de distribution de l'information aux directeurs des entreprises et organisa-

tions agroindustrielles, sont passés en revue. Deux principales méthodes pour passer en revue l'information, la documentation critique et thématique, sont décrites. On détaille les critères d'édition de la revue thématique *Economical questions of Food Industries*, publication trimestrielle de 12 pages publiée sous les auspices de l'Institut Central de la Recherche alimentaire de Hongrie. On décrit les objectifs thématiques, mis en évidence, de la revue préparée à partir de traduction de résumés sélectionnés dans les revues professionnelles, en passant en revue 70 périodiques étrangers. L'un des objectifs est d'informer, à l'aide d'une classification systématique et thématique, les directeurs du secteur industriel alimentaire sur la consommation alimentaire, la production de matière première et la transformation industrielle alimentaire, le commerce national et international, les courants de développement et la tarification des produits alimentaires sur le marché mondial. On présente des idées pour renforcer le caractère documentaire de la publication et de la distribution.

RESUMEN: Se revisan los medios especiales del sistema de suministro de información a gerentes de industrias y de organizaciones de alimentos. Se describen dos medios importantes de evaluación de información, la revisión y la documentación temática. Se presenta un esquema detallado de los principios editoriales de la revista sobre documentación temática, *Economical Questions of Food Industries*,

una publicación trimestral de 12 páginas impresas, editada bajo los auspicios del Instituto Central de Investigación en Alimentos de Hungría. Se describen los objetivos temáticos de la publicación, preparada a partir de traducciones resumidas de trabajos profesionales, seleccionados de 70 revistas extranjeras. Los objetivos incluyen informar a los gerentes de la industria de alimentos, de manera sistemática y mediante clasificación temática, sobre temas como consumo de alimentos, producción de materia prima y procesamiento industrial de alimentos, comercio de alimentos (ventas a nivel doméstico y al exterior) y tendencias de desarrollo, y formación de precios para productos alimenticios en el mercado mundial. Se presentan ideas para fortalecer la distribución y el carácter documental de la publicación.

ZUSAMMENFASSUNG: Die ungarische Zeitschrift "Wirtschaftsfragen der Lebensmittelindustrie" stellt eine Übersichtsinformation für wirtschaftliche Betriebe der Lebensmittelindustrie und anderer auf diesem Gebiet arbeitender Organisationen dar. In Form von "thematischen Sammelbänden" werden Informationen gesammelt, selektiert und verdichtet, wobei eine enge Zusammenarbeit mit in- und ausländischen Institutionen gepflegt wird. Die Aussichten für eine verstärkte Verbreitung des auch wirtschaftlich gesunden Unternehmens sind gut, wozu die ständigen Bemühungen und Verbesserungen des Niveaus beitragen.

Der Vortrag möchte ein spezielles Medium des Systems der Informationsversorgung der Wirtschaftsleiter der Betriebe in der Lebensmittelindustrie und anderer sich mit Lebensmittelverarbeitung beschäftigenden Organisationen bekanntmachen. Es kann unter die traditionellen Mittel der Informationsverbreitung eingereiht werden, doch erhöht sich seine Bedeutung unter den Bedingungen unserer Zeit, der Verbreitung der rechnergestützten Informationssysteme, wo wir eine Explosion der Informatik erleben.

Die Zeitschrift "Wirtschaftsfragen der Lebensmittelindustrie" ist ein Periodicum, das in einem Umfang von 12 Verlagsbogen unter Verantwortung des Zentralforschungsinstituts für die Lebensmittelindustrie vierteljährlich erscheint und in die Kategorie der Übersichtsinformationsversorgung gehört: eine periodische Schrift, die sekundäre Informationen in thematischen Sammelbänden veröffentlicht.

Zur Klärung der wichtigsten Elemente dieser Definition kann in erster Linie die Abgrenzung von anderen Kategorien Hilfe leisten.

Die Zeitschrift muß als Übersichtsinformation von der selektiven Informationsverbreitung unterschieden werden. Letztere gibt sekundäre Informationen mit dem Ziel, dem Verbraucher eine Auswahl der für ihn wichtigen Informationen zu bieten. In unseren Tagen gibt diese Form der Informationsverbreitung, die die Möglichkeiten der EDV in zunehmendem Maße ausnützt, Hilfe zur Orientierung auf dem Gebiet der Fachliteratur zu bestimmten Themen des Fachgebietes.

Es ermöglicht die Auswahl von originalen Publikationen, die den Experten, also den Verbraucher der Informationen, interessieren.

Auch die Übersichtsinformationsverbreitung strebt nach Selektivität, aber auf eine andere Weise, als die selektive. Sie übernimmt eine andere Aufgabe: sie will den Verbraucher der Informationen in dem gegebenen Themenkreis vom Studium eines bedeutenden Teiles der originalen (pri-

mären) Fachliteratur befreien. Sie stellt die Kenntnisse in verdichteter Form und in der Muttersprache des Verbrauchers zur Verfügung und gibt eine umfassende Übersicht über das jeweilige Fachgebiet.

Zur Kategorie der Übersichtsinformationen können zwei wichtige Unterarten gerechnet werden: die Literaturstudie und die thematischen Sammelbände (Themendokumentationen).

Die Literaturstudie faßt zwecks umfassender Verarbeitung des gegebenen Themenkreises mehrere primäre Informationen zusammen. Sie ist zweifellos die entwickeltste Art der Übersichtsinformationen. Sie spart Zeit für den Informationsverbraucher, ihre Verfertigung nimmt dagegen sehr viel Zeit in Anspruch.

Die thematischen Sammelbände fassen die primären Informationen—im Gegensatz zur Literaturstudie—nicht zusammen, aber sie verzichten nicht auf eine logische Systematisierung und sie verdichten—ähnlich der Literaturstudie—die primären Informationen auf ihre inhaltliche Essenz. Dadurch bieten die thematischen Sammelbände für den Informationsverbraucher eine relative bedeutende Zeitersparnis, sie sind aber auch für den Ersteller weniger zeitaufwendig. Daraus ergibt sich, daß Sammelbände zum mehr oder weniger kontinuierlichen Überblick über breitere, umfassende Themenkreise die die naheliegendste und relative billigste Lösung sind.

Als thematischen Sammelband kann man die "Wirtschaftsfragen der Lebensmittelindustrie" in dieser Branche als einzigartig betrachten.

Um den thematischen Charakter der Zeitschrift konsequent zur Geltung zu bringen, bemüht sich die Schriftleitung eine einheitliche Struktur, einen konstanten Aufbau zu sichern: für Informationen, die die ganze Lebensmittelindustrie betreffen, wie auch bei speziellen Fachgebieten wird dieselbe Reihenfolge: Verbrauch—Rohwarenpromotion—industrielle Produktion—Handel—Preise—verwendet.

Dabei werden Probleme, die die tägliche Arbeit der in der Lebensmittelindustrie tätigen Organisationen

Tabelle 1 – Thematische Haupt-schwerpunkte in der Zeitschrift 1990

- Gesunde Ernährung, Lebensmittel mit neuem biologischem Wert, Produktinnovation;
- Qualitätskontrolle, Qualitätsregelung;
- Marketing, Verpackung, Distribution;
- Lebensmittelrecht, Etikettierung, Harmonisierung: EG '92;
- Management, moderne Leitungs- und Entscheidungssysteme;
- Marktorientiertes Betriebsverhalten;
- Mobilisierung innerer Reserven zur Erhöhung der Wirtschaftlichkeit der Betriebe;
- Automatisierung, moderne Einrichtungen, technologische Innovation;
- Technisch-wirtschaftliche Lage von Klein- und Mittelbetrieben;
- Material- und Energiesparung;
- Biotechnologie;
- Alternativer Anbau, Biolebensmittel, natürliche Lebensmittel;
- Lage der Welternährung, Kampf gegen Hunger.

unmittelbar betreffen, in den Vordergrund gestellt. Eine Schriftleitung, die aus Repräsentanten der Betriebe der Lebensmittelindustrie als praktische Anwender, aus Experten des Ministeriums für Landwirtschaft und Ernährung und aus führenden Mitarbeitern unseres Institutes besteht, bestimmt von Zeit zu Zeit die Themenkreise, die besonders wichtig für die Wirtschaftsleiter in der Branche sind.

Ein ebenso strukturell wie inhaltlich wichtiges Merkmal dieser Zeitschrift—ausser den bisher aufgezählten Aufgaben—ist auch, daß sie als Form der Mitteilung der Ergebnisse der ungarischen Lebensmittelforschung und-Entwicklung dient und damit zur Verstärkung der Verbindungen zwischen Wissenschaft und Produktion, und zur Bekanntmachung der Forschungsergebnisse für die praktischen Fachleute beiträgt. In der Redaktion dieses Abschnittes ist es gelungen eine direkte informative und operative Zusammenarbeit mit zahlreichen un-

Tabelle 2 – Die in den “funktionellen Abschnitten” im Laufe der vergangenen fünf Jahre (1985–1989) behandelten Problemkreise

<ul style="list-style-type: none"> • Anwendungsmöglichkeiten von Rechneranlagen in der Lebensmittelindustrie • Exportmöglichkeiten der einheimischen Lebensmittel 1985 • Anwendung der Biotechnologie in der Lebensmittelindustrie • Internationale Produktionskooperation in der Lebensmittelindustrie • Anwendbarkeit der Innovationstheorie in der ungarischen Lebensmittelindustrie • Situation der Weltmarktpreise der Lebensmittel • Innovation in der Lebensmittel-Auswahl der entwickelten Länder • Ergebnisse des regionalen Ener- 	<ul style="list-style-type: none"> gieprojektes des UNIDO in der Lebensmittelindustrie • Anwendungsmöglichkeiten der Strichcodesysteme in der Lebensmittelindustrie • Aktuelle theoretische und praktische Fragen des Marketings in der Lebensmittelindustrie I. • Aktuelle theoretische und praktische Fragen des Marketings in der Lebensmittelindustrie II. • Entwicklungstendenzen der Lebensmittelverpackung • Innovationsbestrebungen auf den Gebieten Anwendung, Recycling und Wiederverwendung von traditionellen Verpackungsmitteln 	<ul style="list-style-type: none"> • Lebensmittelgesetz heute—internationale Umschau • Aktuelle Fragen der modernen Leitung und Verwaltung • Internationale Perspektiven der Lebensmittelproduktion und Verbrauchs • Möglichkeiten der Anwendung der Biotechnologie in der Lebensmittelindustrie, Bioernährung, Biolebensmittel • Entwicklungstendenzen in der Getränkeverpackung • Rolle der Distribution in der Lebensmittelindustrie • Aktuelle Fragen der gesunden Ernährung
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garischen und manchen ausländischen Partnerforschungsinstituten darzustellen.

Mit besonders im Vordergrund des Interesses stehenden Themenkreisen befassen sich sogenannte “funktionelle Abschnitte”. Hier werden umfassende Themenkreise in komplexer Weise, durch Nutzung von mehreren Literaturquellen, unter mehreren Gesichtspunkten betrachtet und nicht selten in Form einer Literaturstudie detailliert besprochen.

“Wirtschaftsfragen der Lebensmittelindustrie” gehört zu jenen Leistungen des Zentralforschungsinstituts für die Lebensmittelindustrie, die eine bedeutende Einnahmequelle sind—und während einer längeren Zeitperiode—einen guten Gewinn abwerfen. Durch allgemeine inflatorische Entwicklungen, und besonders durch Preiserhöhung bei den Druckkosten wurde unser Institut 1990 zur Erhöhung der Bezugspreise gezwungen. Trotz der beträchtlichen Preiser-

höhung—Abonnementpreis pro Jahr für Wirtschaftsorganisationen 5.300 Forint, für andere Organisationen 3.500 Forint—blieb der überwiegende Teil unserer Abonnenten der Zeitschrift treu. Ungefähr 70% der Betriebe der Lebensmittelindustrie sind auch in der Zukunft interessiert. Dazu kommen noch zahlreiche andere Organisationen, landwirtschaftliche Betriebe und neugegründete joint-venture Betriebe, GmbH-Betriebe und auch Banken als Abonnenten.

Der spezifische inhaltliche und strukturelle Aufbau der Zeitschrift hat sich bewährt. In der Zukunft müssen wir unseren Abnehmern das Gleiche bieten wie bisher, aber auf einem sich ständig erhöhenden Niveau. Dies kann durch Konzentration auf die jeweils aktuellen Schwerpunktthemen und durch deutliche Betonung der vor der Branche stehenden aktuellen Probleme geleistet werden.

Im Interesse einer weiteren Erhöhung des Niveaus unserer Zeitschrift

wollen wir besonders auf die Ausdrucksweise, die präzise, genaue und allgemeinverständliche Abfassung und dadurch auf die Verstärkung des thematischen Charakters achten. Demselben Ziel dient die Erweiterung der bearbeiteten Quellen—zur Zeit werden 50 ausländische Zeitschriften systematisch und 20 Zeitschriften gelegentlich referiert. Dazu ist die weitere Vertiefung der Verbindungen mit den verschiedenen Bibliotheken und Dokumentationsabteilungen nötig.

Mit all diesen die Erhöhung des Niveaus fördernden Maßnahmen sehen wir die Zukunft unserer Zeitschrift—besonders hinsichtlich der weiteren Öffnung der ungarischen Wirtschaft gegenüber dem Weltmarkt—gesichert. In der Hoffnung auf den Erfolg werden wir in naher Zukunft versuchen, die Zahl unserer Abonnenten auf das frühere Niveau (ungefähr 350 verkaufte Hefte) zu erhöhen.

Demonstrating the Value of Library and Information Services

Tom Norton

Keywords: cost effectiveness; user satisfaction (information); library administration

ABSTRACT: Information provision improves personal skills, competence and knowledge. The results can neither be easily observed nor can financial benefit be assigned to the provision of specific information at a specific time. The Library and Translation Services of the United Kingdom Ministry of Agriculture, Fisheries and Food (MAFF) quantifies the value of some of its services. Recipients of a current awareness service based on CABI tapes were asked to state how much time the service saved them; the results were translated into monetary terms and demonstrated that the service paid for itself 7 times. Requesters of translations which cost over £250 to produce are asked to estimate the monetary benefits of the translations. There have been some cases where the savings of a few translations have exceeded the annual cost of the entire service and easily justified its provision. The extension workers are routinely notified of the costs of on-line searches carried out by library staff in support of their consultancy assignments so that the library contribution can be visible and acknowledged. Adding a quantitative element to the qualitative assessment of information services enables librarians to demonstrate the value of their services, in a form more easily understood by non-information personnel, and to present a more convincing case for increased resources.

RÉSUMÉ: En fournissant l'information, on améliore les capacités, la compétence et la connaissance personnelles. On ne peut pas observer les résultats, ni attribuer les profits financiers à la fourniture d'une information spécifique à un moment précis. La bibliothèque et les Services de traduction du Ministère de l'agriculture, des pêches et de l'alimentation (MAFF) du Royaume-Uni, quantifient la valeur de certains de leurs services. On a demandé à des destinataires d'un bulletin signalé-

tique basé sur des bande magnétique CABI, de préciser le gain de temps acquis grâce à ce service ; les résultats ont été traduits en termes monétaires et démontrent que ce service vaut 7 fois sa valeur. On a demandé à des demandeurs de traductions s'élevant à environ £250, d'estimer les profits monétaires tirés de ces traductions. Il y a eu des cas où les économies de quelques traductions ont dépassé le coût annuel de la totalité du service, justifiant ainsi facilement la fourniture de ce service. Les vulgarisateurs sont prévenus régulièrement des coûts des recherches en-ligne faites par le personnel de la bibliothèque pour soutenir leur travaux de consultation afin que la contribution de la bibliothèque soit visible et reconnue. En ajoutant des éléments quantitatifs à l'évaluation qualitative des services d'information, les bibliothécaires peuvent démontrer la valeur de leurs services, sous une forme plus aisément comprise par le personnel non-spécialiste en information, et présenter une justification plus convaincante pour une augmentation des ressources.

RESUMEN: Proporcionar información mejora las habilidades personales, la competencia y el conocimiento. Los resultados no se pueden observar fácilmente ni se puede asignar beneficio económico al hecho de proporcionar información específica en un determinado momento. La Biblioteca y los Servicios de Traducción del Ministerio de Agricultura, Pesca y Alimentos del Reino Unido (MAFF) cuantificaron el valor de algunos de sus servicios. Se interrogó a usuarios de un servicio de alerta basado en cintas de CABI sobre el tiempo que ahorran con el servicio; los resultados se tradujeron en términos monetarios y demostraron que el servicio se pagaba 7 veces. Se pidió a los solicitantes de traducciones, cuyo costo de producción es de más de 250 libras, que estimaran los beneficios económicos de éstas. Se han registrado algunos casos en los cuales los ahorros generados por unas pocas traducciones han excedido el costo anual de todo el servicio y fácilmente han justificado su ofrecimiento. Regularmente se notifica a

los agentes de extensión sobre los costos de las búsquedas en línea realizadas por personal de la biblioteca para apoyar sus tareas de consulta, de manera que la contribución de la biblioteca sea visible y reconocida. La adición de un elemento cuantitativo a la evaluación cualitativa de los servicios de información permite que los bibliotecarios demuestren el valor de sus servicios en una forma más fácilmente comprensible por personal ajeno al área de información y que presenten argumentos más convincentes para solicitar más recursos.

ZUSAMMENFASSUNG: Die Bereitstellung von Informationen verbessert die persönlichen Chancen und das Wissen. Es ist nicht leicht, hierfür ein Maß zu finden und den finanziellen Nutzen der Bereitstellung spezifischer Informationen zu einer bestimmten Zeit zu bestimmen. Der Bibliotheks- und Übersetzerdienst des United Kingdom Ministry of Agriculture, Fisheries and Food (MAFF) quantifiziert den Nutzen einiger seiner Dienste. Empfänger eines laufenden Informationsdienstes auf CABI Bändern wurden gebeten anzugeben, wieviel Zeit sie durch den Dienst einsparen; die Ergebnisse wurden in Geld übersetzt und zeigten, daß sich der Dienst siebenfach auszahlt. Besteller von Übersetzungen, deren Anfertigung mehr als £250 kostet, wurden gebeten, den finanziellen Vorteil der Übersetzungen zu schätzen. Es gab einige Fälle, in denen die Ersparnisse durch einige wenige Übersetzungen die jährlichen Kosten des gesamten Dienstes überstiegen und ohne Zweifel ihre Bereitstellung rechtfertigten. Den Beratern werden routinemäßig die Kosten der On-line-Recherchen, die vom Bibliothekspersonal zur Unterstützung ihrer Beratungsaufgaben durchgeführt werden, mitgeteilt, so daß der Bibliotheksbeitrag deutlich erkennbar und bestätigt wird. Die Bibliothekare werden, indem man der qualitativen Bewertung des Informationsdienstes ein quantitatives Element hinzufügt, in den Stand gesetzt, den Wert ihrer Dienste in einer Form zu demonstrieren, die leichter von Nichtinformationspersonal verstanden wird, und ein noch überzeugenderes Bei-

spiel für gewachsene Ressourcen anzubieten.

Introduction

Librarians and other information professionals need to consider ways of showing the value of the services they provide. Libraries are usually seen as an overhead along with accounting, personnel, and office maintenance that provide intangible services. Overheads are usually considered to be too large and there is constant pressure to reduce them. The advantages of overheads are easy to claim, but difficult to justify. Libraries are seen as useful, even though it cannot easily be proved, but they are seen to consume resources rather than generate revenue.

Measuring value: Problems

Most information provision aids the acquisition and improvement of personal skills, competence and knowledge and fosters personal creativity, motivation, confidence and self-improvement. The results cannot often be directly observed and cannot realistically be tied to any particular action at a particular time. A further difficulty in measuring the value of information is that there is no standard unit of measurement; so it cannot easily be costed. It is subjective: information that is of no value to one individual may be priceless to another. The same individual's perception of value may change over time depending on his changing information needs.

It has become increasingly urgent to find an answer to this question. The information professional must be prepared to prove the value of the services provided to the organisation. There are three suggested main approaches:

- Measuring time saved
- Calculating actual money savings
- Providing qualitative, anecdotal evidence of value¹

An additional approach is revenue generation through the sale of library services and products to ex-

ternal users such as subscriptions to a package of services or sale of translations. Such activity is unlikely to be substantial enough to justify more than a small fraction of the whole service, and if it were, it could be considered a diversion from the principal aim and justification for library and information services: service to customers in the parent organization.

Anecdotal evidence of the value of information services is easy to come by and for this reason, it is unconvincing on its own. It needs to be supplemented by harder, quantitative evidence, expressed, preferably, in money terms.

Measuring value: Approaches

King Research, Inc. has done some very useful work in developing quantitative techniques to measure the value of information. The value to users of information is measured by the "effective" price that users pay for information. Part of the effective price is the price paid by users in their time and effort to get and read the information. "The time of professionals in particular is a scarce resource, and if they decide to spend their time getting and reading information, that time is their indication of their assessment of its value"².

The value that results from the use that the information is put can sometimes be measured such as how much time, effort and material was saved in research and development projects. Sometimes the project need not be carried out at all because someone else has already done it and this can represent considerable monetary savings. King Research, Inc. applied these and other perspectives to an attempt to value the Energy Data Base, a bibliographic database covering energy-related science and technology information of the United States Department of Energy. The conclusion of the study was that the investment in the database yielded double the sum in savings.^{3,4}

The King Research study was a major exercise involving the use of

detailed questionnaires and is not something which librarians could normally consider on a routine basis. In my opinion, the King Research approach is useful but what is needed are simpler methods which librarians can use from time to time to measure the value of their services. This is the approach adopted by the Ministry of Agriculture, Fisheries and Food (MAFF) Library and Translation Services and that is described here.

MAFF Library and Translation Services

Let me first give you a brief tour of the MAFF library service in order to set the scene. The Ministry library service consists of a network of 17 major libraries and over 100 smaller library service points, stretching from the North-West of Scotland to the South-West of England. The 17 major libraries are managed by professional librarians and the smaller libraries (some of them part-time) are run by clerical staff who can call on the help of their nearest professional librarian so that the full services of the library network can be made available to all Ministry staff wherever they are located.

There are 38 professional staff (including 5 translators) who are supported by the equivalent of 50 full-time administrative staff. The total book stock of ministry libraries is 500,000 volumes and there are 8,000 subscriptions to journals and other serial publications. Ministry libraries spend just over £1 million a year on books, journals, newspapers, videotext, on-line information services and commissioning translations.

The Value of a Current Awareness Service

The MAFF Library and Translation Services provides some 300 Ministry staff with a computerised current awareness service, based on monthly tapes hired from the CAB International. These tapes are the monthly updates to the CABI database that will be well known to IAALD members. When the tapes are received

they are processed at the MAFF computer centre using software written by MAFF staff. User profiles are matched against the records on the tapes (which include abstracts) and output is supplied in various forms: on-line printer paper, on cards or on floppy disks for incorporation into personal data bases. The information found in these abstracts, or the complete documents that may be requested as a result of reading the abstracts, is used for many purposes: for research, consultancy, management or personal enlightenment. In most cases, although there is a qualitative value in these purposes, it is difficult to quantify the value in monetary terms. However, the provision of this information saves the recipients' considerable time and effort through not having to seek it out for themselves and this can be expressed in those terms.

The decision to change to a different method of producing the service provided an opportunity to find out what customers used the information for and to calculate the value of the service. Recipients of profiles were sent a simple questionnaire⁵ that asked for information as follows: the importance of the service to their work; type of work (advisory, research, administrative); use to which the information was put; how much time the service saved. The UK Civil Service produces tables of staff costs. Any grade of civil servant can find out how much it costs to employ him by the hour, and using such data, it was possible to calculate the monetary value of staff time saved by the current awareness service. This showed that the value of time saved exceeded the cost of providing the service seven times over.

Return of questionnaires was almost 100%. It was assumed that the very small number of customers who failed to respond to the initial questionnaire and follow up, did not value the service and provision of it to them was stopped.

The Value of Translations

MAFF spends £100,000 a year on

externally commissioned translations. This represents 80% of the annual total of translations; the remaining 20% are done in-house by Ministry translators. Unlike CABI abstracts, it is often possible to monitor more closely the use to which translated work is put. Requesters of translations which cost over £250 to produce are sent a one page questionnaire⁶ that asks them to estimate the benefits, in monetary terms if possible, of the translations, or to say how they helped them in their work. There have been some spectacular instances where the monetary benefits of a few translations have exceeded the annual cost of the entire translation service and thus easily justified its provision. Often the value has to be a qualitative one: the requester's knowledge of a subject or situation is increased and he may be able to give better advice to clients or negotiate better at an international meeting. This may result in a monetary gain or saving for the Ministry and the UK but it is often impossible to trace a direct connection with the original translation. Nevertheless, quality is as important as quantity in assessing the value of translations.

In 1987 it was estimated that nine of the translations had a monetary value of £500,000 for expenditure on the translations of £4,000 pounds sterling. In 1988 expenditure of £5,000 on 13 translations achieved a savings of £60,000. Some representative examples are given in the appendix to this paper.

Library Contribution to Chargeable Services

Ministry extension staff provides consultancy services, some of which are charged for⁷. Ministry librarians are often involved in providing on-line searches in support of these services. The cost of these searches is routinely notified to Ministry staff so that they can be included in the charges made for consultancy services. In this way, the library contribution to revenue earning can be visible and acknowledged.

Conclusion

Adding a quantitative element to the qualitative assessment of library and information services enable information providers to demonstrate the value of their services, in a form more easily understood by non-information personnel—particularly those who provide personnel and finance—and to present a more convincing case for increased resources.

NOTES AND REFERENCES

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(4) A shorter version of (3) is in: Griffiths, Jose-Marie and King, Donald W. 1982. "Methods of Attributing Value to Information and Related Systems, Products and Services" in Sixth International Online Information Meeting, London 7-9 December 1982. London: Learned Information. 1-5.

(5) Copies of the questionnaire are available from: Chief Librarian, Ministry of Agriculture, Fisheries and Food, Room 119, 3 Whitehall Place, London, SW1A 2HH. Telephone: 01 270 8448 or 8428. Fax: 01 270 8125.

(6) Copies of this questionnaire are available as in (5) above.

(7) Advice on animal welfare, conservation and environmental matters is free.

APPENDIX

Extracts from reports on the value of translation:

Item: Translation from German of papers on pot flowers

Cost: £360

Quantified value: £5,000 through the avoidance of duplication of research

Qualitative value: The budget for research and development on bulbs is £300,000. It is essential to keep abreast of experimental work and culture techniques in order to plan future experimental work.

Item: Translation from Dutch on hatchery hygiene and utilization of hatchery waste
Cost: £329

Quantified value: About £10,000 through the avoidance of duplication of research
Qualitative value: Useful background information for research and development projects to evaluate the use of waste eggs for pet food manufacture. Pitfalls revealed.

Item: Translation from French on food irradiation

Cost: £892

Quantified value: Not possible to say
Qualitative value: MAFF is about to enter protracted discussions in Brussels on an EC Directive on food irradiation. It is expected that many of the arguments raised and promoted in the translated document

will reappear. It is essential to have the information in advance and this will help in the development of the UK line.

Item: Translation from English into Chinese (Cantonese)

Cost: £376

Quantified value: Not possible to say
Qualitative value: The translation was required for a MAFF/Department of Health and Social Security dietary survey costing £1 million, during which the respondents were required to provide urine samples. One respondent had difficulty understanding the instructions (in English). It is not possible to replace randomly selected respondents, so the translation was vital to ensure completeness. The translation will

continue to be useful for any other Cantonese speaking respondents.

Item: Translation from Hebrew of Israeli regulations on strawberry plants

Cost: £286

Quantified value: Not possible to be precise but this document is a contribution to potential savings in disease control and better export marketing that could be worth about £1.2 million

Qualitative value: The value of the UK strawberry industry is about £60 million. Careful assessment of certification standards protects the UK industry from alien pests and diseases that could come in on Israeli imports. It is also helpful to know the quality standards of Israeli plants with which UK grown stock may be competing.

ALAP: A Government Partner in Agricultural Information Activities

Marina Barile-Frias

Keywords: library education; librarians; library networks; library associations; user needs (information)

ABSTRACT: Agricultural libraries and information centers in the Philippines are found in academic institutions. The greatest number of end users of agricultural information are the extension workers and the farmers. These are the groups wherein the downstream flow of information from basic research should be reached. The extension workers and the farmers are the responsibility of the Department of Agriculture (DA), which has no mandate or jurisdiction over the academic institutions. The Agricultural Libraries Association of the Philippines (ALAP), as a professional organization, is bringing the information sources of these institutions to the final users of agricultural information, the extension workers and the farmers. ALAP is cooperating with the Regional Applied Communication Offices, a joint undertaking of the different government offices in harnessing and coordinating the different information activities. As a professional organization the ALAP brings together not only the librarians but also the resources of the libraries of private and government institutions. A regional approach on information awareness and information delivery is adopted to make information more accessible to the end users. Information needs of each region differ considering the crops grown and the development program of the region. The technical assistance that ALAP is extending enhances the information capabilities of small libraries.

RÉSUMÉ: Aux Philippines, des bibliothèques et des centres d'information agricoles se trouvent dans les institutions académiques. La majorité de leurs clients sont des vulgarisateurs et des agriculteurs. Ces groupes devraient être les destinataires du flux d'information de la recherche fondamentale. Les vulgarisateurs et les agriculteurs sont sous la re-

sponsabilité du Ministère de l'Agriculture (DA) qui n'a ni mandat, ni juridiction pour les institutions académiques. L'Association des bibliothèques agricoles des Philippines (ALAP), en tant qu'organisation professionnelle, donne l'accès aux sources d'information de ces institutions pour les utilisateurs finals de l'information agricole, les vulgarisateurs et agriculteurs. L'ALAP coopère avec les Bureaux de communication appliquée régionaux, une entreprise commune des différents bureaux gouvernementaux pour lancer et coordonner les différentes activités en information. En tant qu'organisation professionnelle, l'ALAP regroupe non seulement les bibliothécaires mais aussi les ressources des bibliothèques et des institutions privées ou publiques. Une approche régionale sur la sensibilisation et la dissémination de l'information a été adoptée pour rendre l'information plus accessible aux utilisateurs finals. Les besoins en information de chaque région diffèrent selon les cultures et le programme de développement de la région. L'assistance technique offerte par l'ALAP accroît les capacités d'information des petites bibliothèques.

RESUMEN: En las Filipinas, las bibliotecas agrícolas y los centros de información se encuentran en las instituciones académicas. El mayor número de usuarios de la información agrícola lo componen los agentes de extensión y los agricultores. Estos son los grupos a los cuales debe llegar el flujo de información de la investigación básica. Los agentes de extensión y los agricultores están bajo la responsabilidad del Departamento de Agricultura (DA), quien no tiene mandato ni jurisdicción sobre las instituciones académicas. La Asociación de Bibliotecas Agrícolas de las Filipinas (ALAP), en su calidad de organización profesional, está poniendo las fuentes de información de estas instituciones al alcance de los usuarios de la información agrícola, de los agentes de extensión y de los agricultores. ALAP colabora con las Oficinas Regionales de Comunicación Aplicada, una empresa conjunta de las diferentes oficinas del gobierno, en el aprovechamiento y coordinación de las

diferentes actividades de información. Como organización profesional, ALAP agrupa no sólo los bibliotecarios sino también los recursos de las bibliotecas de instituciones privadas y del gobierno. Para hacer la información más accesible a los usuarios, se adoptó un enfoque regional de alerta y envío de la información. Las necesidades de información de cada región difieren, si se tienen en cuenta los cultivos que se siembran y el programa de desarrollo de cada región. La asistencia técnica de ALAP se está extendiendo, mejorando las capacidades de información de las bibliotecas pequeñas.

ZUSAMMENFASSUNG: Die landwirtschaftlichen Bibliotheken und Informationszentren auf den Philippinen befinden sich in akademischen Institutionen. Die Berater und Landwirte stellen den größten Anteil der Endbenutzer von landwirtschaftlichen Informationen dar. Sie sind die Gruppen, bei denen Informationen aus der Basisforschung münden sollten. Für die Berater und Landwirte ist das Department of Agriculture (DA) verantwortlich. Es hat weder ein Mandat noch die Oberaufsicht über die akademischen Institutionen. Deshalb bringt die Agricultural Libraries Association of the Philippines (ALAP) als Fachorganisation die Informationsquellen dieser Institutionen an den Endbenutzer, in der Mehrzahl Berater und Landwirte. ALAP kooperiert mit den Regional Applied Communication Offices, einem Gemeinschaftsunternehmen der verschiedenen amtlichen Stellen, um die verschiedenen Informationsaktivitäten nutzbar zu machen und zu koordinieren. Als eine Fachorganisation bringt ALAP nicht nur die Bibliothekare sondern auch die Bibliotheksquellen privater und amtlicher Institutionen zusammen. Ein regionaler Lösungsvorschlag zum Informationswissen und zur Informationslieferung ist angenommen worden, um Informationen für den Endbenutzer zugänglicher zu machen. Die Informationsbedürfnisse jeder Region differieren entsprechend den angebauten Kulturpflanzen und des Entwicklungsprogramms der Region. Die technische Hilfe,

die ALAP gewährt, verstärkt die Informationsmöglichkeiten der kleinen Bibliotheken.

The Agricultural Libraries Association of the Philippines (ALAP), in the long term plan, has committed itself to the establishment of a national agricultural library network. This was formed last year by the ALAP executive board and is underway with the cooperation and support from the Philippine Department of Agriculture (DA).

Before I go on, let me briefly give you a scenario of agricultural libraries and librarianship in the Philippines. An agricultural library that can provide the information needs of its immediate users are found in academic institutions and are manned by professionally trained librarians. Most of the libraries of agricultural government offices are in a sorry state compared with these academic libraries. Last year the Association took the cue that the present administration of the DA is giving importance to information when an assistant secretary was to take charge of information. ALAP has no mandate to call a meeting of heads of libraries of the 24 bureaus and attached agencies under the DA so I had to convince the chief of the Information Division, of which the library is a section, to call a meeting. No less than the Secretary of Agriculture signed the memo circular for the meeting. After presiding over this meeting, I came to realize the one reason that the libraries were in such a sorry state. My assumption, then as with the rest of my colleagues, was that there is a lack of management interest and support for the library. This maybe so, but the main reason the libraries were not giving responsive service was that they were not manned by professionally trained librarians. Of the 24 offices, only six have professional librarians as heads of libraries.

With this information, the 1989 ALAP executive board decided to submit a project proposal to the DA wherein the Association will provide the technical expertise in the realiza-

tion of a national agricultural library network with the DA library as the focal point. Training was emphasized in the proposal that was submitted in January of this year. The immediate reaction of the DA to this proposal was the request for ALAP to organize a workshop for the 24 heads of libraries. The following month the DA sponsored an ALAP workshop on "Library Networking and Bibliographic Databanking". In this workshop, ALAP was able to validate its recommendations to the DA and it was the start of a partnership for both, in trying to improve library services. It was also during this workshop that the assistant secretary requested from ALAP that a small group of experts from the Association act as consultants to the Department and produce a project document needed for the establishment of a national agricultural library.

ALAP sees the training proposal as a priority regardless of how much support the ALAP gets from the Department. The proposal will fail if there is no manpower support to carry out the activities. Furthermore, the Association anticipates the passing of the librarians professionalization law that has passed the final reading in the Senate and is now waiting for the Congress' decision. There are library staff who are holding librarian positions in a permanent capacity, but once the professionalization law is passed, they will not be qualified for the said positions. The ALAP is hoping that these library staff members will be able to comply with the requirements within the required time.

Today, ALAP was able to tap three institutions to provide local training:

- University of the Philippines at Los Baños Library (also the AGRIS National Center)—On the job training on library practices.
- Agricultural Information Bank for Asia—CDS/ISIS software and database management system.
- University of the Philippines, Institute of Library Science—10 month certificate course on agricultural librarianship that can be credited towards a MLS to qualified students. This

certificate course was requested by the DA upon the recommendation of ALAP.

In preparation for the information sharing activities of the DA library network, the ALAP initiated an inventory of library collections. From this inventory we hope to identify the literature of the Philippines that has never been included in any bibliography.

As previously stated, responsive library service in the Philippines is found in academic institutions. The "downstream" flow of information is not realized because the library service is limited to the researchers of the academe. Information to the extension workers, much more to the farmers is very limited. The extension workers and the farmers are the responsibility of the Department of Agriculture who has no mandate over these academic institutions. The Agricultural Libraries Association, as a professional organization has the mandate to gather agricultural libraries and address this problem. In this year's national seminar-workshop of the Association had the theme "Regional Cooperation and Project Development in Agricultural Information Services". Two on-going activities in agriculture Regional Applied Communication Program and the Regional Crop Protection Center were considered during the discussion in the workshop sessions. The workshop's aim is not only to bring the librarians but also the library resources of private and government institutions in each region to provide a responsive information service towards the realization of the regional agricultural development programs.

Problems and needs in information services were for once addressed collectively by both the librarians and information users. The workshop was attended by researchers and extension workers. A farmer and a decision maker delivered a paper on their information needs. The output of the workshop was presented to a representative of the Department of Agriculture for funding of the activities that the Department sees as necessary in

attaining the regional development plans.

The regional activities will be coordinated by the Department of Agriculture Regional Offices with the technical assistance of an ALAP member in the region. Sources of funds will be decided by the Department. Professional training or re-training of librarians comes first which will be simultaneously done with the regional inventory of library collec-

tions. Again this is in preparation for the networking. Computerization, which could provide better retrieval and dissemination of information will have to be scheduled in the second phase because this will involve equipment and further training for the librarians or information processors. There are however institutions in the regions who already have computerized libraries. The libraries will then act as the coordinators in the inven-

tory and maybe tapped as the regional training center during the computerization phase.

We do not know up to what point the Department of Agriculture shall support the activities of ALAP. All that matters is that ALAP was able to get things going towards the improvement of better agricultural library information services.

The Study of Information Requests and Forms of Meeting Them in Scientific Agricultural Libraries of the USSR

V.G. Pozdnjakov

Keywords: user needs (information); use studies; models;

ABSTRACT: The system of the USSR agro-industrial complex comprises about 2,000 scientific and scientific and technical libraries of which 1,400 are scientific agricultural libraries with a total book stock of over 102 million pieces. These libraries are visited by over 3.4 million users who are mainly agricultural scientists and highly qualified specialists. The information requests of this user category is the focus of a study carried out in the Central Scientific Agricultural Library using a third generation ES computer and parts of the INIS application software package. The users were broken down by profession, type of activity, and professional experience to identify their information requests. Relationships between information requests and primary sources by subject field, type, and year of publication were established. The data obtained are used to improve the Library's acquisition policy, to optimize its collections that will allow us to satisfy the information requests of agricultural scientists and specialists in a more complete and prompt way. The percentage of unfilled requests has reduced. This study allows the creation of an optimal model of collections in a scientific agricultural library.

RÉSUMÉ: Le système du complexe agro-industriel de l'URSS comprend environ 2000 bibliothèques scientifiques et technico-scientifiques dont 1400 bibliothèques agricoles avec, au total, plus de 102 million de documents. Plus de 3,4 million d'usagers, la plupart des agronomes et des spécialistes hautement qualifiés, fréquentent ces bibliothèques. Une étude des demandes d'information de cette catégorie d'usagers a été faite par la Bibliothèque centrale scientifique agricole, utilisant un ordinateur ES de la troisième génération et certaines applications du

logiciel INIS. Les usagers ont été classés par profession, type d'activités et expérience professionnelle afin d'identifier leurs demandes d'information. On a établi des relations entre les demandes et les sources primaires, par thème, type et date de publication. Les données obtenues servent à améliorer la politique d'acquisition de la bibliothèque, et à rentabiliser ses collections qui nous permettront de satisfaire les demandes d'information des scientifiques et spécialistes agricoles d'une manière rapide et plus complète. Le pourcentage de demandes non satisfaites a diminué. Cette étude permet de créer un modèle optimal de collections dans une bibliothèque agricole scientifique.

RESUMEN: El sistema del complejo agro-industrial de la URSS comprende aproximadamente 2000 bibliotecas científicas y técnico-científicas, de las cuales 1400 son bibliotecas agrícolas científicas con una colección de más de 102 millones de ejemplares. A estas bibliotecas acuden más de 3.4 millones de usuarios, principalmente científicos agrícolas y especialistas altamente calificados. Las solicitudes de información de esta categoría de usuarios fueron objeto de un estudio realizado en la Biblioteca Central Agrícola Científica, utilizando un computador ES de tercera generación y partes del paquete de programas de aplicación de INIS. Para identificar sus solicitudes de información, los usuarios se clasificaron por profesión, tipo de actividad y experiencia profesional. Se establecieron relaciones entre las solicitudes de información y las fuentes primarias por área temática, tipo y año de publicación. Los datos obtenidos se están utilizando para mejorar la política de adquisiciones de la Biblioteca y para optimizar sus colecciones, lo cual permitirá satisfacer mejor y más prontamente las solicitudes de información de los científicos y especialistas agrícolas. El porcentaje de solicitudes no atendidas se ha reducido. Este estudio permite crear un modelo óptimo para las

colecciones de una biblioteca científica agrícola.

ZUSAMMENFASSUNG: Das System des landwirtschaftlichen Industriekomplexes der USSR umfaßt ca. 2.000 wissenschaftliche und wissenschaftlich-technische Bibliotheken, wovon 1.400 wissenschaftlich-landwirtschaftliche Bibliotheken mit einem Gesamtbücherbestand von über 102 Mio. Bänden sind. Diese Bibliotheken werden von über 3.4 Mio. Benutzern, welche hauptsächlich Agrarwissenschaftler und hochqualifizierte Spezialisten sind, besucht. Die Informationsanfragen dieser Benutzerkategorie waren der Schwerpunkt einer Studie der Central Scientific Agricultural Library, unter Zuhilfenahme eines ES-Computers der dritten Generation und Teilen der INIS Applikations-Software. Die Benutzer wurden unterteilt nach Beruf, Art der Aktivität, berufliche Erfahrungen, um ihre Informationsanfragen zu identifizieren. Verbindungen zwischen Informationsanfragen und Primärquellen hinsichtlich Fachgebiet, Tag und Jahr der Veröffentlichungen werden hergestellt. Die erhaltenen Daten werden benutzt, um die Beschaffungspolitik der Bibliothek für die Optimierung der Bestände zu verbessern, welche uns erlaubt die Informationsanfragen von landwirtschaftlichen Wissenschaftlern und Spezialisten umfangreicher und zügiger zu erfüllen. Der Prozentsatz von unerledigten Anfragen wurde reduziert. Diese Studie erlaubt die Entwicklung eines optimalen Modells von Sammlungen in einer agrarwissenschaftlichen Bibliothek.

Introduction

Scientific agricultural libraries of the USSR, with their book collections of over 102 million pieces provide services to over 3.4 million readers annually, and they play an important role in the unified state system of scientific and technical information.

Great changes are taking place in the libraries today, such as introduction of means of automation, development of non-paper technology of information processing and an accumulation of documents on non-traditional carriers in library stocks. The library is getting more and more complicated and intensive, but the problem of making available to the reader the primary sources of information in an efficient way still remains. The solution of this problem is possible only with the help of improvements in library services and optimization of library stocks to meet as fully as possible information requests of readers.

The study of information requests, establishing and categorizing of aspects affecting the requests, and an analysis of the relevance of library and bibliographic resources of scientific agricultural libraries to information requests of agricultural scientists and specialists have been used as a basis of research. The research was carried out by the Central Scientific Agricultural Library of the V.I. Lenin All-Union Academy of Agricultural Sciences (CSAL of VASKHNIL) jointly with republican scientific agricultural libraries, libraries of research institutions and institutes of higher learning of the agro-industrial complex (AIC) of the country. The subjects of the study were the scientific personnel, as a leading category of CS readers, whose activity determine the development of agricultural science and production. The share of this category, compared with other groups (specialists of AIC, students, post-graduate students) is at 40%.

Information requirements of any reader category exist in the mind of the reader himself, in the form of concrete requests for certain forms and types of primary sources, documents of different subject fields and retrospection from the readers. They do not always coincide and therefore the study involved both data collecting through questionnaires and an analysis of readers' demands.

The aims of the study involved estimation of the comprehensiveness of meeting information requests of a

certain reader category and the analysis of its relationships with the structure of book stocks and reference tools, forms of services and bibliographic competence of information user.

Forming of Information Requirements of IC Scientists

According to the working hypothesis of the study, information requirements of scientific workers are founded under the influence of some among which the most important are:

- Character of work (research, pedagogical activity, science management);

- Specificity of the agricultural science branch as a sphere of the scientist's efforts (level of science development and speed of outdated of the knowledge, influence of related sciences, topicality of problems);

- Professional qualification (availability of scientific degree, time spent on scientific work, knowledge of foreign languages);

- Concrete objective of using the primary information source (solution of a definite scientific task, preparation for a report, or lecture, writing a review, thesis, an article)

The group of the library users under consideration is quite diverse. Therefore it became necessary to study the scientific personnel by type of scientific activity, qualification, purpose to use the library.

Characteristics of the Studied Reader Category

Analysis of the questionnaires showed the following:

- 64% of scientific workers, using CS services are engaged in research work, 31.5% are combining research and pedagogical work, and about 5% are dealing with the management of science;

- 32% of scientific workers are engaged in agronomy, 16% in breeding, 14% in veterinary science, 16% in agricultural economics, and 21% in mechanization and electrification of agricultural production;

- 4% of scientific workers have the scientific degree of Doctor of Sciences and 46% of the degree of Candidate of Sciences; the largest number of workers with scientific degrees are agronomists, and the least, agricultural engineers;

- 50% of the readers of this category have been engaged in scientific work for more than 10 years, 21% for 5 to 10 years, and 13% for less than 5 years;

- 65% of scientific workers know foreign languages including 35% English; 30% German; 3.6% two or more foreign languages and 0.5% three foreign languages.

Analysis of the objectives for using CSA collections by scientific workers showed that 53% of readers request the literature concerning the preparation of theses, over 46% concerning a solution to a certain research problem. The percentage of other objectives for using primary information sources is much lower.

Analysis of Scientific Workers' Requests

Readers' requests as an actual expression of information needs of scientific workers, serviced by CSA, are characterised by the following aspects:

- Frequency of the use of certain publication types;

- Correlation between primary sources of general and related subjects within the total amount of requested literature;

- The degree of the use of old and recent publications.

All groups of the reader categories independent of the purpose of the research show a high interest in monographs (21% of requests) and collected scientific papers in various subject fields and proceedings of research institutions (20% of requests each). Requests for scientific methods as well as practical literature are lower, and requirements for reprints and deposited manuscripts are insignificant.

While writing theses, the readers use mostly author synopses of theses; while preparing for reports, lectures and presentations they use scientific

publications and collections of articles (26% of requests) and author synopses of theses (12% of requests). Popular scientific and reference literature is used for self education and satisfaction of information requests that are not related to professional activity.

The analysis of subject fields of literature was carried out using nine subject divisions: general agriculture, economics and management of AIC, plant breeding, plant protection, animal breeding, veterinary science, agricultural mechanization and electrification.

Most of the requests are for plant breeding literature, and the least amount, for agricultural mechanization and electrification. It is interesting to compare these data in correlation to the main agricultural professions among scientific workers. The share of agronomists, for instance, is 32%, and reader requests in agronomy are 31%, specialists in animal breeding are 16%, the requests in animal breeding are 21%, and respectively, veterinary scientists are 14%, and their requests are 8%, agricultural engineers are 21% and their requests about 15%.

This information possibly characterizes the activity of scientists of different specialities in using scientific literature of the main and related subject fields. As for the interest of agronomists, animal breeders and veterinary surgeons in related sciences it is concentrated on natural and scientific agricultural grounds; the interests of agricultural engineers lie in technical sciences, of economists of the AIC, in sociology and general problems of economy.

Chronological aspects of readers' requests were studied in relation to the character of the scientists' activities, their profession, and their objective for the use of primary sources. The results of the study have shown that literature published during the

last 10–15 years is requested more (85% of requests) than the publications of the current year (78%), and the documents published at the beginning of the 20th century are asked for only by 6% of readers.

The purpose of using primary sources practically does not influence chronological aspects of the requests, the influence of the profession is more apparent: agronomists show higher chronological range of requests, economists are more interested in literature of the recent 5–10 years, and agricultural engineers in publications of the current year.

Meeting Information Requests of Scientists in CSAL

It is obvious that there is close relationship between readers' requests and library stocks. The reader's request to a certain extent depends on the composition of library stocks, and in turn it affects their development and degree of utilization. It makes adjustments in the acquisition policy.

The study has shown that readers' requirements for definite types of publications are not completely satisfied by the libraries, and this fact can be explained with a high probability level by lack of correlation between CSAL collections and information requirements of readers, by an imperfect structure of reference tools, and insufficient bibliographical experience of readers.

Readers' requests can be met more efficiently by the developed system of services such as open access to primary sources, exhibitions of current year publications, subject expositions and topical collections of publications, information days, days of specialists, library days in research institutions and other forms of mass book popularization. Organization of

current awareness information about new acquisitions in CSAL, differentiation of bibliographic services for scientists, access to automated data bases in the USSR and abroad, wide spread use of library and bibliographical knowledge among scientific workers make it possible to raise success and comprehensiveness of scientific information presentation, to reduce the way of readers to primary sources, to make the work both of scientists and librarians more efficient.

Conclusion

As a result of the investigation, CSAL readers have been defined by several characters: speciality, professional experience, knowledge of foreign languages. Information requests of scientific workers in different types of libraries have been studied and identified. The necessity of improving information work with different types of publications has been found. The data obtained reveal the possibility of perfecting the library acquisition policy, and information of stock composition allowing efficient satisfaction of scientists' information requests. The method of a multi-aspect study of readers' requests (Subject area—type of publications, Subject area—year of publication) may be widely applied by libraries in the formation of auxiliary book collections (open access, reference rooms), and in the development of criteria of discarding obsolete books from the book stock in specific and chronological aspects. The further extension of this study assumes involvement of machine-readable and audiovisual information resources, including international automated data bases. This study makes it possible to develop the best model of book stocks at a scientific agricultural library.

Introduction of CD-ROM Technology in ACP Countries:

Report of a CTA Project

J.H.W. van Hartevelt

Keywords: library development; technology transfer; developing nations

ABSTRACT: On behalf of the donor agency CTA, the Royal Tropical Institute (KIT) introduced CD-ROM technology at 18 sites in 15 different African, Caribbean, Pacific (ACP) countries 1989–1990. The projects consisted of the supply of workstations including hardware, software; agricultural databases on CD-ROM; and the training in basic PC skills, word processing and literature retrieval. The implementation of the new technology succeeded without many difficulties because use was made of available local expertise and local connections as much as possible. Experiences and provisional conclusions are reported.

RÉSUMÉ: L'Institut Royal Tropical (KIT) a introduit la technologie du CD-ROM, au nom du CTA, sur 18 sites dans 15 pays différents d'Afrique, des Caraïbes et du Pacifique (ACP), 1989–1990. Ces projets comprennent la fourniture d'un poste de travail comprenant le matériel CD-ROM et des logiciels, de plusieurs bases de données sur CD-ROM et une formation de base en micro-informatique, en traitement de texte et en recherche documentaire. La réalisation de la nouvelle technologie a été couronnée de succès grâce à l'exploitation de l'expertise locale disponible, et des connexions locales. Ce rapport nous présente les expériences et les conclusions provisoires.

RESUMEN: En nombre de la agencia donante CTA, el Royal Tropical Institute (KIT) introdujo la tecnología del CD-ROM en 18

sitios de 15 países de Africa, el Caribe y el Pacífico (ACP), 1989–1990. Los proyectos consistieron en el suministro de estaciones de trabajo, incluyendo equipo y programas; bases de datos agrícolas en CD-ROM; y capacitación en habilidades básicas de manejo de microcomputador, procesamiento de textos y recuperación de información. La implementación de la nueva tecnología tuvo éxito sin mayor dificultad, debido a que se utilizaron al máximo la experiencia y las conexiones disponibles a nivel local. Se informa sobre las experiencias y conclusiones provisionales de este proyecto.

ZUSAMMENFASSUNG: Im Namen des Sponsors CTA führte das Royal Tropical Institute (KIT) die CD-ROM Technologie an 18 Standorten in 15 verschiedenen ACP Ländern (Afrika, Carib, Pazifik) ein. Die Projekte bestanden aus der Lieferung von Arbeitsstationen einschließlich Hardware, Software, landwirtschaftlichen Datenbanken auf CD-ROM, Basis PC-Schulung, Wortverarbeitung und Literaturretrieval. Die Implementierung der neuen Technologie gelang ohne große Schwierigkeiten, weil verfügbare örtliche Sachkenntnis und örtliche Verbindungen so weit wie möglich nutzbar gemacht wurden. Über die Erfahrungen und den vorläufigen Ausgang wird berichtet.

Introduction and objectives

Although there is an abundance of computerized information relevant to developing countries, several constraints prevent these countries from obtaining access to information stored as computerized databases. The CD-

ROM technology has some characteristics that may help to overcome these constraints (van Hartevelt 1987, Metcalfe 1987, Nazim Ali 1988). Self-sufficiency in information supply, however, can only be enhanced if a package is offered that also includes introductions to bibliographic agricultural information sources and computerized bibliographic databases, training in literature retrieval and word processing, and document delivery and other operational support. Furthermore, a complete package will have to include the supply and installation of the workstation, field service of the hardware and training in basic skills required for the use of a PC as well as facilities to cover operational costs. In 1989, CTA¹ launched a project to introduce CD-ROM technology in ACP countries. The general objectives of the project were: to enable organizations to obtain access to information in agricultural and rural development stored in computerized databases through CD-ROM; and to enhance self-sufficiency in the dissemination of information in agricultural and rural development.

It should be noted that the starting point of the project, and hence the objective, depends on the level of development of the participating organization. When an organization has little or no experience in the use of a PC and the use of secondary (compu-

terized) information sources, the project focuses on the familiarization with computer technology and computerized databases (on CD-ROM) in general. In these cases the lack of practice in compiling search strategies for retrieval from computerized bibliographic databases probably will be the largest bottleneck in the efficient use of the CD-ROM technology. The introduction of the databases on CD-ROM enables these organizations to obtain practical experience in searching techniques.

Therefore, an additional objective for the more developed organizations was to stimulate the development of regional networks and regional focal points for regional information services.

For the less developed organizations an additional objective was to stimulate and initiate the introduction of computer technology in information centres, aiming at the eventual modernization (computerization) of information services and local production of databases on agricultural and rural development.

It is only during the last few years that a positive attitude towards information has started to develop in Africa. However, (world-wide) documentation centres do not appear to be very much appreciated, which can be concluded from the budgets they have at their disposal. It was very interesting to notice that the prestige of the documentation centres rose sharply after the computer, with all its optical peripherals, was installed. Often the library suddenly had taken a leading position within its organization as far as technology was concerned. The introduction of CD-ROM technology can greatly influence the general attitude towards documentation centres from both within and without the parent organizations. Considering the instant respect the documentation centres achieved through the implementation of CD-ROM technology and the consequent realization how important information is as a resource in the development of agriculture alone makes the introduction of CD-ROM technology an objective, but only if all necessary peripherals and

elements are (made) available to the cooperating organizations.

Especially for Africa, the basic philosophy regarding the implementation of the optical technology is to supply the equipment and some of the training needed by local hardware and software suppliers as much as possible this is done in order to establish channels through which maintenance and service can be provided locally and in order to establish contacts between the cooperating organizations and commercial computer companies.

Project description

In 1990, a complete package comprised materials and training:

- Databases on CD-ROM: AGRIS AGRICOLA, CIMMYT's Maize Germplasm Bank, CAB Abstracts and KIT's databases TROPAG & RURAL (*Abstracts on Tropical Agriculture and Abstracts on Rural Development in the Tropics*). The CGIARS's Compact Library was included towards the end of the project.

- IBM AT PC/PS2 (or true compatible)

- a laser printer (300 d.p.i.),

- a CD-ROM drive, type LMS CM121, including High-Sierra-compatible MS-DOS driver software and MS-DOS extensions

- UPS/SPS (Uninterrupted Power Supply/Stand-by Power Supply)

- Word processing software (WordPerfect 5.x)

- Budget for operational costs²

- Document delivery facilities to provide (photocopies of) retrieved articles

- Help desk facilities for trouble shooting and remote assistance

The training consisted of a maximum of 5 different modules, all specifically aimed at the usage of databases on CD-ROM:

- Literature retrieval from AGRICOLA or AGRIS, CAB Abstracts and TROPAG & RURAL on CD-ROM.

- Basic skills in microcomputer usage (MS-DOS)

- An introduction into and inter-

facing with word processing (WordPerfect 5.x)

- An overview of bibliographic agricultural information sources

- An introduction in computerized bibliographic databases

In several cases the modules of basic skills and word processing were partly provided by KIT and partly by a local commercial computer company afterwards.

It was anticipated that at each location, the training had to be adjusted to the prevailing situation and needs, therefore to reach a maximum of flexibility, the trainers had to be capable of providing all 5 training modules.

Project locations and selection criteria

The cooperating organizations (both more developed and less developed organizations) were selected by CTA. Criteria used to select these organizations were that they played an important role in the dissemination of information in agricultural and rural development; and that qualified documentation staff was available.

All the organizations selected in 1989–90 agreed to cooperate and accepted their selection. The participating organizations were located in Burkina Faso, Cameroon (2), Ethiopia, Fiji (no training), Ivory Coast (no training), Kenya, Mali, Papua New Guinea (no training), Sudan, Suriname, Tanzania, Trinidad and Tobago (3), Western Samoa, Zambia, Zimbabwe.

Conclusions and recommendations

Implementation—The implementation of the new technology succeeded without any difficulties. It appeared that the organizations were well-informed. However, most of the documentation staff, the trainees, in other words the future CD-ROM users themselves, were not sufficiently informed on the scope and the contents of the project. Some of the trainees even thought that the project also would comprise automation of their

library catalogue. In some organizations the responsible staff (usually the librarian) failed to inform their staff about the project. Apart from the management of the organizations and the documentation staff, scientific researchers (one of the most important target groups of the project) and other beneficiaries were generally not informed about the project at all.

Each project is now being terminated by an official transfer of the entire workstation with all its peripherals to the organization that has to get the project further off the ground. This official transfer on behalf of CTA is then followed by an unofficial mini-seminar. Heads of departments, divisions and sections who are in any way involved in or responsible for agricultural research are invited for an introduction to the project, given the opportunity to ask questions and to have discussions, and finally, to demonstrate the usage of the Library's databases on CD-ROM to (representatives of) their target group(s)³. This is being done in order to introduce the organizations' target group(s) to the advantages and the limitations of CD-ROM as well as to CTA's intended use of the installed workstations and the scope of the project. (Also to indicate that the computer is not intended for secretarial purposes, bookkeeping etc.)

In the more developed organizations, librarians with an agricultural background or with much agricultural experience, appreciated the project more than those without an agricultural background. It is recommended to ensure that the in-house maintenance of the PC (backups, defragmentation, undeleting files, MS-DOS trouble shooting) can be carried out within the organization, preferably by one or two staff members of the information centres themselves, or alternatively by the organization's PC expert (if available). In cases where none of the participants have previous PC skills, extra training was provided by external sources. In cases where at least some of the participants have some PC skills, this part of the training can be incorporated in the project pack-

age. A short introduction into utility software like PC Tools or Norton Utilities is advisable.

Supply of Hardware and Software—The supply of hardware (except for the CD-ROM drives that were supplied by KIT directly) and software through local suppliers proved to be a great success. Generally speaking it is less expensive to order equipment from non-developing countries. In all cases but two, it appeared that ordering through local suppliers could be realized without incurring too many additional costs. Initially the selection of suppliers had to be made by the cooperating organizations. Only if no relations with such companies existed or if assistance was requested, was the selection of suppliers made by KIT. Although this procedure turned out to be somewhat labour intensive, and rather costly in terms of communication (telephone, telex, telefax), it was very cost-effective. Often, the equipment needed appeared not to be available on location in time. In all the cases (except Zambia) the local computer companies were held partly responsible and were requested to provide loan equipment for the first days of training. Consequently in all these cases the projects could be carried out according to the planning with a maximum delay of 2 days.

In order to reduce the material costs further, the possibility was investigated to purchase all equipment for all the projects in one year from one manufacturer with delivery being made to the local suppliers. This approach can only be pursued if both the cooperating organizations and local suppliers agree, in order to safeguard sound implementation and service of the equipment.

The technical installation of the work stations did not encounter unsurpassable problems. Only in Mali the existing (old) PC had to be replaced by a new one that had to be purchased locally at high cost in order to execute the project.

Considering the 525K RAM required for the CIMMYT disk, the 520K RAM required for the CGIAR disk, and the announced new require-

ments for the future SilverPlatter software, the minimum capacity for the PC included in the project will be upgraded to 640K RAM (this has no impact on the 1989–1990 project since all the PC's delivered already had 640K RAM). Considering the objective to use the work station for other applications such as database management, the minimum storage capacity of the PC included in the project was recommended to be changed to 20 MB. More powerful models need to be considered (80386 machines) with graphical cards and colour monitors in order to load forthcoming products. Although the costs are much higher, multi-user and network applications to obtain access to one or more databases simultaneously will have to be considered seriously as well.

Frequent transfer of files on the hard disk of the PC has a dramatic adverse impact on the performance of the PC. In order to optimize the hard disk, software utilities like PC Tools or Norton Utilities to defragmentize the hard disk will be included in the package of software in future projects. The supply of these utilities to the projects already executed is strongly recommended. Since the trainees seriously missed thesauri to search the databases efficiently these are also included in the project package.

In the information centres that were not yet computerized, the need was felt to use the PC for purposes other than CD-ROM only. In most cases the additional applications (library automation, in-house databases) can run on CDS/ISIS. Within the framework of the objective to enhance the self-sufficiency of information centres in ACP countries it is recommended to extend the project and to include CDS/ISIS in the project package. The training in this software can be provided by several organizations throughout the world. In cases where no training can be provided on-location, training can be included in the project package. Many organizations requested photocopy machines to be included in the project. Most of the organizations were excited about having an operational budget at their

disposal to maintain their workstations. They all expressed that continuation is important to keep the workstations in full operation.

Databases Provided—The portfolio of databases was very well received. Francophone countries showed great interest in the availability of French language databases on CD-ROM. AGRICOLA was appreciated best in the Pacific and the Caribbean, whereas CAB Abstracts and TROPAG & RURAL was appreciated best at the African sites. For obvious reasons the appreciation of the CIMMYT Maize Germplasm Bank depended on the region. The features and the performance of the software of SilverPlatter were appreciated more than those of software for other databases. For both the contents (geographical concentration) and the availability of abstracts, TROPAG & RURAL was appreciated best, although it was expressed that animal husbandry and ornamentals were missed in TROPAG & RURAL.⁴

Training—In order to avoid interruption of the staff to be trained as much as possible, training should preferably take place in a location outside the trainees work room.

The assumption that it would be more practical to have the training in basic skills in PC usage and in WordPerfect preferably carried out by local services was correct. In cases where these training modules were given one or two weeks before the training in information retrieval, participants were found to be able to concentrate more on the retrieval part of the training than in cases where all training modules had to be given. In other words, the receptivity of the trainees was higher when the course was preceded by a training in PC skills and word processing. For the complete

training package, 3 weeks were found to suffice as far as the transfer of knowledge was concerned.

The need for training in basic skills in microcomputer usage, WordPerfect and the construction of search strategies was higher than estimated, even in cases where it was known that experienced information specialists were present. The assumed extent of training elements needed was not correct. The training programme had to be adjusted in almost all cases. Therefore the trainers have to master all the modules very well. The standard minimum of only 4 days of training, proved to be sufficient only in cases where the training to be provided was for the retrieval from the CD-ROM's only.

Computer experience was not needed but had a positive impact on the results of the training course. The trainees themselves considered computer knowledge to be the most important element of the training. In contrast the compiling of search strategies was very underestimated. Although all trainees managed to carry out searches efficiently, it was concluded that a 100% result was not always reached. The level of the trainees was adequate to excellent. In two cases the level was too low to implement the technology successfully, and additional training is suggested. In order to optimize the quality of literature searches on CD-ROM it is suggested to provide remote assistance for a limited period of time.

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FOOTNOTES

1. Currently CTA (Technical Centre for Agricultural and Rural Cooperation, operating under the Lomé Convention between Member States of the EC and 69 ACP Countries) has decided to continue the project in 1991–1992 with an additional 12 projects. At the time of editing this paper, CD-ROM projects were executed by the Royal Tropical Institute in over 17 different ACP countries for CTA, and 18 projects (Egypt, Indonesia, Mali, Tanzania, Zaire) for other agencies in the fields of health, family planning and food and nutrition.

2. This budget is meant to cover costs needed to operate the CD-ROM working station (toner, printer paper, diskettes). Document delivery will be taken care of in a separate CTA project.

3. It was also very interesting to notice that the researchers and the management of the organization reacted with great enthusiasm to other CTA services as well. The catalogue of handbooks e.g. was not known to any of the staff. The unfamiliarity with CTA's services amongst researchers (not amongst library staff) was also noticed at other locations.

4. In the 1990/1991 projects both TROPAG & RURAL and CAB Abstracts were appreciated best because of the availability of abstracts.

EDITOR'S NOTE:

This paper was also presented at the Fédération Internationale D'information et de Documentation held in Cuba, September 13–22, 1990.

From Camels to Computers:

The Realities of Increasing the Flow of Agricultural Information in Pakistan's Northwest Frontier

**Attaullah,
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Keywords: information technology; innovation; technological literacy; library automation.

ABSTRACT: The North West Frontier Province (NWFP) Agricultural University in Peshawar, Pakistan has recently combined with the Ministry of Agriculture research stations in the NWFP to upgrade both the research and training capabilities for agricultural scientists in the province. The development of modern information systems and services within the university library to complement the teaching and research responsibilities of scientists in the agricultural sector was begun in 1984 with the beginning of the TIPAN Project, a cooperative USAID-funded development project with the NWFP Agricultural University, the University of Illinois at Urbana-Champaign (UIUC), and Southern Illinois University at Carbondale (SIUC). Various steps and stages of the modernization of the information storage and retrieval systems and implementation of services for faculty, students, and provincial agricultural scientists are outlined. An innovative model in which the information consultant works intermittently with the librarian and his staff at the university over a period of years has proven to be an effective way to build up both technical and managerial skills and foster self-confidence among the library staff. The intermittent consultant visits have served to provide renewed vigor into the system where requirements imposed by local institutions and donor agencies may appear counterproductive to sustainable development of information systems and services.

RÉSUMÉ: L'Université agricole de la Province de la frontière nord-est (NWFP) de Peshawar, au Pakistan, s'est associée récemment aux stations de recherches du Ministère de l'Agriculture au NWFP pour promouvoir les moyens de recherche et de formation des agronomes dans la province. En 1984, pour compléter les responsabilités des scientifiques agricoles,

dans le domaine de la formation et de la recherche, le démarrage du projet commun de développement TIPAN de l'USAID, l'Université agricole de NWFP, l'Université d'Illinois d'Urbana-Champaign (UIUC) et l'Université Southern Illinois de Carbondale (SIUC), consiste à développer des systèmes et des services d'information modernes à l'intérieur de la bibliothèque universitaire. Différentes étapes de la modernisation des systèmes de stockage de l'information, et de recherche sont définies, ainsi que l'exécution des services pour la faculté, les étudiants et les agronomes provinciaux. Un modèle innovateur où le consultant en information travaille par intermittence avec le bibliothécaire et son personnel à l'université pendant plusieurs années, a prouvé son efficacité pour développer les compétences techniques et directoriales, et stimuler la confiance en soi du personnel de la bibliothèque. Les visites intermittentes du consultant ont injecté une nouvelle vigueur dans le système où les exigences imposées par les institutions locales et les agences de donation peuvent sembler aller à l'encontre du développement viable des systèmes et des services d'information.

RESUMEN: La Universidad Agrícola de la Provincia de la Frontera Noroccidental (FPN) de Pakistán, localizada en Peshawar, se unió recientemente a las estaciones de investigación del Ministerio de Agricultura de la FPN, para mejorar las habilidades de investigación y capacitación de los científicos agrícolas de la provincia. El desarrollo de sistemas y servicios de información modernos, para complementar las funciones de docencia e investigación de los científicos del sector agrícola, se inició en la biblioteca de la universidad en 1984, con el Proyecto TIPAN, un proyecto de desarrollo cooperativo financiado por USAID, con la participación de la Universidad Agrícola de la FPN, la University of Illinois en Urbana-Champaign (UIUC) y la Southern Illinois University en Carbondale (SIUC). Se esbozan los diversos pasos y etapas de la modernización de los sistemas de almacenamiento y recuperación de información y la implementación de servicios para los profes-

sores, estudiantes y científicos agrícolas de la provincia. Un modelo innovador en el cual el consultor de información trabaja regularmente en la universidad con el bibliotecario y con su personal, durante varios años, ha demostrado ser una forma efectiva para desarrollar habilidades técnicas y administrativas y para estimular la autoconfianza entre el personal de la biblioteca. Las visitas regulares del consultor han servido para vigorizar nuevamente el sistema, en donde los requerimientos impuestos por las instituciones y las agencias donantes locales pueden parecer contraproducentes para el desarrollo continuo de sistemas y servicios de información.

ZUSAMMENFASSUNG: Die North West Frontier Province (NWFP) Agricultural University in Peshawar, Pakistan, ist kürzlich mit den Forschungsanstalten des Landwirtschaftsministerium im nordwestlichen Grenzgebiet Pakistans verbunden worden, um die Forschungs- und Ausbildungskapazitäten für die Agrarwissenschaftler in der Provinz zu verbessern. Die Entwicklung der modernen Informationssysteme und -dienste in der Universitätsbibliothek zur Ergänzung der Lehr- und Forschungsverpflichtungen der Wissenschaftler auf dem Agrarsektor begann im Jahre 1984 mit der Einführung des TIPAN Projektes, ein kooperatives von USAID finanziertes Entwicklungsprogramm zusammen mit der NWFP Landwirtschaftsuniversität, der Universität von Illinois in Urbana-Champaign (UIUC) und der Universität von Süd-Illinois in Carbondale (SIUC). Verschiedene Schritte und Stufen der Modernisierung der Informationsspeicherung und des Retrievalsystems sowie der Implementierung der Dienste für die Fakultät, die Studenten und die zur Provinz gehörenden Agrarwissenschaftler werden beschrieben. Ein innovatives Modell, bei dem der Informationssuchende abwechselnd mit dem Bibliothekar and seinem Personal an der Universität über einen Zeitraum von Jahren zusammenarbeitet, hat sich als ein effektiver Weg erwiesen, sowohl technische als auch Managementfertigkeiten zu erreichen, um das Selbstvertrauen des Bibliothekspersonals zu fördern. Die inter-

mittierenden Beratungsbesuche haben dazu gedient, für eine Reaktivierung des Systems zu sorgen, dessen von örtlichen Institutionen und Sponsoren vorgegebenen Anforderungen sich als kontraproduktiv zu einer erträglichen Entwicklung der Informationssysteme und -dienste erweisen könnten.

Introduction

Several articles have been written about the difficulties of improving libraries in developing countries. Susan Harris (1990) has prepared an extensive review of the state of agricultural information in developing countries. She presents at length the problems that confront these libraries. In addition, two solutions that have worked for a variety of libraries, networking and technology based solutions, are also discussed. This paper outlines the progressive step method that is being employed to develop enhanced library systems using up-to-date technologies at the newly created agricultural university in Pakistan's Northwest Frontier Province.

Background

The Northwest Frontier Province Agricultural University (NWFP AU) in Peshawar, Pakistan is the major institution for providing education in the agricultural sciences in the province. The university was created in 1933 as the Islamia College, Department of Agriculture. Upon the establishment of the University of Peshawar in 1950, this department was moved to the new university and periodically upgraded from department to college then faculty status. In 1981, the Faculty of Agriculture, Peshawar University was made an autonomous university under the name Northwest Frontier Province Agricultural University. In 1984, a joint project between the Government of Pakistan (GOP) and the United States Agency for International Development (USAID) with the University of Illinois as implementing agency was initiated to increase the teaching and

research capabilities at the NWFP Agricultural University.

One of the goals of the project was to develop modern information systems and services within the university library to enhance the teaching and research capabilities of faculty and provincial agricultural scientists. This paper outlines the various steps in the process to modernize the information storage and retrieval systems and to implement services for faculty, students, and provincial agricultural researchers.

Early Development

At the beginning of the project, the information consultant was sent to Peshawar to refine the project design for the NWFP Agricultural University Library. The consultant report outlined a program for enhancing and modernizing the library to meet the research and teaching needs of faculty and students (Johnson, 1984). Professional staff at the library had limited exposure to service-oriented libraries. The design paper recommended that at least one librarian be sent to the United States for a master's degree in library and information science. In 1986, the head librarian entered the master's program at the University of Hawaii and was encouraged to learn as much as possible about microcomputer-based information systems. During his two years in Hawaii he arranged to work in the microcomputer laboratory in the Department of Library Science. Through this position he gained a broad-based working knowledge of word processing and database management programs and how they may be applied to library systems.

Specialized Training Program

During the last three months of the librarian's study tour, a special training course was arranged in which he worked with the information consultant at the University of Illinois to apply the concepts gained from his

master's education to specific needs of the NWFP AU Library. The librarian and the consultant worked together to design, modify, and implement systems using INMAGIC, a microcomputer software program developed for library applications. The first system to be designed was for cataloging. Under the project many books had been ordered. With access to the titles of these books through the on-campus project office, the librarian began to enter data into the newly designed system on the titles that had just been shipped to Pakistan. Information from MARC records in the University of Illinois' on-line catalog was used to create high quality records for these titles.

The librarian worked mornings with the consultant to gain an understanding of various aspects of the word processing (WordPerfect) and database management (INMAGIC) programs. In the afternoon, he worked independently to enter data, search for cataloging information, and gain experience in using the two programs. It was understood that the librarian must first become proficient in using the software before he could adequately train his staff back in Peshawar. When questions arose in implementing the system, they were discussed and resolved within a day's time. With three months of work in this manner, the librarian gained a solid working knowledge of both basic and intermediate aspects of the programs and how to move data back and forth between the two. Besides the cataloging database, additional ones for serials, acquisitions, and circulation were designed.

Transferring the Systems to the NWFP AU Library

In early September, 1988, the librarian backed up the databases and output formats onto floppy diskettes and hand carried the disks back to Peshawar. Upon his arrival he successfully restored the various files on to the computer housed in the library. In addition to continuing work with

building up the computerized database, the librarian was faced with the necessity to develop some organization and routine into library activities. During the two-year study leave, the library had functioned only at a very basic level.

Basic Training for Library Staff

In December 1988, the information consultant visited Peshawar to conduct training courses for four other librarians and several support staff in preparing information for data entry into the computerized database and in learning basic-level commands in word processing to prepare records for transfer to the INMAGIC database. The first two days were spent in learning to complete worksheets for documents following uniform standards of entry. A draft data entry manual was prepared by the librarian and the consultant to outline and illustrate how information was to be entered for each field in the record. The participants completed worksheets for several types of documents that were then reviewed with the librarian and information consultant and revised if necessary.

During the next two days of the training course, the participants were introduced to the basic concepts of word processing with WordPerfect 5.0. Using the worksheets from the earlier part of the training, each participant prepared data entry forms, and then used these forms to enter records that would then be transferred to the AULIB database in INMAGIC. As most librarians in Pakistan have never used a computer or even a typewriter, entering data was quite slow. However, by the end of the six-day training course it was impressive how much progress had been made as each person gained experience in using the computer. Throughout the training, emphasis was placed on maintaining quality input. Instances where the standards had not been closely followed exemplified the difficulties encountered in accurately retrieving

records that contained inconsistencies from the database.

Initiating Special Services for Faculty

During this same consultant visit, the librarian expressed the desire to initiate some services for faculty. Knowing that entering records for most of the library materials would take one or two years, he felt that some services needed to be implemented immediately that would illustrate the library's commitment to developing the research capabilities of staff and inform them of the vast changes taking place in the library. Thus, during the consultant's visit the procedures for providing current contents service were established. A list of serials currently received in the library along with a questionnaire was distributed to each of the teaching faculty. The librarian presented a seminar to introduce faculty to the new service and acquaint them with new developments in the library.

The current contents service in which faculty received photocopied contents pages of up to five journals in their field gained acceptance quite rapidly. If the faculty member found an article of interest, he notified the librarian in charge of the contents service and a photocopy of the article was sent to him. Since journals do not circulate, this service has made it possible for faculty to become more aware of new developments in their fields of specialization.

Obstacles in the Path of Library Development

One does not wish to give the impression that everything has always progressed smoothly in the development of the library. Three months after the current contents service was started, the photocopier in the library was removed during some student unrest. The current contents service had to be suspended as the librarian had no regular access to a photocopier to be able to provide the service in a timely manner. Six months later,

a new photocopy machine was installed in the library and the contents service was resumed. Faculty are again enthusiastic about the service, but one wonders how often such a service can be suspended and restarted before faculty give up for the lack of dependability of the program.

Distribution of new accessions lists was curtailed when access was denied to the university's offset printer. These lists are now displayed on public notice boards across campus to reach a broad group of people with as few copies as possible. The librarian has learned to provide services that are often a compromise between the grandiose ideas emanating from the well-funded project and the everyday realities of maintaining services on a limited local budget.

Building Up the Bibliographic Database

Over the next six months approximately 200 new records were added to the database by the library staff. During this same period, the information consultant worked back in Illinois with the photocopied catalog cards from the NFWP AU Library to prepare records for older titles held in the library. The library's catalog had contained only one author and a title card for a book. Even these two cards had not always been made if a faculty member required a book immediately. There had never been any subject headings assigned to books. The only subject access was via the Dewey Decimal Classification number that had been assigned to the book. With access to the University of Illinois' on-line catalog, records for approximately 3,000 titles with subject headings were completed for the library and loaded into their database in July 1989.

Because the library regularly purchases more than one copy of a book in order to keep the first copy in the reference section, it was soon discovered that there had been considerable duplication of data entry due to the random manner in which worksheets were made for books. A simple

flow chart was created to show the staff how to eliminate unnecessary duplication of records. It was stressed that both the card catalog and database must be searched before a worksheet would be made for a document.

The librarians were taught how to search the library's computerized database. If the title was found in the database, then a special short form was completed so that additions or corrections would be made to the existing record. The call number from the record was recorded in the book and then it was sent directly for labeling and shelving. If the title was not yet in the database, then a worksheet was completed for data entry. The cataloger provided the descriptive cataloging information and then the book with accompanying worksheet was passed on to the head librarian for assigning the call number and subject terms.

In this manner, each librarian learned to use the database initially to search for duplicates. The experience they gained in searching was soon applied to providing individualized searches for faculty and students. These informal services have greatly increased the librarians' value and status in the eyes of both faculty and students. The library staff is now regularly using its unique capabilities to complement those of researchers and teachers to raise the level of research and instruction in the university.

At the end of this period, it was evident that library staff had attained the necessary command of the technical systems to have an impact on real development within the institution. The key for further advancement now lay in developing each librarian's personal commitment to attaining a higher level of expertise through practice on the systems and a commitment to doing high quality work. It was also emphasized that the university administration needed to exhibit its commitment to the development of the library by providing support for the new programs began by the library so they would not become intermittent services.

Managing Systems and Staff to Provide Enhanced Services

Recently the information consultant returned to Peshawar after a 7-month break. The development within the library during that period was impressive (Johnson, 1990). Each of the junior librarians had been assigned responsibility for some aspect of library operations, i.e., cataloging, acquisitions, serials, circulation, etc. The head librarian had spent the previous months working with each individual librarian to train them to carry out their responsibilities in a competent manner. There was constant interaction, immediate feedback, and explanations of how their work affected the successful functioning of the library system as a whole.

The database manual (Attaullah, 1990) was finalized with many examples gleaned from implementing the database and training other librarians to contribute to the system. This manual has already been used to work with librarians from the Institute of Development Studies on the NWFP Agricultural University campus to set up their database so it will be compatible with the main library's database. A directory of serials at the NWFP AU Library (Naeemullah, 1990) has been produced from the serials database that has been completed for titles now received in the library. The librarians continue to increase their skills in using the various databases by providing regular retrieval services for faculty and students. The library is beginning to function as an information center. The enlarged base of information and en-

hanced services provided by the librarians is making the library a true partner in the institution building process.

Conclusion

The success in modernizing the library at the NWFP AU Library is because of a combination of factors—strong leadership, support from university administration, adequate project funds for equipment and training, realistic time frame, and competent, well-trained, and committed staff. Each of these elements affects the outcome of the process to upgrade the library. However, perhaps the most critical component is the realistic time frame that has allowed staff to gain adequate experience at basic levels before proceeding on to the intermediate and advanced levels. The implementation of new systems using new technologies has taken place over a period of 18 months since the librarian returned from his advanced studies abroad. Each step in the development process allowed for staff to gain experience and self-confidence before advancing on to the next level.

Administrative units and development agencies often expect complex systems to be implemented in too short a time frame and, all too often, the results fail to meet expectations. Funding agencies also may have similar expectations, while at the same time their procurement procedures delay the installation of equipment and software until several months after the proposed delivery date. The implementation time-line applied in the AU Library's development (Figure 1) has provided sufficient leeway

Figure 1 – Time Line for NWFP AU Library Development

Activity	1988			1989						1990
	6-8	9-10	11-12	1-2	3-4	5-6	7-8	9-10	11-12	1-2
Design databases										
Modify databases										
Data entry										
Staff training										
Prepare new outputs										
Provide search services										

to cope with unforeseen difficulties while still maintaining momentum. In addition, the training, backstopping, and general support provided by the information consultant during her intermittent visits has kept library staff continually reaching for higher goals—both short term and long term. As a unit, the librarians have matured to the point where they are establishing their own priorities and designing and implementing procedures to meet these goals.

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Information Management Projects in Developing Countries:

The Challenge of Working with Varying Levels of Infrastructure

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Keywords: technical assistance; information management

ABSTRACT: Since the late 1970s a number of international development projects have included information management components in their design. This phenomenon results from increased awareness by planners, donors and managers that continuing solutions to problems cannot be formulated without access to documentation of past work; lessons are lost to project countries unless there exists mechanisms to store and retrieve information. For this reason donor agencies are recognizing the need to create or enhance documentation centers. For the past seven years the University of Arizona's Arid Lands Information Center (ALIC) has been providing technical assistance in information management. Pursuing its interests in the arid world, ALIC has focused its efforts in the Middle East and Africa. Specific projects in five locations—Mauritania, Yemen, Niger, Bahrain, and Botswana—illustrate the extremes in levels of infrastructure that affect project implementation. ALIC documentation specialists worked in environments ranging from most poorly developed to those possessing advanced technologies. Appropriate strategies for strengthening capabilities in information management are discussed. Examples will include identification of sites and physical facilities, articulation of policies and procedures, development of microcomputer-based catalogs, training in the use of international online databases, and evaluation of CD-ROMs as a means to access large amounts of information.

RÉSUMÉ: Depuis la fin des années 70, un nombre de projets de développement internationaux englobent, dès le départ, les composantes de la gestion de l'information. Ce phénomène est le résultat d'une prise de consciences croissante auprès des décideurs, donateurs et administrateurs, que des solutions durables aux problèmes ne peuvent être formulées sans l'accès à l'information des travaux antérieurs; les leçons sont perdues pour les pays du projet si des mécanismes de stockage et de recherche de l'information sont inexistantes. Pour cela, les agences de donation reconnaissent le besoin de créer ou d'encourager des centres de documentation. Ces sept dernières années, le Centre d'information des pays arides (ALIC) de l'Université d'Arizona a fourni une assistance technique en gestion de l'information. Poursuivant ses intérêts dans les pays arides, ALIC concentre ses efforts au Moyen-Orient et en Afrique. Des projets spécifiques dans cinq endroits—Mauritanie, Yémen, Niger, Bahrein et Botswana—illustrent les extrêmes des niveaux d'infrastructure qui affectent la réalisation du projet. Les spécialistes en documentation d'ALIC ont travaillé dans des environnements les moins développés aux plus avancés technologiquement. Des stratégies appropriées pour renforcer les possibilités en gestion de l'information sont étudiées. Des exemples portent sur l'identification des sites et des facilités physiques, l'articulation des politiques et procédures, le développement de catalogues informatisés, la formation en recherche en-ligne dans des bases de données internationales, et l'évaluation des CD-ROM comme moyen d'accès à une masse importante d'information.

RESUMEN: Desde finales de los 70, varios proyectos internacionales de desarrollo han incluido en su diseño componentes de manejo de información. Este fenómeno es el resultado de una mayor

conciencia por parte de los planificadores, los donantes y los administradores de que no se pueden formular soluciones continuas a los problemas si no se tiene acceso a la documentación del trabajo anterior; los países que realizan proyectos pierden la oportunidad de aprender de otros, a menos que existan mecanismos para almacenar y recuperar información. Por esta razón, las agencias donantes están reconociendo la necesidad de crear o expandir los centros de documentación. Durante los últimos siete años, el Centro de Información sobre Tierras Áridas (ALIC) de la Universidad de Arizona ha estado proporcionando asistencia técnica en el manejo de información. Prosiguiendo con su interés en el mundo árido, ALIC ha concentrado sus esfuerzos en el Medio Oriente y en África. Proyectos específicos en cinco localidades—Mauritania, Yemen, Níger, Bahrein y Botswana—ilustran los extremos en cuanto a niveles de infraestructura, que afectan la implementación de los proyectos. Los especialistas en documentación de ALIC trabajaron en un rango de ambientes que uiba desde los menos desarrollados hasta aquellos que poseían tecnologías avanzadas. Se discuten estrategias apropiadas para fortalecer las habilidades de manejo de información. Se incluyen ejemplos para identificar lugares e instalaciones físicas, articular políticas y procedimientos, desarrollar catálogos en microcomputador, capacitar en el uso de bases de datos internacionales en línea y evaluar el CD-ROM como medio de acceso a gran cantidad de información.

ZUSAMMENFASSUNG: Seit den späten 70er Jahren hat eine Reihe von internationalen Entwicklungsprojekten auch Informationsmanagement in ihre Vorhaben aufgenommen. Dieses Phänomen resultiert aus der gewachsenen Erkenntnis von Planern, Sponsoren und Managern, daß fortwährende Lösungen von Proble-

men nicht ohne Zugang zu Dokumentationen früherer Arbeiten formuliert werden können und daß wichtige Erkenntnisse über die Projektierung in diesen Ländern verloren sind, wenn dort nicht Mechanismen existieren, um Informationen zu speichern und wiederaufzufinden. Aus diesem Grunde haben Sponsoren klar die Notwendigkeit erkannt, Dokumentationszentren zu schaffen oder sie auszubauen. Seit den vergangenen sieben Jahren hat die University of Arizona's Arid Lands Information Center (ALIC) technische Hilfe in Informationsmanagement geleistet. Unter Verfolgung seiner Interessen in der ariden Welt hat ALIC seine Bemühungen auf den Mittleren Osten und Afrika konzentriert. Spezifische Vorhaben an fünf Standorten—Mauritanien, Jemen, Niger, Bahrain und Botswana—illustrieren die Gegensätze in den Infrastrukturen, die die Projektimplementierung beeinflussen. Die Dokumentationsspezialisten von ALIC arbeiteten an Standorten, die von ausgesprochen niedrig entwickelt bis zu solchen einzuordnen waren, die fortgeschrittene Technologien besaßen. Angemessene Strategien zur Verbesserung der Fähigkeiten im Informationsmanagement werden diskutiert. Beispiele beinhalten die Identifikation von Örtlichkeit und äußeren Möglichkeiten, die Artikulation von Politik und Verfahren, die Entwicklung von Katalogen auf Microcomputerbasis, die Schulung im Umgang mit internationalen Online-Datenbasen und die Nutzung von CD-ROMs als ein Mittel des Zugangs zu großen Informationsmengen.

Introduction

Since the end of World War II, wealthy nations acting individually and collectively have offered financial and technical assistance to resource poor countries. As the number of resulting development projects has increased, so has the accompanying documentation. The massive accumulation of information in the form of inventories, field trial data, surveys, statistical analyses, and reports has taxed the managerial capacity of most institutions in developing countries. To address the problem of information access and to ensure that records are kept of past efforts and accomplishments, national governments and donor agencies have funded the establishment of specialized documentation centers within development assistance projects.

For the past eight years the Uni-

versity of Arizona's Office of Arid Lands Studies (OALS) has been actively providing technical assistance to establish and upgrade documentation centers in developing countries. Pursuing its interests in the world's dry areas, OALS has focused its efforts in the Middle East and Africa. Specific projects in five locations—Bahrain, Botswana, Mauritania, Niger, and North Yemen—are examined in this paper, which looks first at the resources available in support of the projects and then at the differing processes of implementation. Because the infrastructure levels for each of these countries varies considerably, technical assistance provided by OALS staff has ranged from establishing the most basic levels of information management to use of advanced computer technologies.

All five countries are considered "developing" in that they are building their economies and modernizing their institutions. Nevertheless, these nations differ significantly in the number and types of resources that are in place and available to support development. For the purposes of this paper "infrastructure" is defined by in-place resources and include such attributes as: economic resources; facilities; technologies; and personnel.

The countries also are situated within dry zones and are sparsely populated. All are resource-poor, except for Bahrain's petroleum deposits and Botswana's diamond mines. Public services such as transportation facilities and communication networks are at a minimal level in the West African countries (Mauritania and Niger) and in North Yemen. However, in the more developed countries (Bahrain and Botswana), access to advanced technologies such as online telecommunications systems is limited because of their high costs.

Information Management Resources

Not surprisingly, Bahrain and Botswana have the most advanced and best developed infrastructure for

information management of the states surveyed because of their peculiar natural resource base. These two nations have well-established facilities and networks to improve access to information. Computers, advanced software, and telecommunications systems. CD-ROM units, and other technologies have been imported and emplaced. Local institutions have joined regional and global information exchange networks, created user associations in several cases, and participated in personnel training programs.

Yet, in spite of the expenditures on buildings, equipment, and furnishings in both countries, human resources have not kept pace with the growth of physical resources. For example, just as Bahrain has relied on imported manual labor for construction and maintenance, it has required foreign expertise to help in the operation of the new technologies. In Botswana too, lack of trained manpower poses a key problem for libraries. Even though the University of Botswana has begun a library science degree program that includes a generous scholarship package, most professional librarians in Botswana remain foreign specialists. The heavy workload these librarians assume has hindered their participation in networks for cooperation, and limited information exchange within the country.

In Niger, Mauritania, and Yemen, although some significant strides are being made, accessing information is still at a very low level. In Niger nearly all organizational resources that include documentation centers are concentrated in the capital city of Niamey. The government, alert to the critical role of information in national development, has moved to modernize documentation facilities within the national ministries. However, until now these organizations have had few trained personnel, insufficient space and equipment, and virtually no funds.

In Mauritania and Yemen the institutional environments exhibit similarities. In each instance, a revolutionary regime governs via recently developed, but poorly elaborated institu-

tions. Mauritania's sparse population is distributed over a million square kilometers, inhibiting national coordination. Yemen's rugged landscape similarly hampers centralization. There are few documentation centers in each country. There has been no systematic survey of such facilities in Mauritania, but it is likely that fewer than a half-dozen exist. In Yemen a 1984 survey of agricultural libraries revealed only six worthy of note. Both in Yemen and Mauritania, there are almost no trained library professionals.

Implementation of Information Management Projects

Levels of institutional development differ, but country by country documentation capabilities need strengthening in all five countries. While there is variation in the types of information services targeted for improvement, foreign expertise is often expected to provide virtually all assistance necessary to achieve the desired enhanced capabilities.

In the five projects the OALS undertook and presented here, the creation of Yemen's Documentation Learning Resource Center (DLRC) was the most elaborate and had the longest lifespan. The idea for creating an agricultural documentation activity within the U.S. Agency for International Development (USAID) Agricultural Development Support Program (ADSP) first surfaced in 1978 when foreign advisors working on the project were frustrated in their attempts to obtain even recently completed documents. However, it was not until three years later that USAID approved the establishment of a center and secured the support of the ministry of Agriculture. From its inception, the DLRC was an ambitious undertaking, destined to become the first center of its kind in Yemen. Throughout the DLRC's formative period from 1983 to 1986, the University of Arizona assumed responsibility for general coordination.

Because no office space existed for the DLRC, the first component of

the activity was the erection of a building. With architectural design assistance from the University of Arizona, a 500-square meter annex to the existing Ministry of Agriculture was completed in September 1984. Furnishings and equipment including library furniture, photocopiers, typewriters, document processing materials, and supplies were obtained from the U.S. and put in place as soon as the facility opened. Bureaucratic and technical obstacles delayed the arrival of a microcomputer until 1986 and a minicomputer until 1988, but the center is pursuing its long-term plan to create an online catalog using the MINISIS software system.

Staffing the DLRC required for two non-Yemeni librarians to operate the DLRC during an interim period, in the meantime a Yemeni professional obtained a graduate degree in library science at the University of Arizona, and three Yemenis were sent to Arizona to obtain hands-on technical training as documentalists. Although the DLRC operated without an official counterpart for a number of years, the commitment to a training program for future staff members ensured the continued operation of the Center after the departure of the foreign consultants.

With collaboration from Yemeni clerical and secretarial personnel, the DLRC staff has established the center as a fully operational unit of the Ministry. Collection development has proceeded rapidly and already by the end of the center's second year 13,000 documents had been acquired, with nearly half cataloged. Monthly usage figures demonstrate that the center has been much appreciated, providing important domestic capabilities in information management. In addition, the Yemeni professional obtained his Master of Library Science degree and has returned to work for the Ministry.

The University of Arizona's cooperation with the Ministry of Planning in Niger under the Evaluation Assistance Project (EAP) was much more limited in scope and provided short-term technical assistance to the Ministry's documentation service in

Niamey. Three concurrent activities comprised the scope of work: 1 automation of the cataloging system, 2 preparation of detailed management policies and procedures; and, 3 training of Nigerien documentalists. In addition, a two-person consultant team advised the Ministry on plans for a new documentation facility.

With a dedicated IBM-XT microcomputer and UNESCO's free CDS-ISIS software package, the consultants first worked to install and develop an automated cataloging system for the Ministry's 30,000 document collection. Nigerien counterparts aided in the project development and were taught fundamental skills in typing, word processing, and database management. These counterparts, funded by the United Nations Development Programme, remain at the facility and are helping the documentation center to fulfill its mission.

In addition, the project team assessed the documentation service's physical resources, scattered holdings, and personnel, and proposed five sets of policies on: collection development; retention of materials; document processing and classification; circulation and distribution; and organization for the service and its personnel. Finally, they prepared long-term plans for the documentation service and formulated plans for continuing training and support from Arizona.

The consultants from Arizona also advised the ministry on plans for a new building for the center. With funding from the World Bank, the facility was constructed and became functional in 1989.

Like the Niger activity, assistance provided to the Arabian Gulf University in Bahrain was a concentrated, short-term effort. The consultation aimed to strengthen the institution by training personnel in the use on online computer services and by establishing guidelines for library operations.

As in Niger, the consultation began by assessing and evaluating institutional resources. Because facilities were housed at different branches of the campus, the survey examined not only the central library, but the medi-

cal library, and the special science library. Through interviews with administrators, library personnel, and users, the consultant evaluated the facilities, collections, and operation of the university library system. Again, a key feature of the assignment was to draft policies and procedures for managing information and documentation.

Unlike Niger and Yemen, Bahrain subscribes to many regional and international on-line information services. Therefore, a particular concern of AGU officials was to train library personnel from throughout the Gulf region to use existing computer networks. In a week long workshop, the UA consultant instructed 24 participants in employing general on-line searching strategies and techniques, accessing the DIALOG on-line service, and using other major on-line databases such as CAB Abstracts. Despite excellent telecommunications facilities, the cost of using these for routine searches was prohibitive. Thus, we concluded that CD-ROM stand alone systems offer the most cost-effective means for accessing database information in developing countries. Finally, to minimize duplication of effort, lack of information, and organizational isolation, the project promoted increased networking and sharing of resources among regional institutions.

Like Bahrain, Botswana possesses a well-developed library system. With partial funding from a USAID grant designed to build and strengthen ties between U.S. universities and foreign institutions, the UA consultant conducted a survey of agricultural libraries in the capital city of Gaborone in December 1989. Six libraries were visited including the Department of Agricultural Research Library, the libraries at the University of Botswana and the Botswana Agricultural College, the National Institute for Development Research Library (NIDR), the documentation center for the regional Southern Africa organization SACCAR, and the Ministry of Agriculture Library. In each case librarians were interviewed about their

policies and procedures on collection development, cataloging and classification systems, services to patrons, use of automation systems, and future plans. Results of the interviews and surveys are being prepared as a report for the participating libraries to help them in increasing their networking capabilities. In addition, based on the linkages established during this activity, future cooperative projects are being planned by librarians from the SACCAR documentation center, the NIDR library and OALS.

Of the five projects outlined here, the Mauritanian effort has been the least implemented. The 1985 Mauritanian Agricultural Research Project II (AGRES II) proposal to USAID detailed an effort to provide documentation assistance to the National Agronomic Research Center (CNRADA) in Kaedi. This project was similar to that undertaken in Niger for the Ministry of Planning and was approved by USAID and by the national research organization, CNRADA.

As elsewhere, the proposed effort aimed to improve the ability of the research organization to manage its documentation resources. Kaedi, in Mauritania's southern riverine region, serves as the headquarters of CNRADA. Until recently, facilities for a documentation center in Kaedi have been very poor. With French financing, CNRADA has constructed new headquarters including offices, laboratories, and a dedicated documentation center. Shelving has been installed and a microcomputer is available for use. However, there is neither consistent document control nor policies for the organization of the collection. At present, the microcomputer is used solely for word processing.

Training of a potential documentalist has been slow, first because of the lack of available and suitable personnel—and, lately, because of political unrest in the country. The intended trainee, who had been sent to France for a 4-month course in information management, was deported to Senegal soon after he returned to his post!

Conclusion

In conclusion, in this "information age" it is becoming increasingly obvious to developing country institutions that national economic development requires maximal access to information about past efforts. Frustration over inefficiency and duplication of effort has prompted several institutions to request donor assistance in the realm of information management. However, in our experience, the ability of personnel working on assistance projects to build and enhance the information capabilities of an organization is influenced by the level of infrastructure already in place. In particular, we find that three aspects are most important:

Commitment. Not surprisingly, these include funding, facilities and personnel. Without proper support, no project can succeed.

Counterparts. A responsible, committed and involved host-country technical counterpart is essential to the success of any project. Counterparts serve two purposes: they provide critical insight into the actual needs of the institution that foreign consultants cannot completely learn; and the counterparts provide the continuity needed to sustain the activity when external support is terminated because their professional status becomes tied to the project.

Technical alternatives. As seen in these examples, the levels of technical expertise and services vary widely among countries. Thus, success is tied to identifying interventions that are appropriate to the technical environment. For example, even in Bahrain with its excellent telecommunications service, the high cost of this on-line service suggests instead the use of CD-ROM.

When these three aspects are considered, technical assistance projects have a much greater chance to achieve initial success and to make lasting contributions to the institutional capabilities of the parent organizations.

The "Information Center" Concept as a Fund-raising and Marketing Tool for Information Organizations in Developing Countries

Keith W. Russell

Keywords: information centers; fund raising

ABSTRACT: Libraries and other information organizations in the United States and other countries are using the concept of an "information center" to further their service goals. Creation of such information centers often facilitates fund-raising from governmental and other public and private sector sources and donors. Funds raised, along with other resources and expertise that serve its mission enable it to respond to evolving informational needs of its users and potential users. Such information centers contribute to the marketing of those services and increase the visibility of the organization. The "information center" concept is defined; and some variations on the theme are reviewed. Examples that demonstrate potentials, benefits, actual successes and some limitations of the concept in practice are given. Related fund-raising and marketing principles are discussed, along with perspectives from both fund-raising and donor organizations. Actual and potential benefits available to developing countries are stressed, using developing country examples wherever possible and recognizing the conditions in developing countries that may limit its success or require special modification of its application.

RÉSUMÉ: Aux Etats Unis, des bibliothèques et autres organisations d'information utilisent le concept de "centre d'information" pour favoriser les objectifs de leurs services. La création de ces centres d'information permet souvent de réunir, facilement, les fonds auprès du secteur public, privé et gouvernemental et des donateurs. Ces fonds, ensemble avec les autres ressources et l'expertise permet-

tent de répondre aux besoins croissants d'information des usagers présents et potentiels. Ces centres d'information contribuent au marketing de ces services et augmentent la visibilité de l'organisation. Le concept de "centre d'information" est défini, et on passe en revue quelques variations sur le thème. Les exemples donnés montrent les profits potentiels, les succès actuels et quelques limitations du concept dans la pratique. Les principes de financement et de marketing sont étudiés ainsi que les perspectives des agences de donation et de financement. Les profits actuels et potentiels disponibles pour les pays en développement sont mis en évidence, s'appuyant si possible, sur des exemples des pays en développement et tenant compte des conditions de ces pays qui peuvent limiter son succès ou exiger des modifications spéciales dans son application.

RESUMEN: Las bibliotecas y otras organizaciones de información de los Estados Unidos y de otros países están utilizando el concepto de "centro de información" para expandir sus objetivos de servicio. La creación de dichos centros de información facilita a menudo la consecución de fondos procedentes de fuentes gubernamentales, de otras fuentes de los sectores público y privado, y de donantes. Los fondos recolectados, junto con otros recursos y con la experiencia que respalda esta misión, les permite responder a las necesidades cambiantes de información de sus usuarios reales y potenciales. Dichos centros de información contribuyen al mercadeo de tales servicios y aumentan la visibilidad de la organización. Se define el concepto de "centro de información" y se revisan algunas variaciones sobre el tema. Se incluyen ejemplos que demuestran el potencial, los beneficios, el éxito real y algunas limitaciones

del concepto en la práctica. Se discuten los principios relacionados con el mercadeo y con la consecución de fondos, al igual que las perspectivas para las organizaciones recolectoras de fondos y para los donantes. Se destacan los beneficios reales y potenciales para los países en desarrollo, utilizando en lo posible ejemplos de dichos países y reconociendo las condiciones de los mismos que pueden limitar su éxito o requerir modificaciones especiales para su aplicación.

ZUSAMMENFASSUNG: Bibliotheken und andere Informationsorganisationen in den Vereinigten Staaten und anderen Ländern benutzen das Konzept eines "information center" (Informationszentrums), um ihre Dienstleistungsziele zu fördern. Die Gründung solcher Informationszentren erleichtert häufig die Mittelbeschaffung aus Regierungs- und anderen öffentlichen und privaten Quellen und von Sponsoren. Verstärkte Mittel zusammen mit anderen Ressourcen und Sachkenntnis, die dieser Bestimmung dienen, ermöglichen es, entstehenden Informationsbedürfnissen von Benutzern und möglichen Benutzern zu entsprechen. Solche Informationszentren tragen zum Marketing solcher Dienstleistungen bei und verstärken das Erscheinungsbild der Organisation. Das "information center" Konzept wird definiert und einige Varianten zu diesem Thema werden besprochen. Beispiele, die die Möglichkeiten, den Nutzen, die aktuellen Erfolge und einige Begrenzungen des Konzepts in der Praxis demonstrieren, werden angeführt. Verwandte Mittelbeschaffungs- und Marketingprinzipien werden zusammen mit Perspektiven der Mittelbeschaffung als auch der Sponsororganisationen diskutiert. Der aktuelle und mögliche Nutzen für Entwicklungsländer wird hervorgehoben, indem nach Möglichkeit Beispiele aus Entwicklungs-

ländern angeführt werden und indem von den Bedingungen in den Entwicklungsländern Notiz genommen wird, die den Erfolg begrenzen oder spezielle Modifikationen bei der Anwendung notwendig machen können.

Introduction

In a recent column in *Library Journal*, Herb White observes: "Peter Drucker has noted that managers only get credit for two things, innovation and marketing. Doing the same things as before, even if doing them well, creates that greatest of all management communication sins: it is boring." (White, 1989, p. 78) Innovation and marketing can help the library attract additional resources, yet each may require resources in order to generate resources.

Some libraries view this as a catch-22 situation: If resources are not available for innovation and marketing, how can the library attract the resources to do more of the same? Others counter by saying that innovation on a small scale does not require significant resources, and that all libraries are involved to some degree in marketing activities whether or not they realize it. Carroll goes farther and argues convincingly that "Creative marketing programs offer the most certain relief from financial despair... As heretical as it may seem in these times, marketing probably deserves financial preference over the more basic library activities. Marketing, if properly directed, holds at least the promise of finding and eliciting support from new and current patrons." (Carroll, 1982, p. 216)

Nevertheless, libraries can be more innovative, do more marketing, and (the bottom line) serve the needs of their users if they have adequate resources. Fund-raising activities to secure those resources are important activities in most libraries. Library fund-raising in developing countries can, however, be particularly difficult. The purpose of this paper is to describe one fund-raising tool—the "information center" concept—that has been moderately successful at the National Agricultural Library

(NAL), and consider how that idea may be useful in developing countries.

Background

Marketing is a well established management function in nonprofit organizations, and the leading authority on such marketing in the United States is Philip Kotler. The third edition of his classic text contains major revisions because of the ready acceptance of marketing by nonprofits, and it contains many library examples. Important topics covered in the text include: the idea of exchange, whereby "Target audience members are asked to exchange something they value for something beneficial provided by the nonprofit organizations." (Kotler and Andreason, 1987, p.25); customer-centered marketing management, where "In a sophisticated marketing organization, all marketing analysis and planning begins and ends with the customer." (ibid, p.52); and segmentation of the market, where "...in designing any particular marketing program, the nonprofit manager should routinely assume, until shown otherwise, that the market ought best be thought of as a combination of many small sub-segments that may deserve separate marketing programs." (ibid, p.54)

Kotler and Andreason include chapters on the application of marketing principles to "leveraging limited resources" and "fund-raising." Perhaps the most telling statement related to fund-raising and segmenting the market is this description of the strategic marketing stage of fund-raising: "Here the prevailing attitude is 'We must analyze our position in the marketplace, concentrate on those donor sources whose interests are best matched to ours, and design our solicitation programs to supply needed satisfactions to each donor group.' This approach involves carefully segmenting the donor markets; measuring the giving potential of each donor market; assigning executive responsibility for developing each market; and developing a plan and budget for

each market based on its potential." (ibid, p. 324)

One way to segment the user population is to create an information center. The ALA Glossary defines an information center as "An independent organization or an administrative unit of an organization that normally collects, organizes, stores, retrieves, and disseminates documents and performs such services as literature searches, compilation of bibliographies, issuance of selective dissemination of information bulletins, and abstracting, but does not produce evaluative reports requiring the analysis and synthesis of the contents of documents." (Young, 1983, p. 117)

Schmidt adds a bit more flavor to the meaning of information center. She submits that "the rapid advances in technology during the last decade have drastically and permanently altered the methods by which information is gathered and disseminated, and these changes have given birth to a new entity: THE INFORMATION CENTER." (Schmidt, 1987, p.3) Further, the information center "...has absorbed the traditional library..." which now becomes "...part of a much larger, more complex unit in which books, periodicals and the like are supplemented by exciting new information products springing forth from technological advances that occur almost daily." (ibid, p.3) She also points out that the idea of an information center, and what it can be and do, is still evolving and difficult to pin down, but that the information center "...can and will become a center for generating new ideas and also a place where information is stored and retrieved." (ibid, p.4)

NAL's experience with information centers

The National Agricultural Library has fifteen information centers. At NAL, an information center has these key characteristics: has a defined scope of subject coverage; has a dedicated staff with expertise in the subject area; offers traditional library services, including reference, online

searching, etc.; ensures that extra efforts are made to build the collection in the designated subject area: strengthens indexing and cataloging activities related to the subject in AGRICOLA, the NAL bibliographic database, and seeks other organizations to add records to that database; establishes and maintains contacts with appropriate U.S. Department of Agriculture (USDA) contacts and other related contacts and organizations outside of USDA; networks with other information organizations; has an active outreach program that includes exhibits and presentations at appropriate meetings and conferences; develops special publications and bibliographic instruction programs on the topic; and develops new information technology applications related to the subject. Additional information about NAL information centers is contained in the Frank article listed in the bibliography.

The information center is another way of packaging and marketing traditional library services but it is done very actively. New centers are developed whenever an information center seems to be the best way of serving a subset of NAL users or potential users. Information centers are developed in response to presidential initiatives, USDA initiatives, strong interests of users, congressional interests, and other needs determined by NAL. The information center concept has enabled NAL to obtain funding from USDA, Congress, other Federal agencies, professional and trade associations, individuals, foundations, and other organizations. NAL is an agency of USDA, serving the department's 107,000 employees and also serving as one of three U.S. national libraries. Most of NAL's budget of approximately 15 million dollars is provided by the government. Besides seeking increases in the regular budget each year, NAL has made conscious efforts to supplement normal funding by seeking outside funds and by doing joint projects with other organizations with similar interests. More than one million dollars of the current budget has been raised by

focusing on information center activities and developing collections and services for specific subsets of users and potential users. Particular success has been realized in the areas of biotechnology, technology transfer, water quality, rural information, alternative farming systems, and youth development. In addition, at the request of Congress, NAL has established an Animal Welfare Information Center, that adds an additional \$750,000 to its budget. Work is underway to obtain support for information centers on global change and plant genome, as well as for increased support for several existing centers. Other existing information centers (on such topics as aquaculture, horticulture, food and nutrition, critical agricultural materials, agricultural trade and marketing, and family) continue to work with users and donors to improve support.

In sum, the NAL experience has been this: funding sources (and potential funding sources) have not been interested in supporting general library activities or in providing increases in funding to accommodate new programs and increases in operating expenses, but they have been very responsive to NAL requests for support of collections and services in narrow disciplines. By proper marketing of developing and existing information center services, NAL has been able to leverage additional support (funding, donated and volunteer staff, publications, etc.) from other agencies and organizations working in those disciplines.

Application in developing countries

The information center concept can be useful in fund-raising in developing countries, and sometimes already has been. Several authors have written about the difficulties of providing information services in developing countries. Three recent useful articles that cover the topic are Bell (1986), Harris (1990), and Kaniki (1988). In each of these articles limited

resources is one of the main problems encountered.

Because of resource limitations, the library manager in developing countries may want to note two marketing principles that affect fundraising and that are well stated by Sterngold: (1) To be effective, the special library or information center "...must align itself with the goals and activities of the organization it serves. In other words, it must constantly strive to maximize its contribution to the organization (and by so doing, to gain the credibility, influence and support it needs to make that contribution)." (2) "A major tenet of modern marketing is that an organization can operate most effectively by concentrating its efforts and resources on meeting the selected needs of specific groups of users (or customers, clients, members), rather than trying to be all things to all people. An organization should consciously choose how it positions itself in its marketplace. (Sterngold, 1982, p. 255)

Grunenwald examines some of the practical aspects of marketing, including strategy development. He also stresses the importance of generating "...in the minds of the individuals in a given segment a clear and distinct image about the library." (Grunenwald, 1984, p.29) The use of an information center focused on a specific subject area can help establish that clear image, which is also useful in helping cooperation and exchange programs with other libraries and organizations.

In many, cases, libraries in developing countries are already specialized because of the agricultural interests of the organizations and clientele they serve. Restriction of the scope of coverage can have various benefits: it defines and limits the number of organizations and other information centers with which the center should actively maintain relations; it helps define what the center needs (e.g., by way of collections) and should do, and what it can offer to users and other libraries; it makes it easier to target services to appropriate groups, successfully serve those groups, and

to evaluate services (and be evaluated by funding agencies); it enhances relations with the researchers, administrators, and others served by the center; it delineates areas in which center staff need to develop expertise; it provides guidance in selection of appropriate information technologies to adopt; and it can add a prestige element to the perception of the center. In the area of fund-raising, it makes it much easier to identify potential donors and cooperators, and easier to show what the center has to exchange for resources from the donor.

Conclusion

The information center concept has proven itself a useful tool in fund-raising and marketing. While it is only one of several such tools and it may not work in every situation, informa-

tion managers in developing countries may want to consider its use.

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New Technologies for Document Delivery and the Barriers to Their Use in the Developing Countries

Mary Ochs

Keywords: information technology; telecommunications

ABSTRACT: Telefacsimile, computer networks, and optical scanning hold great potential for rapid document delivery. Most large libraries in the United States have purchased fax machines in the past two years. However, costs, labor, speed of transmission and quality of transmission have all surfaced as issues in the use of fax. Because of these issues, more sophisticated technologies, such as high speed networks and optical scanning are being investigated for use in document delivery. Several projects are now underway in the U.S. to combine optical scanning and network transmission for document delivery. The United States National Agricultural Library and the Research Libraries Group are both conducting tests on document transmission via the Internet. These projects are described briefly. Some of the barriers to the use of scanning, network transmission and fax in the developing countries, such as high costs and dependence on high speed telecommunications, will be discussed.

RÉSUMÉ: Le télécopieur, les réseaux informatiques et la lecture optique ont un potentiel important pour la diffusion rapide de documents. Ces deux dernières années, la plupart des grandes bibliothèques aux Etats Unis ont acheté des télécopieurs. Cependant, il apparaît que les coûts, la main d'oeuvre, la vitesse et la qualité de transmission sont des problèmes dans l'utilisation du télécopieur. A cause de ces problèmes, des technologies plus sophistiquées telles que les réseaux à grande vitesse et la lecture optique, sont étudiées afin d'être utilisées pour diffuser des documents. Plusieurs projets sont en cours aux E.U. pour combiner la lecture optique avec la transmission par réseau pour diffuser des docu-

ments. La Bibliothèque Agricole Nationale des E.U. et le Groupe des bibliothèques de recherche mènent ensemble des tests sur la transmission de documents via Internet. Ces projets sont décrits brièvement. On va étudier certaines barrières à l'utilisation de la lecture optique, de la transmission par réseau, et du télécopieur dans les pays en développement, telles que les coûts élevés et la dépendance des télécommunications à grande vitesse.

RESUMEN: El telefacsimil, las redes de transmisión por computador y la lectura óptica de caracteres poseen gran potencial para el envío rápido de documentos. En los últimos dos años, la mayoría de las bibliotecas grandes de los Estados Unidos ha adquirido equipo de telefax. Sin embargo, los costos, la mano de obra, la velocidad y la calidad de transmisión han surgido como obstáculos para el uso del telefax. Debido a estas limitaciones, se están investigando tecnologías más complejas para el envío de documentos, como las redes de transmisión a gran velocidad y la lectura óptica de caracteres. Actualmente, hay varios proyectos en desarrollo en los EE.UU. para envío de documentos, que combinan la lectura óptica y la transmisión por redes. La National Agricultural Library de los Estados Unidos y el Grupo de Bibliotecas de Investigación están haciendo pruebas de transmisión de documentos via Internet. Se describen brevemente estos proyectos y se discuten algunas de las limitaciones para el uso de la lectura óptica, la transmisión por redes y el fax en los países en desarrollo, como son el alto costo y la dependencia de telecomunicaciones a gran velocidad.

ZUSAMMENFASSUNG: Telefax, Rechnetze und optisches Scanning besitzen große Möglichkeiten für eine schnelle Dokumentenlieferung. Die meisten großen Bibliotheken in den Vereinigten Staaten haben in den letzten zwei Jahren Fax-Geräte gekauft. Beim Faxen sind jedoch alle Probleme, wie Kosten, Arbeits-

aufwand, Übermittlungsgeschwindigkeit und Übermittlungsqualität aufgetaucht. Aus diesem Grunde werden ausgefallene Technologien, wie Hochgeschwindigkeitsnetze und optisches Scanning für die Dokumentenlieferung untersucht. Verschiedene Projekte laufen gegenwärtig in den Vereinigten Staaten, um das Optische Scanning und die Netzübertragung für die Dokumentenlieferung zu verbinden. Die United States National Agricultural Library und die Research Libraries Group führen Versuche über die Dokumentenlieferung via Internet durch. Diese Projekte werden kurz beschrieben. Einige Hindernisse bei der Anwendung von Scanning, Netzübertragung und Fax in Entwicklungsländern, wie hohe Kosten und Abhängigkeit von Hochgeschwindigkeits-telekommunikation werden diskutiert.

I would like to take the next fifteen minutes to discuss three new technologies for document delivery: telefacsimile, computer networks, and optical scanning. These technologies hold great potential for improving access to research information. I will address issues that affect developing countries, such as cost and the heavy dependence of these technologies on telecommunications. I plan to include enough technical detail to allow you to understand where problems may occur and how they can be corrected.

Let's start with telefax. It seems that 1988 was the Year of the Telefax in the libraries of the United States. Suddenly the technology had evolved to the point where use of fax was efficient and cost effective. The quality of the images received had improved dramatically, and the machines themselves required much less staff

time to operate. Libraries all over the country, large and small, were purchasing fax machines for rapid delivery of interlibrary loan photocopies.

Facsimile technology is not that new. It was developed in 1842 by a Scottish clock maker, Alexander Bain, who constructed a rudimentary machine that transmitted a crude image for a short distance (Sims, 1988). The technology was improved over the course of the next 120 years, and in the 1960's, some libraries began to experiment with the technology.

A modern fax machine goes through a four part process to send an image. The machine scans a page, distinguishing between black and white areas on the page. It encodes this information into a digital signal, which is a series of electrical pulses or bits. This signal is then sent over regular telephone lines. The image is reconstituted at the receiving fax machine. An understanding of this process is key to understanding where problems can occur. The quality of a fax transmission is determined by the sending machine. However, "noisy" lines will distort a high quality image by the time it reaches its destination. Fax machines have been divided into four groups according to standards set by the International Telegraph and Telephone Consultative Committee. This United Nations organization has established standards for scanning and encoding documents sent via facsimile machines, concentrating on the protocols and line signals exchanged between machines. Machines in Groups I and II were used in the 1960's and 70's. They were very slow, taking on the average six minutes per page for the Group I machines and 3 minutes per page for the Group II machines (Jackson, 1988). These first two groups of machines relied on analog telecommunications technology. The current standard is the Group III machine, which uses the faster digital technology. A standard business page takes roughly 30 to 60 seconds to transmit. Most machines being installed today are Group III machines. Group IV machines are available, but are still very expen-

Table 1 – Long Distance Phone Rates—AT&T International Calls (January 1990)

	1st minute	Additional minutes
New York to London		
7 a.m.–1 p.m.	\$1.44	\$.94
1 p.m.–6 p.m.	\$1.15	\$.71
6 p.m.–7 a.m.	\$.98	\$.60
New York to Philippines		
5 p.m.–2 a.m.	\$3.25	\$1.40
2 a.m.–11 a.m.	\$2.75	\$1.10
11 a.m.–5 p.m.	\$2.30	\$.85
New York to Budapest, Hungary		
7 a.m.–1 p.m.	\$2.23	\$1.25
1 p.m.–6 p.m.	\$1.67	\$.94
6 p.m.–7 a.m.	\$1.33	\$.75
New York to Zimbabwe		
6 a.m.–12 noon	\$2.59	\$1.33
12 noon–5 p.m.	\$1.95	\$.99
5 p.m.–6 a.m.	\$1.55	\$.80
New York to Addis Ababa		
1 p.m.–2 a.m.	\$3.12	\$1.60
7 a.m.–1 p.m.	\$2.35	\$1.20
2 a.m.–7 a.m.	\$1.86	\$.97

sive. They differ from the previous groups in that they have the capability of transmitting data over high-speed data networks rather than over voice grade telephone lines. Transmission speeds as fast as three seconds per page are possible.

Let's move on to discuss some of the issues in using fax for document delivery. Whether you are sending a transmission 250 miles from Ithaca, New York to New York City or thousands of miles from New York City to Zimbabwe, the critical issues are costs and phone line quality. The severity of the problem may vary, but in all situations, these are the key issues. The sample AT&T phone rates shown in Table 1 illustrates the kind of costs involved with international fax. At the rates shown, a 10 page fax sent from New York to Addis Ababa, averaging one minute per page would cost anywhere from \$8.75 to \$14.56, depending on the time of day. Fax machines that have built in memory can store pages for delayed sending. This allows libraries to take advantage of off-peak phone rates, since staff can pre-program a document to be sent at 2 a.m., for example. In purchasing a machine, this is a key feature to look for. Any document

delivery operation considering the purchase of a fax machine, should look for a machine with as large a memory as possible, in order to send a large number of pages on off-peak hours. The machine we have at Mann Library has a 2 megabyte memory and stores approximately 70 business pages. However, this translates into roughly 25–30 typical journal article pages, and often is not adequate. You will note that the off-peak period varies from one place to another. Staff would have to learn when rates are lowest for various countries. This may prove impractical under some circumstances.

Phone line quality is the second critical issue. Static on the line can result in missing lines or distortion of the image. Speed of transmission is also affected. Poor line quality forces the fax modem to step down to lower speeds, resulting in increased telecommunications costs and a poor quality copy. Poor line quality is not simply a problem in the developing countries. Even in our transmissions between Ithaca and New York City, where Cornell Medical College is located, we have encountered line problems. We have gone through periods where all that reached Cornell

Medical center were copies filled with characters that look like messages from outer space. The technician who installed our machine related an incident with a fax installed at a trucking company nearby. He said that their machine had been called in for service because it was sending copies that were totally black. It turned out that noise and vibrations from engines and machinery were causing enough line noise to create the black copies. The problem was solved by moving the fax machine.

Any situation where fax is being investigated for possible implementation should be carefully analyzed. It is possible that the costs can be justified if the quality of the copy is good enough. It may be that fax to certain locations is of consistently good quality, yet to others it is not. Where the mail is slow or unreliable, it is perhaps an important technology simply for sending requests for material.

Choosing a fax machine among the myriad of machines now on the market can be a frustrating task. One publication that can aid in sorting through the jumble of companies and features is the May 1990 fax issue of a magazine called *What to Buy for Business*¹.

Network communication, or electronic mail, is a second important technology for document delivery, both for sending requests and for the transmission of whole documents. Some networks are now available for international transmission of electronic information, whether it be electronic mail messages or larger files. International networks link into local networks allowing scientists in West Germany to send electronic messages directly to scientists in Mexico. I have gathered some information on the networks that might be of use for the international sharing of research information. Some of you may know of other systems available.

Perhaps the most important network now available for agricultural research institutions is CGNET. Many of you probably make use of CGNET, so I will just briefly describe it. CGNET is a communication network

interconnecting a group of agricultural research organizations via electronic mail and data communications facilities. A private company, CGNET Services in Palo Alto, California, administers the network. It has no "network" of its own, but relies on existing networks tied together to link agricultural scientists all around the world.

A number of other networks are available worldwide. Two examples are BITNET and Internet. BITNET was originally used for collaboration and communications among systems programmers at United States university computing centers. Today it is used by scholars and administrators at universities all over the world (Quarterman, 1986). The Internet developed out of the need to interconnect institutions working on federally sponsored research in the U.S. These and other similar networks are critical components in international communication because they allow for more efficient use of communication media than conventional services, such as telex. Increased efficiency can translate into cost savings (Frieron, 1989). Work is underway in the United States to develop a network called the National Research and Education Network (NREN) which is intended to evolve from the existing Internet. Eventually NREN is expected to link together thousands of campuses and research labs enabling them to exchange huge quantities of computerized information. The speed and capacity of this network is expected to reach 3 billion bits per second by 1996. This translates into the capability of sending 100,000 typed pages every second (Alberico, 1990). These networks alone cannot solve the problems of document delivery. They must be combined with technology that can convert printed documents into electronic formats. One of these technologies is optical scanning.

Optical scanning technology is currently being investigated to improve access to research information in many fields. Cornell is now involved in testing this technology for preserving library materials. This is a common application for the technology.

Scanning technology falls into two basic categories, conversion to bit-mapped images and conversion to ASCII files. In either case, pages of material are scanned and the image is first bit-mapped. This is the same process used in telefax, whereby a scanner digitizes the image into electrical pulses that indicate whether that particular point on the page is black or white. Bit-mapped images are then compressed to reduce the computer storage space required to store the image. Compression is the systematic removal of redundancy from an electronic signal for efficient storage and transmission. The compression is done according to the same standards established for fax by the CCITT, either Group III or Group IV (Walker, 1989).

To convert these images to an ASCII file, the image must be translated using optical character recognition (OCR). The end-product of OCR is a text-file that is readable and indexable. The major difficulty with current OCR technology is the error rate. Consider that on a typical 5000 character page, if the error rate is only 1%, there will be 50 errors to correct. Another disadvantage of the ASCII files is that they cannot accommodate graphic images. For material that includes both text and graphics, as occurs with most journal literature, the paper document must be segmented and stored in two ways for maximum efficiency. The text is stored in ASCII format and the graphics are stored in bit-mapped format (Walker, 1989).

For document delivery purposes, however, there is usually no need for a text file of a document. The requester merely needs a legible copy of the original article, thus the transmitting of bit-mapped files of documents via the networks offers great possibilities for rapid delivery of copies of printed documents. One disadvantage of current technology, however, is the slow (more than 2 minutes per page) printing of documents.

At present, the Research Libraries Group in the United States is developing a Document Transmission

Workstation, that will scan and electronically transmit documents among members of the Group using the technologies described previously. The workstation will be comprised of a PC/AT or compatible microcomputer, a laser printer, a scanner, and communications hardware and software. Scanned images will be transmitted via the Internet. The one disadvantage of such a system is that the receiving institution must know that a transmission is coming. Equipment must be prepared for receiving transmissions, thus times for sending of material must be prearranged. The United States National Agricultural Library is also experimenting with this technology. NAL and North Carolina State University are attempting to use the Internet to transmit ASCII text and bit-mapped images via a SURANET node at the University of Maryland (Andre, 1989). As more networks become available in the developing countries, transmission of bit-mapped images has the potential for improving access to research library collections throughout the world. It does little, however, to reach the isolated areas, where networks will not be

extended for many years. Some other technologies, such as satellite transmission, have been used to help solve data communications problems. In Sri Lanka, for example, the International Irrigation Management Institute uses a satellite earth station to connect to CGNET (Frierson, 1989). It is clear that these new technologies have the potential to make rapid, high quality document delivery available worldwide. However, the limitations in communications in many parts of the world still present a barrier to their use. It is important, not only for document delivery, but for general communication among researchers throughout the world, that our communications infrastructure continue to improve and expand.

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NOTE

1. *What to Buy for Business* (U.S. edition), bimonthly, \$95.00 per year from What to Buy, Inc., 350 Theodore Fremd Avenue, Rye, New York 10580. *What to Buy for Business* (British edition), £34.50 per year from Managing Your Business, Ltd., 7 Cromwell Road, London, SW7 2HR, England.

Determining the Current Core Literature in the Agricultural Sciences

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Keywords: library collection development; information management; information storage; developing nations

ABSTRACT: The Mann Library at Cornell University has received a \$550,000 grant from the Rockefeller Foundation to identify the core literature of the agricultural sciences appropriate for education and research in Third World countries. The literature identified through this project will be put in full text onto compact disks and made available as core libraries. The core literature will be determined by citation analysis and other bibliometric techniques, including review by scholars in eight subject disciplines. The lists will be published in eight volumes: Agricultural Economics and Rural Sociology, Agricultural Engineering; Plant Sciences—Basic; Plant Sciences—Applied; Animal Science; Economic Entomology; Forestry and Silviculture; and Soil Sciences. Details of the program's purposes and schedule, subject areas to be included and progress on the compact disk effort are provided. The bibliometric methods used in determining the core literature in each of the eight subject categories are outlined. The methods for choosing reviewers, determining balance in the lists, weighting of reviewer's decisions, and threshold levels for removal of titles are covered. The project includes the selection of core literature not only for the Third World, but also the developed world, and the relationship between these two points of view are noted.

RÉSUMÉ: La Bibliothèque Mann de l'Université de Cornell a eu une bourse de 550.000 US de la Fondation Rockefeller pour identifier la littérature grise des sciences agricoles, appropriée pour l'éducation et la recherche dans le Tiers Monde. La littérature identifiée grâce à ce projet sera saisie plein texte sur compact disque et sera disponible comme bibliothèque

grise. Cette littérature grise sera déterminée par les analyses de citation et autres techniques bibliométriques, y compris la révision faite par des spécialistes dans huit disciplines thématiques. Ces listes seront publiées en huit volumes : économie agricole et sociologie rurale, ingénierie agricole, sciences végétales-bases, sciences végétales-applications, sciences animales, entomologie économique, production forestière et sylviculture, et sciences du sol. Des détails sur les objectifs, les domaines d'intérêt et le déroulement du programme sont fournis ainsi que les progrès du disque compact. On définit les méthodes bibliométriques utilisées dans la détermination de la littérature mémoire, dans chacune des huit catégories thématiques. Les méthodes pour choisir les analystes, déterminer l'équilibre dans les listes, évaluer les décisions des analystes, sont présentées avec les niveaux de seuil pour l'élimination des titres. Le projet comprend la sélection de la littérature grise, non seulement pour le Tiers Monde, mais aussi pour les pays développés, et les relations entre ces deux points de vue sont relevées.

RESUMEN: La biblioteca de Cornell University, Mann Library, recibió de la Fundación Rockefeller una partida de 550,000 dólares para identificar la literatura básica en ciencias agrícolas, adecuada para la educación y la investigación en países del Tercer Mundo. La literatura identificada en este proyecto se pondrá en texto completo en disco compacto y estará a disposición como biblioteca básica. La literatura básica se determinará mediante el análisis de las referencias bibliográficas y mediante otras técnicas bibliométricas, incluyendo una revisión por personal experto en ocho disciplinas. Las listas se publicarán en ocho volúmenes: Economía Agrícola y Sociología Rural, Ingeniería Agrícola, Botánica Básica, Botánica Aplicada, Zoología, Entomología Económica, Ciencias Forestales y Silvicultura y Edafología. Se describen en detalle los objetivos y el calendario del programa, las áreas de conocimiento que se incluirán y los avances en la transferencia a disco

compacto. Se esbozan los métodos bibliométricos utilizados para determinar la literatura básica en cada una de las ocho categorías de materia; también se describen los métodos para la elección de revisores y los parámetros para la eliminación de títulos. El proyecto incluye la selección de literatura básica no sólo para el Tercer Mundo, sino también para los países desarrollados; se destaca además la relación entre estos dos puntos de vista.

ZUSAMMENFASSUNG: Die Mann-Bibliothek an der Cornell Universität hat Mittel in Höhe von 550.000 Dollar von der Rockefeller Foundation erhalten, um die Kernliteratur auf dem Gebiet der Landwirtschaftswissenschaften zu ermitteln, die sich für die Ausbildung und Forschung in Dritte-Welt-Ländern eignet. Die mit Hilfe dieses Projektes ermittelte Literatur wird in Volltext auf Kompaktdisketten übertragen und als Kernbibliothek zur Verfügung gestellt werden. Die Kernliteratur wird mit Hilfe von Zitatanalysen und anderer bibliometrischer Methoden einschließlich Rezensionen von Gelehrten in acht Fachdisziplinen ermittelt werden. Die Listen werden in acht Bänden veröffentlicht, und zwar Agrarökonomie, ländliche Soziologie, Agrartechnik, Pflanzenproduktion-Grundlagen, Pflanzenproduktion-angewandte Bereiche, Tierproduktion, Angewandte Entomologie, Forstwirtschaft und Waldbau, Bodenkunde. Einzelheiten über Ziele und Zeitplan des Programms, über zugehörige Fachgebiete und die Fortschritte in den Bemühungen um die Kompaktdiskherstellung werden gegeben. Die bibliometrischen Methoden, die bei der Kernliteraturbestimmung in jedem der acht Fachkategorien zur Anwendung kommen, werden skizziert. Die Methoden für die Auswahl der Rezensenten, für die Ermittlung der Ausgewogenheit in den Listen, für das Abwägen der Entscheidungen der Rezensenten und der Schwellenwert für die Herausnahme von Titeln werden besprochen. Das Projekt umfaßt die Auswahl der Kernliteratur nicht nur für die Dritte-Welt-Länder sondern auch für die Industrieländer. Die Beziehung zwischen diesen zwei Standpunkten wird erwähnt.

It has always been tantalizing to determine what constitutes the core of a discipline's current literature. Are 16 or 60 journals required to satisfy 75% of users' needs? Can books over 10 years old be discarded, or are there classics beyond that time period that must be kept? The Mann Library has stepped into this tempting and difficult area by establishing a core literature project for the agricultural sciences. This paper is concerned with the methods and procedures involved in this effort, with a brief note about the products.

The project was undertaken in order to provide assistance in several areas of library and literature collection management. The time is fortuitous and the action apropos because of the increased importance of academic collection evaluation and the prospect of electronic storage of full text. Also, there have been dramatic changes in the agricultural world as a result of internationalization, self-sufficiency, and competition. The past decade appears to have been a watershed in world agriculture, as well as its literature. With these trends in mind, the Core Agricultural Literature Project was begun to provide some guidance in these areas:

- Analysis of the literature should provide better tools to evaluate and determine the strengths and weaknesses of academic collections; in this regard, it must be noted that our aim is to deal with the instructional and research literature;
- The judgment system should assist in establishing specific titles with rankings for historical preservation; and
- Several scholarly end products should result and be of assistance, such as a critical review of the literature of the disciplines of the agricultural sciences, but most importantly the identification of the current, most valuable monographs, journals, and report series.

These studies can also provide evaluation tools and title compilations for agricultural literature for the Third World handled as a portion of the total literature study. A final product would be the storage, page-by-page,

of the core literature on compact disks for Third World use. With these extrapolations in mind, funding from a donor agency was obtained. The Third World aspect of the Core Literature Project is fairly well known because of the funding, the potential use of compact disks for literature storage, and the publicity these received. However, the project staff is identifying the core agricultural literature for both the developed and the developing worlds.¹

The following areas of the agricultural sciences have been designated for concentrated study.

1. Agricultural Economics and Rural Sociology,
2. Agricultural Engineering,
3. Animal Science and Diseases,
4. Plant Protection and Improvement,
5. Food Science and Human Nutrition,
6. Soil Science,
7. Forestry and Silviculture.

These seven areas follow academic organizations at many agricultural universities and colleges. Some sub-disciplines have been grouped together into concentrated, larger areas. The worldwide designations and subject groupings reflect some Third World influence particularly in areas 3, 4, and 5.

The first study area, agricultural economics and rural sociology, is completed as far as Mann Library intends to take it. Work began in May 1989 on agricultural engineering which was completed in September 1990; the animal science and diseases study began in April 1990, and Soil Science in November 1990, both with Steering Committee meetings at Cornell University.

The basic methodologies as set in agricultural economics and rural sociology will be used with variations in the other disciplines.

Source Documents. The literature was analyzed by going to the discipline publications which had an historical perspective, included all aspects of the discipline, and were from respected journals or monographs. Preference was given to literature reviews particularly when these had been critiqued by colleagues prior to

publication. This critical step of choosing documents to be analyzed was guided by the Cornell faculty and was an iterative process. Thus, we used a few advanced textbooks, some annual review volumes, and works devoted to the literature of the discipline. A recent three volume agricultural economics literature review provided the basic historical and evaluative perspective we needed.² Determining the source documents for citation analysis is a critical step in which possible skews must be eliminated. Our aim was to find the core literature for both instruction and research, so care had to be taken to find appropriate works to reflect that purpose. Special balance had to be achieved with Third World literature. Twenty-four documents were used in agricultural economics and rural sociology (Appendix). Beginning with agricultural engineering, a steering committee of scientists and librarians was established to guide the choice of source documents as well as to assist with subject balance, contacts with reviewers, writing, editing, and general criticism. A Steering Committee is established for each subject area at the beginning of the study.

Citation Analysis. This process involves looking at all citations in the source documents and extracting information and data from them. Every monograph cited in a source document was recorded and each time it was cited again, a tally was added. The same was done for journal titles and reports. This is an elaborate and laborious process. For the monographs, data were kept on the places and dates of publication, and types of publishers and monographs. Approximately 85,000 citations were analyzed and data recorded from them. The results are ranked lists of the most cited journals, the most cited reports, and the most cited monographs of the past 50 years. Extensive additional data were recorded concerning monographic series, primary publishers, and the relative age of the material cited. By this process, 4,000 monographs were identified in agricultural economics. Early analyses

indicated that the developing and developed countries cited some of the same literature, but that they diverged, so the monographs were divided into one list for the developed countries and another for the developing.

Monograph Evaluation. These monograph lists for the two communities created by citation analysis were sent to reviewers in Africa, Asia, Europe, Latin America, and the United States. After the initial work with agricultural economics and rural sociology, Canada and Australia were added for subjects following. Both sets of lists were sent with details on the purpose of the project, particularly on the intention of identifying educational and research literature, and with guidelines for evaluation. To provide us with a broad overview of the discipline, reviewers were sought who had recent teaching and research experience, who had worked for an extended period of time, and who were considered good scholars and knowledgeable about their literature. Reviewers were asked to provide counsel on the subject balance within the lists and to recommend titles. Only 85 monographic titles were recommended by this method. This painstaking procedure gave us a numerical count by citations analysis which was combined with ratings from the evaluators, and numeric rankings on all monograph titles. The lists went through several evaluative iterations resulting in 1,421 monographs for advanced countries, and 1,002 for Third World countries. Only 33% of the titles are common to both lists. The top twenty titles in both groups are remarkably similar (Table I). The agricultural engineering and animal science monograph lists were each evaluated by 35 people, nearly equally divided between persons with developed and developing backgrounds.

Third World reviewers chose more recent works and dropped three pre-1970 titles from the top 20 developed countries ranking. Surprisingly, two remained from the 1960s. The two groups of evaluating scholars think similarly, but not identically. University presses published 75% of the top

20 titles with heaviest representation from Johns Hopkins (4), Cornell (3), and the University of Minnesota. The three commercial books published in 1945, 1952, and 1964 are among the four oldest on the list. All three of these early commercial books were voted Classics by the Fellows of the American Agricultural Economics Association. The more recent top 20 titles are multi-authored or edited works, often resulting from conferences or workshops where papers were invited. Forty percent of the titles are of multiple authorship or multiple editorship. Wrongly or not, the editors of these volumes tend to get credit for the volume. Of the 12 volumes not edited, nearly half have multiple authors. It appears that agricultural economics and rural sociology have gone to collaborations, and generally shorter, more discrete pieces of work. Similar data, detailed lists and analyses from this project will appear in book form.³

Journals. Titles were recorded and tallies made on journals in all of the source documents analyzed. These were ranked on the basis of the citation analysis, again with one list for the developed countries and another for the Third World countries. Journal evaluations or rankings were not done by individuals although there was consultation with Cornell faculty. Data from the citation analysis were correlated with earlier journal studies, other ranking techniques such as number of articles published, and citation analysis records of the Institute for Scientific Information.⁴ These correlations provided a basic, statistically valid list of near 100 titles of which 60 clearly are the core for both communities. These 100 titles are published by the following types of organizations:

Associations, Societies and Independent Organs	35.6%
Universities (Presses and Departments)	27.8%
Commercial Publishers	26.6%

Data were kept on the most cited titles of numbered monograph series

reports; this information is provided in the book.³ Representative titles are Research Reports, Discussion Papers and Bulletins of such organizations as the Asian Development Bank, FAO, U.S. Dept. of Agriculture, World Bank, and experiment stations. Such report series constituted about 11% of all citations.

Some Products

The first result was a more elaborate set of tools for evaluating agricultural economics and rural sociology collections in academic libraries. Data and methods are now being tested in U.S. libraries through the Research Libraries Group Conspectus verification studies. The lists and citation analysis methods used will be similar with each discipline of agriculture. These will provide more precise evaluation tools than used in the past.

The next product will be a set of books, one on each of the 7 subjects under study. They will appear in a set entitled Literature of the Agricultural Sciences. The first volume on agricultural economics and rural sociology is in preparation by the publisher. The second on agricultural engineering is completed and under review. These books will be surveys of the literature or the nature of publishing in each discipline, and will include chapters such as:

- A brief, historical overview of the discipline during the past five decades;
- A survey essay and analysis of the literature of the discipline;
- Information on citation analysis and how it was conducted in this discipline;
- Lists of the core monographs for developed and developing countries;
- Lists of the core journals for developed and developing countries; and
- A compilation of recently published reference books in the discipline.

These six basic topics in each volume, will have major additions or variations. For example, in agricultural economics and rural sociology an extensive list of Working Papers important in the field has been provided

Table 1 – Rankings of Top Twenty Monographs in Agricultural Economics and Rural Sociology.

Rank in Developed Countries	Monograph	Rank in Third World
1	Lee R. Martin, editor. <i>A Survey of Agricultural Economics Literature</i> . Minneapolis; University of Minnesota Press for the American Agricultural Economics Association, 1977–1981. 3 vols. (Vol. 4 due in 1991).	1
2	Clifton R. Wharton, editor. <i>Subsistence Agriculture and Economic Development</i> . Chicago; University of Chicago; Aldine Publishing Co., 1969. 481p.	3
3	Herman M. Southworth and Bruce F. Johnston, editors. <i>Agricultural Development and Economic Growth</i> . Ithaca, New York; Cornell University Press, 1967. 608p. (Reprinted in 1979) Quality Award of American Agricultural Economics Association (AAEA).	2
4	Lloyd G. Reynolds, editor. <i>Agriculture in Development Theory</i> . New Haven; Yale University Press, 1975. 510p.	5
5	Yujiro Hayami and Vernon W. Ruttan. <i>Agricultural Development: An International Perspective</i> . Baltimore; The Johns Hopkins University Press, 1971. 367p. (Revised and expanded in 1985, 506p.) AAEA Classic and Quality Publication.	4
6–7–8	Hans P. Binswanger and Vernon W. Ruttan. <i>Induced Innovation: Technology, Institutions, and Development</i> . Baltimore; The Johns Hopkins University Press, 1978. 423p. Quality Award of AAEA.	15–16
	Carl K. Eicher and John M. Staatz, editors. <i>Agricultural Development in the Third World</i> . Baltimore; The Johns Hopkins University Press, 1984. 491p.	6
	Theodore W. Schultz. <i>Transforming Traditional Agriculture</i> . New Haven; Yale University Press, 1964. 212p. (Reprinted by Arno Press, 1976) AAEA Classic.	7
9	Thomas M. Arndt, Dana G. Dalrymple, and Vernon Ruttan, editors. <i>Resource Allocation and Productivity in National and International Agricultural Research</i> . Minneapolis; University of Minnesota Press, 1977. 617p.	8
10	John W. Mellor. <i>Economics of Agricultural Development</i> . Ithaca, New York; Cornell University Press, 1970. 418p. Quality Award of AAEA.	10
11	Vernon W. Ruttan. <i>Agricultural Research Policy</i> . Minneapolis; University of Minnesota Press, 1982. 369p.	15–16
12	Carl K. Eicher and L. W. Witt, editors. <i>Agriculture in Economic Development</i> . New York; McGraw-Hill, 1964. 415p.	Above 20
13	I. Adelman and Erik Thorbecke, editors. <i>The Theory and Design of Economic Development</i> . Baltimore; The Johns Hopkins University Press, 1967. 427p.	Above 20
14	Theodore W. Schultz. <i>Agriculture in an Unstable Economy</i> . New York; McGraw-Hill, 1945. 299p. AAEA Classic. (Available in reprint)	Above 20
15	Don Paarlberg. <i>Farm and Food Policy: Issues of the 1980s</i> . Lincoln; University of Nebraska Press, 1980. 338p.	17–20
16	C. Peter Timmer, Walter P. Falcon, and Scott R. Pearson. <i>Food Policy Analysis</i> . Baltimore; The Johns Hopkins University Press, 1983. 301p. Quality Award of AAEA.	9
17–18–19	James K. Boyce and Robert E. Evenson. <i>National and International Agricultural Research and Extension Programs</i> . New York; Agricultural Development Council, Inc., 1975. 229p.	13–14
	Earl O. Heady. <i>Economics of Agricultural Production and Resource Use</i> . New York; Prentice-Hall, 1952. 850p. AAEA Classic and Quality Publication.	Above 20
	John W. Mellor. <i>The New Economics of Growth: A Strategy for India and the Developing World</i> . Ithaca, New York; Cornell University Press, 1976. 335p.	11
20	James A. Roumasset, Jean-Marc Boussard, and Inderjit Singh, editors. <i>Uncertainty and Agricultural Development</i> . Laguna, Philippines; Southeast Asian Regional Center for Graduate Study and Research in Agriculture; and New York; Agricultural Development Council, 1979. 453p.	12
Above 20	T. W. Schultz, editor. <i>Distortions of Agricultural Incentives</i> . Bloomington; Indiana University Press, 1978. 343p.	13–14
Above 20	Hans P. Binswanger and Mark R. Rosenzweig. <i>Contractual Arrangements, Employment and Wages in Rural Labor Markets in Asia</i> . New Haven; Yale University Press, 1984. 330p.	17–20
Above 20	Bruce F. Johnston and Peter Kilby. <i>Agricultural and Structural Transformation: Economic Strategies in Late-Developing Countries</i> . New York; Oxford University Press, 1975. 474p.	17–20
Above 20	Allen H. Maunder and Kazushi Ohkawa, editors. <i>Growth and Equity in Agricultural Development; Proceedings of the Eighteenth International Conference of Agricultural Economists</i> . London; Gower, 1984. 619p.	17–20

most of these titles will not be represented in the core listings.

The agricultural economics and rural sociology volume has three authors, whereas the agricultural engineering volume has eighteen and two editors. This difference came from the recommendation that literature reviews in agricultural engineering be selectively included since the discipline does not publish reviews extensively. Literature review chapters are included on aquacultural engineering, forest engineering, automation and electronics, and energy and agriculture. Similar chapters about the literature or publishing of a discipline which will be helpful to students and researchers will be encouraged in subsequent volumes.

The Mann Library has recently embarked on the extension of its core literature work into retrospective literature, that period from circa 1870 through 1949. Similar analysis methods are being used to determine the primary journals, monographs, and report series for this time. Data and analyses on retrospective literature will be incorporated in chapters in future volumes beginning with animal science and diseases. These core lists will be aimed, however, at decisions on which titles are most influential and historically important to U.S. agriculture for preservation in a library collection. These monograph recommendations will be limited to English language titles; the journal rankings will not be restricted by language.

The Third World

There is a clear relationship between information, wealth, and progress. This is particularly apparent in the agricultural sciences where progress is based on knowledge and technological advancements. Knowledge in the Third World has often been provided by experts and expatriate specialists. In pursuit of self-sufficiency, institutions cannot continue to import intellectual capital in this expensive form. Scientific literature will increasingly be the basic source

of knowledge for developing country experts and students.

The vigorous efforts of Third World countries to build educational and research institutions in the past two decades is beginning to have major impact. For example the numbers of colleges, universities and research institutes in 5 African nations (Kenya, Malawi, Mali, Nigeria, and Tanzania) has gone from 60 in the 1960's to 221 according to listings in the *World of Learning*.⁵ This quadrupling along with some improvement in quality are evident in many Third World countries. The explosion in the educational and research infrastructure has been accompanied by a proportional growth in the number of students and young scientists being trained for leadership positions. While educational opportunities and the number of trained experts have grown, the poor access to information and knowledge remains relatively unchanged. Access to published literature of the world is a critical component of institution building and agricultural self-sufficiency. However, most efforts to build libraries and information systems in developing areas have proven either too expensive to sustain or too insignificant to make a real difference. These efforts have included sporadic shipments of books and journals from overseas, overly ambitious attempts to implement a national information infrastructure, and ineffective gift and exchange programs. The results are painfully obvious in libraries of many Third World universities and research centers; almost unfailingly the state of the collections is abysmal.

The potential for a dramatic improvement in the library and educational resources of developing academic institutions may be found in the compact disk technology. This remarkable storage medium is opening-up access to bibliographic citations and full-text in advanced and developing countries. The technology is exceedingly compact, will not deteriorate in a tropical climate, is easily transported, quickly learned and utilized, and may overcome many developing area problems of inadequate collections. There-

fore, the third major product planned of great interest to Third World academic institutions is the transfer of the full text of the core literature to optical disk technology, probably compact disks. This astounding potential is slowly being understood by academicians and agriculturalists.

The 1,002 agricultural economics and rural sociology monographs on the Third World list have an estimated 323,000 pages; the 70 most important journals for the developed and developing countries for a 10 year old run is 175,000 pages. These are large numbers reaching to 20 compact disks for this one discipline when bitmapping is used, indexing and specialized tagging are added in. Fortunately, the technology is still relatively new and the costs, compression, end products and marketing strategies are improving.

No decision has been reached at this time on who will prepare the disks. In our discussions with a producer of full text literature on compact disks, some plans have emerged which call for: 6,000 monographs covering all disciplines, and 500 journals covering the last five years of each title. It is estimated that these compact libraries for the Third World can be produced, discipline by discipline, over a four-year period beginning in 1992. Annual updates on the journals are planned for Third World institutions.

The completion of this text transfer to compact disk is not a certainty since substantial financing must be found. Donor agencies are willing to underwrite the project if Third World educators, scholars, and librarians express their interest and need.

The creator of the disks must obtain copyright privileges, pay royalties, locate the publications, scan them, provide indexing, master and reproduce the disks, and market and distribute the product. With these complexities in mind, the estimated price of \$1.50 for each monograph is astounding. In fact, the low price should make an instant core agricultural library available to nearly every developing academic and

research institution within a five year period.

For the Third World academic and research agricultural institutions, a quantum jump in access to the literature of agriculture should be realized, bringing a potentially advanced level of academic participation for many who were literature-poor.

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APPENDIX

Source Publications Used for Monograph and Journal Evaluations:

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1989

Randolph Barker. Unpublished 1989 Reference list of 1486 Citations to Agricultural Development in Asia, loaned by the compiler.

Carl K. Eicher and Doyle C. Baker. "Research on Agricultural Development in Sub-Saharan Africa: A Critical Survey," dated June, 1989, forthcoming in *A Survey of Agricultural Economics Literature*, ed. by Lee A. Martin, vol. 4.

1988

Antonelli, G. and A. Quadrio-Curzio, eds.

The Agro-Technological System Towards 2000: A European Perspective. Amsterdam and New York; North-Holland, 1988. 297p.

David L. Brown, editor. *Rural Economic Development in the 1980's: Prospects for the Future*. Washington, D. C.; U.S. Dept. of Agriculture, 1988. 399p. (*USDA Rural Development Research Report*, 69).

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1982

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1971

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1970

Bruce F. Johnston. "Agriculture and Structural Transformation in Developing Countries: A Survey of Research," in the *Journal of Economics Literature*, 1970: 8(2):369-404.

1969

Karla S. Fox and D. Gale Johnson, selectors. *Readings in the Economics of Agriculture*. Selected by a Committee of the American Economics Association. Homewood, Ill.; Richard D. Irwin, Inc. 1969. 517p. 27 articles.

1967

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1966

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1954

Frederick V. Waugh, editor. *Readings on Agricultural Marketing*. Ames, Iowa; Iowa State College Press, 1954. 456p. (Assembled and published under the sponsorship of the American Farm Economic Association) 1953.

Murray R. Benedict. *Farm Policies of the United States, 1790-1950: A Study of Their Origins and Developments*. New York; Twentieth Century Fund, 1953. 548p.

1949

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Implementing Results, Roles and Effects of the Chinese Agricultural Information Services Project

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Keywords: access to information; bibliographic databases

ABSTRACT: The results of the Project of Chinese Agricultural Information Services are presented and evaluated against the pre-defined goals. The evaluation was positive and the service has reached or exceeded its goals. It has played a key role in promoting the establishment of an agricultural scientech information system at the national level in China. An international evaluation team substantiated these findings and if support is continued, the project will play an important role in the development of Chinese agricultural information.

RÉSUMÉ: Cet article présente les résultats du projet des Services d'Information agricole chinois et les évalue par rapport aux buts pré-définis. L'évaluation a été positive et les services ont atteint ou dépassé leurs buts. Elle a joué un rôle primordial dans la promotion de la création d'un système national d'information agricole, scientifique et technique en Chine. Une équipe internationale d'évaluation a justifié ces résultats et, si le soutien est maintenu, ce projet jouera un rôle important dans le développement de l'information agricole chinoise.

RESUMEN: Se presentan los resultados del Proyecto de Servicios de Información Agrícola de China y se evalúan en relación con los objetivos definidos previamente. La evaluación fue positiva y el servicio logró o superó sus metas. El servicio ha jugado un papel crucial en promover el establecimiento de un sistema de información agrícola científica y técnica a nivel nacional, en China. Un equipo internacional de evaluación respaldó estos resultados; si se continúa recibiendo apoyo, el proyecto desempeñará una función im-

portante en el desarrollo de la información agrícola en China.

ZUSAMMENFASSUNG: Die Ergebnisse des Projektes des Chinese Agricultural Information Services werden präsentiert und mit den gesteckten Zielen verglichen. Die Bewertung war positiv und der Dienst hatte seine Ziele erreicht oder sogar überschritten. Er spielte eine Schlüsselrolle in der Gründung eines landwirtschaftlichen wissenschaftlich-technischen Informationssystems auf der nationalen Ebene in China. Ein internationales Auswertungsteam konkretisierte diese Erkenntnisse und wenn eine Förderung fortgesetzt wird, wird das Projekt eine wichtige Rolle in der Entwicklung der chinesischen landwirtschaftlichen Information spielen.

Introduction

The Chinese Academy of Agricultural Sciences (CAAS) and the International Development Research Center (IDRC) signed the Memorandum on the Project of the Chinese Agricultural Information Services on May 7, 1986. During the past four years, IDRC invested 358,000 Canadian dollars and CAAS invested 8,320,000 RMB Yuan to implement the Project. With efforts from both sides, the Project has been proceeding smoothly and the expected goals have been obtained (Figure 1).

Implementing Results of the Project

Establishment of the National AGRIS Center of China and the Seven Regional Subcenters – On the basis of investigation and discussions made by CAAS, China's National

AGRIS Center was set up in the Scientech Documentation and Information Center (SDIC). The seven Regional Subcenters are located at the Information Institute of Hebei Provincial Academy of Agricultural Sciences (North China), Information Institute of Liaoning Provincial Academy of Agricultural Sciences (Northeast China), Information Institute of Jiangsu Provincial Academy of Agricultural Sciences (East China), Information Institute of Hubei Provincial Academy of Agricultural Sciences (Central China), Information Institute of Guangdong Provincial Academy of Agricultural Sciences (South China), Information Institute of Shaanxi Provincial Academy of Agricultural Sciences (Northwest China), and Information Institute of Sichuan Provincial Academy of Agricultural Sciences (Southwest China). The tasks, roles and coordinating regulations were made at the same time. It was decided to hold a technical consultation meeting every year in one of the seven subcenters and the national center in rotation, starting from the national center. Since 1987, leaders of the National AGRIS Center and seven subcenters have held 4 consultation meetings to discuss and coordinate services and technical problems in the current year. With the support from IDRC, the national center and the seven subcenters all have their equipment conditions improved, quality of personnel enhanced and resources developed. Now, the national center has over 70 personnel of senior, medium and junior levels and

507 personnel in the subcenters who are working on the construction of the Chinese AGRIS system; thus, a backbone contingent of technicians has gradually formed which works effectively.

Strengthening of Agricultural Information Transmission Services – In line with the targets of the Project, SDIC has begun to publish a series of abstract journals of foreign agricultural literature and a series of abstract journals of Chinese agricultural literature. These include 6 branch journals of *Crop Genetics and Breeding*, *Agricultural Entomology*, *Soils and Fertilizers*, *Animal Science*, *Veterinary Medicine* and *Bulletin of Biological Technology*. The abstract journals of Chinese agricultural literature include *Food and Industrial Crops*, *Horticulture*, *Plant Protection*, *Soils and Fertilizers*, *Animal Science* as well as *Veterinary Medicine*; and a series of bibliographies including *Bibliography of Foreign Sciencetech Documents—Agriculture*, and *Bibliography of Chinese Sciencetech Documents—Agriculture*. Meanwhile, a journal which mainly carries general reviews of subject information in agriculture entitled *Information Research in Agriculture and Animal Husbandry* has been also published. About 90,000 records of agricultural information both in Chinese and foreign languages are reported and transmitted throughout the country each year. Among them, over 20,000 are abstracts, 70,000 bibliographic records and about 100 review papers on special topics. They all play an important role in exchange of information, learning of development trends and levels in various subjects and improving utilization of agricultural information. In addition, about 50,000 agricultural documents are copied and transmitted in microforms every year.

Preliminary Establishment of Computer System – More than 60% of the IDRC funding has been used for the establishment of a computer information system at the National AGRIS Center and the seven subcenters. The National AGRIS Center has been equipped with HP 3000/37

Figure 1 – Chinese Agricultural Information Services

Objectives

General

- To systematize the identifying, collecting and processing of significant agricultural literature produced in China;
- To effectively participate in the International Information System for Agricultural Science and Technology (AGRIS) in order that the world community will mutually benefit from this cooperative information exchange and to ensure that information can be rapidly and efficiently disseminated to users.

Specific

- To set up a National AGRIS Center in China to coordinate AGRIS related information activities throughout the country;
- To set up seven subcenters in the seven administrative regions of China to help the Sciencetech Documentation and Information Center (SDIC), CAAS in identifying, collecting and processing local agricultural information;
- To improve the facilities and resource conditions at the levels of both the national center and subcenters by upgrading the capability in handling and utilizing information;
- To train technical information personnel in AGRIS methodology and information sciences.

Products

- Chinese abstracts of both the Chinese and foreign agricultural literature
- National agricultural bibliography of China
- Agricultural review papers on specialized topics
- Project promotional brochure

Project Services

- Training of users
- SDI Services from AGRIS and CABI tapes
- Document delivery (paper and microform)
- Reference Services
- Translation Services
- AGRIS input

minicomputer, Asian Vectra, 55 MB Winchester, 404 MB and 571 MB disk drives, Chinese-English line printer and MINISIS software. This equipment has arrived here in succession since the second half of 1987 and has been installed, tested and put into operation. In autumn 1988, IDRC provided the National AGRIS Center and each of the seven subcenters with one IBM PS/II 50 microcomputer and Micro CDS/ISIS software in Chinese that has also been installed, tested, and put into operation. At the same time, the National AGRIS Center raised funds to purchase and install an HP 3000/70 minicomputer and necessary peripheral equipments based on the needs of the system. Presently, the computer information systems of the National AGRIS Cen-

ter and the seven subcenters have been preliminarily established. Various training workshops have been run and the computer processing of agricultural information has been done in a planned and organized way. Since late 1988, we have been sending floppy disks containing our data to the AGRIS Processing Unit. The establishment of the Chinese agricultural documentation database was started in 1989.

Improvement of Sharing of the Chinese Agricultural Information Resources – The National AGRIS Center and the seven subcenters coordinatively input Chinese agricultural information to AGRIS and CABI databases in a planned way. In 1985, the input was 714 records to AGRIS, however, in 1989, it increased to 4,500

and further to 6,000 records in 1990. The input in 1989 was 4.5 times that of 1985. However, its quality needs to be further improved. The input to CABI is 800 abstracts each year from 1985–1989. These selected Chinese agricultural information records inputted into the international agricultural databases can be quickly transmitted to various countries and regions the world over. Many users wrote to us for reference or copies of full texts.

Meanwhile, the products *AGRIN-DEX* and tapes from AGRIS and CABI are being used for on-line or off-line searching. They are well accepted by the users. At present, there are more than 270 permanent users of CABI and over 100 users to AGRIS for SDI.

Training a Personnel Contingent – Since December of 1986, with the support from IDRC, a number of personnel have been trained in various training courses at home and abroad such as on the use of AGRIS, MINISIS, CDS/ISIS, dBASE software and operation of HP 3000 minicomputers, Chinese characters input, documentation classification and indexing and so on. So far, 17 training courses have been held at home which had 588 participants. A backbone contingent for software and hardware development and pretreatment of documents now is taking shape formed by more than 100 personnel in the National AGRIS Center and the seven subcenters, including 28 senior, 46 medium, 49 junior technical staffs and 13 assistants. Many other information institutes in provincial (region or municipality) academies of agricultural sciences, library and information centers in universities and colleges and agricultural research stations have also trained their personnel for the processing and use of agricultural information products. This backbone contingent is gradually getting strong by the way of running more training courses taking on apprentices and on-the-spot teaching, thus providing more and more qualified personnel for fulfilling the tasks given by the National AGRIS Center

and developing agricultural information resources.

Speeding up the Construction of Database for Agricultural Documents – Since there has been equipment and qualified personnel, the construction of database of the agricultural documents has been implemented quickly. In addition to the input to AGRIS, the National AGRIS Center organized the seven subcenters, according to regions and common standards, to select and process locally produced agricultural documents using floppy disks which are sent to the National AGRIS Center for examination and then input to the main database run by HP 3000 minicomputer. Now, there are more than 40,000 bibliographic records inputted into the Chinese agricultural documents database; 2,000 abstracts in the database of scientech achievements in agriculture, animal husbandry and fisheries; 3,000 abstracts in agricultural abstracts database. In addition, CABI and AGRIS databases have also been established. All these databases have begun to serve users and try long distance on-line retrieval with good results produced and the users satisfied.

Integrate Processing of the Database – So far, there are 6 journals such as the *Bibliographies of Chinese Agricultural Documents* and the *Chinese Agricultural Abstracts*, that are edited, and composed all in one integrated process by computers. To accomplish this, a series of programmes have been developed. They are the programme for integration of database construction, and composition; the editing programme for construction of subject classification; the programme for automatic formation of the subject index which uses 9 function keys to limit the range of searching points in order to ensure the searching quality and increase indexing efficiency; and the programme for numbering each record to help accurately edit the database.

Promoting International Exchange and Cooperation - During the implementation of the Project with the IDRC's support, we joined the

Fifth and Sixth Technical Consultation of AGRIS, and three annual MINISIS users' groups meetings. We attended the IAALD Regional Conference: Strategic Issues in Agricultural Information with Special Reference to Developing Countries and the International Plant Protection Information Symposium sponsored by CABI in 1988. At the same time, we visited the IDRC Regional Office in Singapore and AIBA. Through these international meetings and visits, we learned development levels and trends of agricultural information of science and technology, exchanged ideas and experiences with foreign friends. All of these activities are beneficial for improving Chinese agricultural information services.

A Preliminary Analysis of the Implementing Results

With the mutual efforts and close cooperation from both IDRC and China, the Project has reached its expected targets, with some items exceeding the set targets. For example, the Project planned to offer HP 3000 / 37 minicomputer for the National AGRIS Center, however, China raised funds by herself to add another HP 3000 / 70 minicomputer; data in the Chinese agricultural documentation database are two times greater than that in the original plan; the input to AGRIS has also surpassed 4,000 records set for the fourth year; and the data transmitted annually by the National AGRIS Center are 80% more than the planned 50,000 records. In general, the Project has been developing satisfactorily and realized its original expectations. Success of the Project is attributable to its correct guiding thought, namely, to concentrate the limited funds first for the establishment of the National AGRIS Center, and then, organize the seven subcenters to form a powerful radiative source and gradually extend its influencing range. The implementing results of the first phase of the Project will have far reaching effects in the development of the Chinese

Agricultural Information Services. The reasons are as follows:

- The construction of the National AGRIS Center has a considerable scale as a basis to effectively organize and coordinate agricultural information services throughout the country. Its information products and technical rules may not only serve the agricultural information users, but also play a leading and demonstrating role in the development of agricultural information system of the country. The establishment of the seven subcenters makes the National AGRIS Center even more powerful, thus forming an agricultural information network above the provincial level, with the National AGRIS Center as the main body and the seven subcenters as its key branches. This network as a whole will play an even greater role with improvement of the equipment conditions, in realization of on-line and off-line retrieval of agricultural information in China.

- During the first phase of the Project, a procedure was developed to input the Chinese agricultural information in to AGRIS and CABI databases in a planned way, and created conditions for introducing the information products from AGRIS and CABI to China. Actually, this has opened the path for common sharing of the Chinese agricultural information resources. Users who can not read Chinese may learn the Chinese agricultural research highlights and experiences from our English bibliographies and abstracts through the international agricultural databases. The first phase of the Project supported by IDRC has a very good beginning for the development of the Chinese agricultural information resources. To use it as a basis, the results of common sharing of the Chinese agricultural information resources will be gradually extended.

- The construction of the Chinese agricultural documentation database will provide to the agricultural information units, at provincial level for their local database construction with the experience and technique, including skills and specifications for pre-

treatment, the Chinese agricultural thesaurus and its indexing, as well as development of software. Meanwhile, the national center and the seven subcenters will successively sum up their experiences and solve new problems during its advancement, distribute periodically technical bulletins to agricultural information units throughout the country and run technical training sources so continuously improve the computer retrieval system of the Chinese agricultural documents.

- At present, the technical contingent of 100 personnel on pretreatment and input data, hardware and software in the National AGRIS Center and the seven subcenters can not only fulfill their own tasks but also plays the role of a disseminator to spread techniques to various parts of the country. Therefore, the strengthening and enlarging of this contingent will have even greater effects on the construction of the Chinese agricultural information cause.

Important Role of Agricultural Sciencetech Information on the Development of China's Agriculture

China has a population of 1.1 billion, of whom over 80% are in rural areas. Bumper harvest or shortfall in grain production directly influences the developing rate of national economy of the country. In most cases, a prosperous or depressed economy in China has its background in the increase and decrease of output of agricultural production in the current year or in the previous year.

Large population with relatively small arable land resources is one of the serious problems now in China's agriculture. What is the solution? The solution may be birth control to limit the increase of population on one hand, and on the other hand, we should rely on good policies, on science and technology and more input.

From a long-term point of view, science, technology and input are essential, and science and technology has tremendous potentials. Today, sci-

ence and technology are developing rapidly in the world, therefore, to solve the problem of agriculture that concerns rise and decline of the country by relying on science and technology should take unprecedented importance on the agenda. In order to settle the living problem of 1.1 billion people on a relatively small area of arable land, great efforts should be spent on enhancing agricultural productivity, increasing crop yield and effectively using agricultural resources. In some high yield areas, the grain output is 15 tons per hectare. If there is no important breakthrough in technology, it will be very difficult to further increase the yield. For the development of science and technology, sciencetech information is essential. There are almost 250,000 agricultural papers published in the world each year. And during the last decade, there were more than 25,000 major agricultural achievements and about 40,000 agricultural papers produced in China each year. This is a tremendous potential productivity in agriculture. The most important thing is to timely disseminate the advanced and practical techniques and information to millions of farmers and technicians. Since 1985, IDRC has supported the Chinese Agricultural Information Services. This conforms to the needs of the development of Chinese agriculture and has produced significant results. It is an act of foresight and strategic considerations.

China is a large agricultural information market. There are several million current information users and dozens of millions of potential users. Audio-video materials are welcomed by users at and below the county level. Literal information market is getting more and more brisk in rural areas. Distribution of the *Bulletin of Agricultural Science and Technology* is distributed in 470,000 copies. The *Farmer Abstracts* was once distributed at 1.2 million copies. Electrical information products are also welcomed by scientists, teachers and students above the provincial level. To support the Chinese Agricultural Information Services will promote

the expansion and flourishing of the Chinese agricultural information market and will achieve even greater social and economic benefits.

Conclusions on the Project Drawn by the International Evaluation Team

In order to summarize the achievements and experiences obtained in this Project and to further strengthen the construction of Chinese agricultural information, IDRC and SDIC-CAAS jointly invited Dr. Syed Salim Agha, Prof. Zeng Minzu, Dr. Josephine C. Sison and Professor Jiang Xiangdong to form an international evaluation team to make an evaluation of the Project during 17–21 March 1990 after they had participated the International Symposium on New Horizons in Agricultural Information Management held in Beijing.

The evaluation team headed by Dr. Syed Salim Agha wrote a report in which they made a serious and objective evaluation on the achievements of the Project and the existing problems, and put forth beneficial recommendations on the future de-

Figure 2 – Recommendations of the Evaluation Team

- Enhancement of communication links between the national centre and various subcentres to enlarge their functions, and enhancement of computer equipment at subcentres to enable them to maintain local databases for effective document delivery and information services.
 - Enhancement of constructing Chinese documentation databases. The existing Chinese agricultural document resources should not be neglected and they should be processed to be machine readable in order to increase their availability.
 - To create user awareness and publicity of the value of agricultural information, to strengthen user training and to provide more terminals for users to conduct searches by themselves.
 - Acquisition of databases in CD-ROM for the centre or subcentres which do not have enough computer space for local agricultural information services.
 - Enhancing the establishment of non-bibliographic databases, such as factual and numerical databases.
-

velopment of the Project. The evaluation team is of the opinion that the implementation of the Project of the Chinese Agricultural Information Services has far exceeded the preset targets and has successfully established China's national AGRIS centre and seven subcentres which can effectively conduct services in information provision and document delivery. The effect of the Project on the users is positive. The results of the Project has created favorable conditions for enhancing the construc-

tion of the Chinese agricultural information and documentation database, expansion of users, and gradual increase of inputs of Chinese agricultural documents to AGRIS.

The evaluation team believes that the reasons are evident for continuing support for the construction of the Chinese agricultural information systems in order to enhance further development and effective services for China's agriculture.

Training for a Changing Environment:

The Challenges in a Decentralized System

Margaret L. Morton

Keywords: professional development; staff development; microcomputers; information services

ABSTRACT: The need to maintain and update the skills of professional staff in a changing technological environment presents special training problems in an agricultural library system that is widely spread geographically. Maintaining standards of service and the compatibility and transportability of data requires consistency of approach among network nodes for highest effectiveness. The problems of coordinating commercial, departmental, and in-house training are discussed with primary emphasis on microcomputer applications and on-line searching for front line staff. The development of in-house training standards and schedules for both searching and for local microcomputer applications is outlined. The resolution of questions on shared funding with host establishments is described, as is the training of end users to access and exploit network information services in the absence of intermediaries. The use of electronic mail to hasten document delivery and the introduction of CD-ROM facilities to end users is discussed.

RÉSUMÉ: La nécessité de maintenir et de mettre à jour les compétences du personnel professionnel dans un environnement technologique changeant, présente des problèmes spéciaux de formation au sein d'une bibliothèque agricole répartie géographiquement. Maintenir les normes de service, de compatibilité et de transport des données exige une approche cohérente au sein des noeuds de réseaux pour

avoir un maximum d'efficacité. Les problèmes de coordination entre la formation interne d'un service et la formation commerciale sont étudiés avec un accent particulier sur les applications informatiques et les recherches en-ligne pour le personnel en première ligne. Le développement des normes et des programmes de formation interne pour la recherche en-ligne et les applications informatiques est défini. La solution aux questions sur le partage des fonds avec les établissement-hôtes est décrite ainsi que la formation des utilisateurs à l'accès et à l'exploitation des services d'information des réseaux en l'absence d'intermédiaires. L'usage du courrier électronique pour accélérer la distribution de document est étudié ainsi que l'introduction des utilisateurs aux facilités CD-ROM.

RESUMEN: La necesidad de mantener y actualizar las habilidades del personal profesional en el ambiente tecnológico cambiante de un sistema de bibliotecas agrícolas, ampliamente difundido a nivel geográfico, presenta problemas de capacitación especiales. Para lograr mayor efectividad, el mantenimiento de los estándares de servicio y la compatibilidad y el transporte de los datos requieren un enfoque uniforme entre los nodos de la red. Se discuten los problemas inherentes a la coordinación de la capacitación comercial, departamental e interna de personal de referencia, con énfasis en aplicaciones para microcomputador y en búsquedas en línea. Se esboza el desarrollo de estándares y calendarios de capacitación interna tanto para búsquedas como para aplicaciones locales en microcomputador. Se resuelven interrogantes sobre recursos financieros compartidos con establecimientos que ofrecen la

capacitación, y se describe la capacitación a los usuarios en el uso y explotación sin intermediarios de los servicios de las redes de información. Se discuten el uso del correo electrónico para acelerar el envío de documentos y la introducción de equipo de CD-ROM al servicio de los usuarios.

ZUSAMMENFASSUNG: Die Notwendigkeit, die Fachkenntnisse des Fachpersonals in einer sich wandelnden technologischen Umwelt zu erhalten und zu aktualisieren, hat besondere Ausbildungsprobleme in einem landwirtschaftlichen Bibliothekssystem, das geographisch weit zerstreut ist, zur Folge. Die Fortschreibung von Dienstleistungsstandards, die Kompatibilität und die Transportfähigkeit von Daten machen eine Übereinstimmung von Verfahrensweisen zwischen Netzwerknoten für eine maximale Effizienz erforderlich. Die Probleme der Koordination kommerzieller, ministerieller und hausinterner Ausbildung werden diskutiert, wobei der Schwerpunkt auf Anwendungsmöglichkeiten von Mikrocomputern und Online-Recherchen für Spitzenpersonal liegt. Ein Überblick wird über die Entwicklung von hausinternen Ausbildungsstandards und -plänen sowohl hinsichtlich des Recherchierens als auch hinsichtlich der Anwendungsmöglichkeiten lokaler Mikrocomputer gegeben. Die Lösung von Problemen bei gemeinsamen Mitteln mit Hostunternehmen wie auch die Schulung von Endbenutzern auf Zugriff und Nutzbarmachung von Netzinformationssystemen ohne Vermittler werden beschrieben. Außerdem werden die Verwendung elektronischer Versendungsarten zur Beschleunigung der Dokumentenlieferung und die durch Einführung von

The library system of Agriculture Canada is a large one, consisting of a Central Library in Ottawa, thirty permanently staffed field libraries and some twenty-four libraries that are regularly serviced by library staff. The system is very widely spread geographically, from Newfoundland on the east coast to British Columbia on the west, a distance of more than 7,000 kilometers. The whole system makes up the Libraries Division, which is functionally responsible for all library services in a department of more than 11,000 employees. All formal library staff belong to the Division (about 90 people) but some client branches assist with their own staff, usually on a part-time or occasional basis. The budget of the Division is roughly \$4.5 million, about \$3 million for salary costs and a large portion of the rest for acquisition costs. About 1,300 monographs and 4,000 current periodicals are acquired annually for the Central Library, mostly in agriculture, food and the biological sciences. The Central Library is the resource collection for the entire system but at least an equivalent dollar amount is paid by individual research stations for the collections and facilities in Field Libraries. The funding split is important because half of the Libraries Division staff is physically located in the Field Libraries. The Division pays all library staff costs and the host stations pay for the equipment and communications that tie the whole system together.

As the result of successive restraint programs affecting the whole Department, the Division has had to deal with personnel cuts (10% since 1981, 20% since 1976) and with a stagnant operating budget since fiscal year 1983/84. The only way that services have been maintained in the face of such constraints is by the adoption of new technology. Because of government policy, however, the "old" existing staff was a given even under changed working conditions.

Even without this constraint the job market could not supply the mix of skills and subject knowledge that was needed. Fortunately, the staff of the Division was and is of excellent quality so the major problem was *how* to train for the new technology, and not *who*.

Because there was already a program of orientation and in-house training, a shift of focus to "new technology" seemed a natural move. For these purposes "new technology" covers on-line searching, word processing, a dedicated in-house Geac minicomputer, electronic communications through the Departments private X-25 network and the use of microcomputers for library applications. Each of these has its own training demands that are met through various combinations of in-house training sessions, external courses, and hands-on experience.

The ones that called for formalized in-house training modules, however, were on-line searching and microcomputer training. The reason—standards and value-for-money: standards because of the integration of processes and services across the system and because of the policy of uniform accessibility and uniform levels of service no matter where; value-for-money because of the shared funding for both on-line searching and microcomputer applications. Because the research stations pay for hardware, software, and communication costs and the Division pays for staff and staff training, it was very important to have a careful, considered, and thrifty approach to the introduction of either service. In both cases the development of the training packages followed the same pattern: identification of needs, of existing skills within the Division, and of complementary external training; development of curriculum contents, modules and schedules; negotiation of agreements with research stations; multi-year budgeting; and follow-up and refresher training.

The whole process for the on-line training course began with an extensive cost-benefit analysis of alternative ways of delivering the services, followed by a pilot course in 1981

that ultimately resulted in AgriSearch. AgriSearch is a two-week course given in Ottawa in either English or French, preceded by background reading and followed by advice and backup as necessary by the course trainers. The choice of database vendors was easy and limited to two—Dialog and Can/Ole. Databases available only on other vendor services continue to be searched by Central Library staff on an as-required basis.

AgriSearch Training

The AgriSearch course includes instruction in both system protocols and database content. The database structure of Biological and Chemical Abstracts, Agricola and CABI are emphasized. There are two course instructors, with additional assistance provided by the reference staff. One week is reserved for Can/Ole and the other for Dialog. Extensive hands-on experience is provided to the trainee. To-date, seventeen (17) field library staff members have received training at the average cost to the Division of \$4,000. This sum includes travel and accommodation, trainers and trainees salaries and on-line costs. Each trained field library staff member receives an average budget of \$3,000 per year per site which is contributed by the Research Station.

There have been no major identifiable problems with the AgriSearch programme. Each trainer has had extensive experience in searching agricultural, biological and food science databases and each brings a particular set of abilities as a result of this experience. Of particular value is the fact that the individuals involved know each other personally, if only by telephone or electronic mail. One slight drawback could be that one individual being trained may need more on-line connect time than another and could benefit by additional days of training.

The AgriSearch programme has proven both viable and rewarding to all participants. In the future, the course could be teamed with the microcomputer software course to form a sort

of "super course" in several satisfying applications of librarianship.

Microcomputer Training

The choice of software for microcomputer applications for libraries was considerably more complicated than the choices for on-line searching, although it followed the same type of study. The Department itself is highly standardized in the choice of hardware and software for general applications. For Divisional use, the systems staff reviewed and tested promising library software, or specific applications of more general packages, and developed a set of recommended software for all libraries in the system. For this set, the Division commits itself to provide advice, assistance and currency for all library users. The micro training course also lasts 10 working days although training has been introduced as it has become cheaper and more available.

Between March 1988 and November 1989, 10 professional librarians from the field received the micro-training course. This course was prepared and given by a core group of 2 librarians in the Division assisted by other members of the Systems group. The course was made up of the following modules:

<i>Category / Software</i>	<i>Training Time</i>
<i>DOS & Utility Programs</i>	
DOS 4.0	1 Day
XtreePro	1.5 Hours
Fixed Disk Organizer	1 Hour
<i>Word Processing</i>	
WordPerfect	2 Days
<i>Telecommunications</i>	
Crosstalk XV1	2 Hours
or Smarterm 240	2 Hours
Personal Editor II	2 Hours
<i>Spreadsheets</i>	
Lotus 1-2-3	1 Day
<i>Database Management</i>	
dBase IV	4 Days

Demonstrations

Fastback Plus	1 Hour
Pro-Cite	1 Hour
Harvard Graphics	1 Hour
Total Training Time	10 DAYS

Besides the 10 day courses, approximately 15 library staff received a 1/2-day to a 3-day training session in various microcomputer applications, depending on their needs. Approximately 75 days were spent, as well, by library staff members training, in turn, other staff members in microcomputer applications over the past 2 years. This does not take into account the informal training done on a day-to-day basis.

The entry of commercial training at competitive costs has given greater flexibility to the general training plan. To permit the replacement of the old stand-alone word processing system by microcomputers, 24 library staff received (or will receive) a 2.5 day training on WordPerfect between February and June, 1990. This course is contracted out but is being given on-site. The total cost of this training will be \$5,150.

A typical microcomputer workstation, including hardware and software, now costs between \$6,800-\$9,000, depending on the choice of configuration. These configurations include the latest IBMPS/2 model 55SX computer equipped with a 60MB hard disk, one diskette drive, 2MB of memory, a letter quality dot-matrix printer and all the major software used by the Division: WordPerfect, dBase, Lotus, DOS, Smarterm 240, XtreePro, Fixed Disk Organizer. The highest quotation includes a color monitor and a tape backup unit. The lowest quotation includes a black and white monitor and a package to make backups on diskettes instead of tapes.

One major problem, which will continue, is the introduction of new software into the system. Individually, all staff are highly motivated

and enterprising and do nominate candidates for inclusion in the tool kit from their own experience. Because the systems staff of the Division is so small, time to assess new applications is very limited. Asking would-be sponsors to run field trials and report back performance against standard needs has been quite successful. The basic requirement is that the approved software be learned and used for all major applications. Local diversity is recognized as a fact of creative life, if not actively encouraged, as long as the primary needs of the users are being satisfied.

End User Training

Up until now, the training offered to end users has been limited to general orientation tutorials, seminars and demonstrations on the use of Agri-Cat, our union catalogue, and Agri-Doc, the protocol developed for the document request carried by electronic mail on AgriNet, the private departmental communications network.

With the use of CD-ROMs beginning to take hold, new possibilities for end user access at fixed costs have arrived. The equipment and the data bases have been assembled in both the Central Library and a growing number of Field Libraries. End users are being actively encouraged to use this technology by both formal orientation sessions and personal hands-on exploration. It is too early to predict the ultimate changes which this sort of access will mean to the organization as a whole. It is safe to say, however, the changes in the technology itself, along with rising communication costs, will assure the continuing development of new training approaches to maintain the relevance of the libraries to the Department and to the Canadian agricultural community at large.

Optical Technology: New Ways of Providing Information to the End User

Pamela Q.J. André

Keywords: optical disks; information storage; optical scanners

ABSTRACT: The National Agricultural Text Digitizing Project was designed to test the premise that optical imaging with distribution on CD-ROM held the greatest potential for information delivery. The effectiveness of optical discs as a storage medium and the enhanced accessibility due to sophisticated computer retrieval software made possible this major cooperative project involving NAL and forty-five land grant libraries. The purpose of this project was to test the feasibility, costs and effectiveness of newly emerging technologies for capturing page images, providing access to their content and disseminating them via CD-ROM. The project utilizes optical scanning technology to capture text material which is indexed and stored on CD-ROM discs for dissemination to the agricultural community. Documents on aquaculture, Agent Orange, and acid rain have been scanned during this two-year project. A variety of issues have been raised regarding the effectiveness of these technologies for developing and disseminating full text databases including the need for a basic low-cost retrieval workstation, standards for image material, a standard user interface and the capability to provide long-term archival storage for electronic media. These issues are discussed from the end user's viewpoint.

RÉSUMÉ: Le projet national de digitalisation du texte agricole a été prévu pour tester la prédiction que l'image optique distribué, sur CD-ROM, détient le plus grand potentiel pour la diffusion de l'information. L'efficacité des disques optiques comme support de stockage et la meilleure accessibilité dues aux logiciels d'interrogation sophistiqués ont rendu possible ce grand projet coopératif impliquant la NAL et quarante-cinq bibliothèques de prêt. Le but de ce projet était de tester la faisabilité, les coûts et l'efficacité des nouvelles technologies qui

émergent pour capturer des pages d'images, donner un accès à leur contenu et les diffuser via CD-ROM. Ce projet utilise la technologie du lecteur optique pour capturer des textes indexés et stockés sur disques CD-ROM, pour la diffusion à la communauté agricole. Des documents sur l'aquaculture, l'agent orange et les pluies acides ont été balayés pendant les deux années de ce projet. Une variété de questions ont été soulevées concernant l'efficacité de ces technologies dans le développement et la diffusion des banques de données plein texte, ainsi que le besoin d'un poste d'interrogation bon marché, les normes de matériel optique, une interface standard pour l'utilisateur et la possibilité de stocker, à long-terme, des archives pour les médias électroniques.

RESUMEN: El Proyecto Nacional de Digitalización de Textos Agrícolas se diseñó para probar la premisa de que la formación óptica de imágenes con distribución en CD-ROM posee el mayor potencial para envío de información. La efectividad de los discos ópticos como medio de almacenamiento, y el mayor acceso que brindan los sofisticados programas de recuperación de información en computador, hicieron posible la realización de este importante proyecto colaborativo, que involucra a la NAL y a cuarenta y cinco bibliotecas patrocinadas por el estado. El objetivo de este proyecto fue evaluar la factibilidad, el costo y la efectividad de las nuevas tecnologías para captar imágenes de página, proporcionar acceso a su contenido y difundirlo via CD-ROM. El proyecto utiliza tecnología de lectura óptica de caracteres para captar el material de texto, asignarle descriptores y almacenarlo posteriormente en discos compactos (CD-ROM) para dissemination a la comunidad agrícola. Durante este proyecto de dos años, se ha hecho lectura óptica de documentos en acuicultura, agente naranja y lluvia ácida. Han surgido varios interrogantes con respecto a la efectividad de estas tecnologías para el desarrollo y dissemination de bases de datos de texto completo, como la necesidad de una terminal básica de recuperación de bajo costo, de están-

dares para el material que contiene ilustraciones, de una interfase estándar para el usuario y la capacidad de almacenar, a largo plazo, archivos en medio electrónico. Se discuten estos aspectos desde el punto de vista del usuario.

ZUSAMMENFASSUNG: Das National Agricultural Text Digitizing Project wurde geplant, um die Prämisse zu testen, daß die optische Aufzeichnung bei der Informationsverbreitung über CD-ROM die größten potentiellen Möglichkeiten bietet. Die Leistungsfähigkeit optischer Disketten als Speichermedien und die erweiterten Zugriffsmöglichkeiten dank verfeinerter Computer-Retrievalsoftware machten dieses umfangreiche Kooperationsprojekt möglich, das NAL und 45 staatlich unterstützte Bibliotheken einschließt. Der Zweck dieses Projektes war, die Durchführbarkeit, die Kosten und die Effizienz neu auftauchender Technologien für die bildmäßige Erfassung von Seiten zu testen, die Zugang zu deren Inhalt geben und die Verteilung via CD-ROM ermöglichen. Das Projekt verwendet optische Scanningtechnologien zur Texterfassung, der auf CD-ROM-Disketten indexiert und gespeichert wird und an Landgemeinden verteilt werden soll. Dokumente über Aquakultur, agent orange und sauren Regen sind während dieses Zweijahresprojektes abgefragt worden. Eine Vielzahl von Problemen ist hinsichtlich der Effizienz dieser Technologien zur Entwicklung und Verbreitung von Volltext-Datenbasen aufgetreten, einschließlich des Bedarfs an Informationsvermittlungsstellen mit niedrigen Grundkosten, Standards für die bildmäßige Erfassung, den Anwenderanschluß und die Fähigkeit einer Langzeitarchivspeicherung für elektronische Medien. Diese Probleme werden aus der Sicht des Endnutzers diskutiert.

Introduction

Providing access to information is a primary role of libraries. In spite of this, little headway has been made in putting material into machine-

readable form and providing direct access through computer retrieval. Three years ago, the National Agricultural Library (NAL) began a series of projects to investigate providing computer access to full text and graphic information. The first project utilized optical digital videodisc as a storage medium for text and graphics with access provided via microcomputer. Two discs have been completed and are being used in various university libraries. A second videodisc project resulted in the development of an analog videodisc of graphic materials from the Forest Service Photograph Collection. In addition, work with Compact Disc-Read Only Memory (CD-ROM) gave greater insight into retrieval success.

National Agricultural Text Digitizing Project

Overview – The National Agricultural Text Digitizing Project (NATDP) was a natural extension of earlier activities. The experiences with both digital videodisc and CD-ROM technology reinforced the idea that optical technologies have tremendous potential in the libraries of the future in terms of both preservation of materials and enhanced access to those materials. Having experienced the ease of use and the fast response time of CD-ROM technology, and tremendous frustration associated with preparing textual databases from machine-readable source files, we became interested in optical technologies for developing and distributing machine readable text materials for agriculture.

As a result, NAL and forty-five land grant libraries entered into a three-phase cooperative project to test the feasibility, costs and effectiveness of emerging optical technologies for capturing page images, providing access to their content and disseminating them on CD-ROM to be made available to both library staff and end-users.

The project was organized into three phases. Phase I, the pilot project, tested an optical scanning system and a number of indexing-search

software systems with a variety of high visibility agricultural materials. The first collection to be scanned was on aquaculture. Four thousand pages of the most important, non-copyrighted, aquaculture material were scanned and digitized. Both the page images and the ASCII text were mastered onto a CD-ROM using the TEXTWARE software, by UNIBASE.

A second CD-ROM has been created in conjunction with the Consultative Group on International Agricultural Research (CGIAR). The material for this disc consisted of the most important papers on international agricultural research as determined by the CGIAR centers. CGIAR is an association dedicated to supporting a system of agricultural research centers around the world with the purpose of improving the quantity and quality of food production in developing countries. It is supported by the World Bank and the United Nations. This disc uses the KAWARE 2 retrieval software by Knowledge Access.

A third CD-ROM disc has been developed on the topic of Agent Orange. This is a very important historical collection on the creation and use of this chemical defoliant. The collection currently resides in boxes at NAL due to lack of funds for processing. This project provided an opportunity to make some part of the collection available. The software used for this disc was Personal Librarian by Personal Library Software.

An in-depth evaluation of each CD-ROM distributed as part of the pilot project will be completed by Iowa State University. A variety of issues are being addressed during the evaluation including cost comparisons of image versus text and user satisfaction with retrieval software.

The pilot is structured with two levels of workstation based on the special proprietary nature of high resolution image handling. Five test sites will have high resolution workstations with the capability to display and print page images that are as readable as the originals. The remaining sites have standard microcom-

puter workstations that can view text and a lower quality image.

In Phase II of the project, the University of Vermont completed an in-depth project on acid rain materials. Utilizing funding from U.S. Department of Education grants program, this aspect of the project used a vendor to capture text and image data from a major collection of Canadian research materials on acid rain. This two-disc set is accessed using the retrieval package KAWARE 2 by Knowledge Access.

Phase III of the project focuses on alternative delivery mechanisms using telecommunications. Dr Clifford Lynch, Director of Library Automation, the University of California System, completed a state-of-the-art survey of telecommunications options for transmission of digital data. Based upon the results of this report, NAL and North Carolina State University have begun a project to test the feasibility of transmitting document images over the U.S. National Science Foundation network known as the INTERNET.

Operations – The scanning facility was installed at NAL in January 1988. It is a microcomputer based optical scanning system integrated by Science Applications International, Corp. The system uses a PC AT 286 microcomputer with the DOS 3.1 operating system to manage the scanning control documentation identification and editing. The scanner is a RICOH high speed flatbed scanner that scans at 300 dots per inch (DPI). Images are stored using CCITT group 4 standard compression. The text conversion is handled by the CALERA compound document processor that converts the page images to digitized ASCII code. The image handling, including compression and decompression is done by the LaserData image subsystem resident on the microcomputer. All image and converted text materials are stored on optical disc. The system uses a Maxton 5-1/4 write-once-read-many (WORM) for this purpose. A RICOH laser printer is used for printing page images at 300 DPI, thus ensuring a print copy

that is as high quality as the original version.

This system was used to scan and convert materials for the Aquaculture and Agent Orange discs. The data for CGIAR and Acid Rain discs were handled by contract due to time constraints.

Usage Issues – As the completion date for the pilot project draws near, it is clear that the project has raised almost as many questions as it has answered.

The experience with optical character recognition (OCR) showed that present conversion methods do not deliver acceptable conversion quality for historical material. The accuracy rate for the Aquaculture and Agent Orange materials that were converted via scanning and OCR was 90%. This material was corrected manually to 100%. The accuracy rate for CGIAR and Acid Rain materials that were converted by keyboarding was 100%. High quality content is an obvious user requirement.

The delivery and display of high

resolution (300 DPI) images was very effective on the high resolution monitor using proprietary image handling software. However, the cost of the retrieval workstation was very high. Delivery of images on standard PC workstations with EGA or VGA monitors was not so effective. The need for a low-end, low cost workstation that allows display of a high resolution (300 DPI) image is critical to the continuation of information delivery using scanned images.

Related to the issue of effective image delivery and display is the issue of image standards. At this time there is no standard for image data. The effect was a nightmare of complications in the effort to deliver high resolution images with several different retrieval packages. Since the proprietary high resolution image handling capability was part of the image capture system but not part of the retrieval systems, extensive interface software was necessary to ensure that images could be displayed.

Information retrieval is another

issue not clearly resolved during the pilot project. Three retrieval packages were tested and all were found to have flaws. Work is now underway, with contract help, to identify a retrieval package to be used with future products.

A final issue relates to preservation and longevity requirements. Optical discs, although promoted to last 50–100 years, have not been proven as long term archival media. It is not clear now how long they will last. However, plans are underway to design an archival system using WORM media that will effectively monitor the stability of the discs and simply rewrite them prior to the point at which degradation is anticipated.

NAL believes strongly that image data and optical disc storage media hold the key for information storage and delivery in the future and we are committed to the effective use of these technologies in the present.

Information Needs in Agriculture and Markets for CD-ROM Products: Results of a Joint Market Study

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Keywords: Optical data disks; user needs (information)

ABSTRACT: A major market study was conducted by the CGIAR Secretariat and Digital Publications in the Summer of 1989 to assess the information needs in agriculture in the developing and developed countries, and to relate these needs to the potential for CD-ROM products. The survey was sent to twelve hundred libraries and research centers worldwide. Respondents were asked to provide detailed information on current information resources and practices. They were also asked to assess the needs and markets for two major types of documents on CD-ROM, primary journal literature and reports for the CGIAR Centers. The data from that study are discussed in two primary contexts: a comparison of the needs data with the report conducted for CGIAR by Aspen Corporation in 1987, and an analysis of current information resources and practices; and an analysis of the climate for newer technologies such as CD-ROM in the provision of information to the agricultural community.

RÉSUMÉ: Le Secrétariat du CGIAR et les Publications Digital ont mené, en été 1989, une importante étude de marché afin d'évaluer les besoins en information agricole dans les pays développés et en développement, et de faire le lien entre ces besoins et le potentiel pour les produits CD-ROM. L'enquête a été effectuée auprès de 1200 bibliothèques et centres de recherche dans le monde. Les réponses devaient fournir une information détaillée sur les ressources et pratiques documentaires existantes, et évaluer les besoins et le marché pour deux principaux types de document sur CD-ROM: documents primaires de périodiques, et rapports pour les Centres CGIAR. Les résultats de cette

enquête sont analysés de deux manières: comparer les besoins avec le rapport effectué par Aspen Corporation en 1987 pour le CGIAR et l'analyse des ressources et pratiques documentaires existantes, et l'analyse du climat pour de nouvelles technologies telles que le CD-ROM, véhicule d'information pour la communauté agricole.

RESUMEN: En el verano de 1989, el Secretariado del GCIAR y Digital Publications realizaron un importante estudio de mercado para evaluar las necesidades de información en el área agrícola de los países desarrollados y en desarrollo, y para relacionar estas necesidades con el potencial de los productos en CD-ROM. Se envió una encuesta a 1200 bibliotecas y centros de investigación de todo el mundo. Se solicitó a los encuestados que proporcionaran información detallada sobre las prácticas y los recursos de información utilizados actualmente. También se les pidió que evaluaran las necesidades y el mercado de dos tipos importantes de documentos en CD-ROM, como son la literatura primaria de publicaciones periódicas y los informes para los Centros pertenecientes al GCIAR. Se discuten los datos de ese estudio en dos contextos primarios: en el primero, se comparan las necesidades con el informe realizado para el GCIAR por Aspen Corporation en 1987, y se analizan los recursos de información y las prácticas utilizadas por los encuestados en la actualidad; en el segundo, se analiza el ambiente para introducir tecnologías más recientes, como el CD-ROM, para proporcionar información a la comunidad agrícola.

ZUSAMMENFASSUNG: Im Sommer 1989 wurde eine größere Marktstudie vom CGIAR Secretariat und von Digital Publications durchgeführt, um die Informationsbedürfnisse der Landwirtschaft in den Entwicklungs- und Industrieländern zu ermitteln und um diese Bedürfnisse mit den Möglichkeiten für CD-ROM-Produkte in Beziehung zu bringen. Die Erhebung wurde

1200 Bibliotheken und Forschungszentren in der Welt zugeschickt. Die Angehörigen wurden gebeten, detaillierte Informationen über ihre Informationsquellen und Praktiken zu liefern. Sie wurden außerdem gebeten, die Bedürfnisse und Märkte für zwei größere Dokumententypen auf CD-ROM, primäre Zeitschriftenliteratur und Berichte für die CGIAR Zentren zu schätzen. Die Angaben aus dieser Studie werden unter den beiden Hauptgesichtspunkten diskutiert: Vergleich der Angaben über die Bedürfnisse mit dem Bericht, der für CGIAR durch die Aspen Corporation im Jahre 1987 durchgeführt wurde, sowie eine Analyse der gegenwärtigen Informationsquellen und Praktiken, außerdem wurden praktische Voraussetzungen für neuere Technologien wie CD-ROM zur Informationsversorgung der landwirtschaftlichen Gemeinden analysiert.

Introduction

The Consultative Group on International Agricultural Research (CGIAR) is a group of 40 donor agencies which funds 13 agricultural research centers worldwide. Over the last 25 years these 13 centers and an additional 7 centers with closely related research programs have published over 25,000 scientific and technical publications documenting their research results.

In the 1980's there was increasing demand for center publications. Unfortunately, many older materials were hard to identify and harder to locate. Most were not included in the major agricultural databases, nor were they held by most agricultural libraries.

In response to a request from the World Bank, the CGIAR secretariat contacted centers to see if there was any enthusiasm for establishing a pro-

gram to develop "portable libraries" of center publications that could be made available to scientists, libraries, and documentation centers all over the world. Donors would be asked to support production of a basic set. In developing countries distribution of the basic set and supplements could be subsidized. Income from sales of the basic set in developed countries would be used to support production of supplements. The initial concept was that publication would be reproduced on microfiche, and that a book catalogue and database would be available for access to the fiche.

Centers were enthusiastic and once funding was secured, the secretariat began a project called the CGIAR Preservation and Dissemination Project in 1986.

By 1986 optical disc technology, particularly CD-ROM (Compact Disc, Read-Only Memory), was beginning to be used for the publication of scientific information. In order to examine whether it might be applicable to the CGIAR project, the first phase of the project was redesigned to include two major efforts:

- Identification, acquisition, cataloguing, and indexing of a core collection of major literature produced through 1986, and creation of a bibliographic database.
- A study to examine developing country needs for agricultural research information and determine whether the CGIAR project would meet those needs, and whether optical disc technology would be the appropriate information technology for preserving and disseminating center research results.

Aspen Systems Corporation conducted the study in late 1986 and reported on it in 1987 (Aspen Systems Corporation, 1987, Frierson, 1987). The Aspen report stated that the proposed CGIAR product would indeed meet all but one of the major developing country needs for agricultural research information, and recommended that CD-ROM technology be chosen over microfiche.

Aspen recommended that the CGIAR proceed with CD-ROM, and

directors of the participating centers approved that recommendation in 1987. Since then, a prototype CD-ROM disc, *Food, Agriculture, and Science*, has been published and evaluated in about 140 sites in over 40 countries to date. Plans are well underway for production of the basic retrospective set in late 1991.

Access to journals acquired through purchase subscriptions was the major information need that would not be met by the CGIAR project. The international centers participating in the CGIAR project and project donors were concerned about this unmet need, and instructed the CGIAR secretariat to explore ways to cooperate with institutions working to publish this type of essential information on CD-ROM.

Digital Publications, Inc., is a firm working to develop core collections of agricultural journal literature on CD-ROM. In the summer of 1989, the CGIAR secretariat and Digital Publications jointly funded a market study, designed and executed by CGNET Services, Inc., which had several goals:

- To determine the potential market for the CGIAR project and a core agricultural journal CD-ROM product.
- To identify the most important subject areas for potential customers.
- To determine the level of equipment and training that would be necessary for successful implementation of agricultural CD-ROM products.
- To produce current information on customer preferences for CD-ROM publications in comparison with microfilm and printed versions of the same materials.

Questionnaires in English, French, and Spanish were mailed in the summer of 1989 to a sample of 1,252 research centers, libraries, and documentation centers drawn from a total possible worldwide population of 10,592. Of these 1,252, 15 were returned as "undeliverable", resulting in a final sample size of 1,237. To date, 317 responses, or 26 per cent, have been returned. In addition to analysis of these responses, additional information included in the results

reported below was supplied through follow-up telephone interviews conducted in December 1989 with approximately 25 respondents in the U.S., U.K., Canada, and Australia.

Information Needs Reflected in the 1987 and 1989 Surveys

The 1987 Study

The 1987 Aspen study included data on developing country libraries and documentation centers. Questions were designed to answer the following questions concerning information needs and practices:

What were the primary needs for agricultural research information?

What sources were available?

What were the most important information access problems?

Several questions explored the availability and use of traditional sources of information such as printed publications and printed indexing and abstracting journals. Others explored the availability and use of more recent information sources such as microfilm and on-line databases.

Results of the 1987 Study

Several tables illustrate important results of the study. [Editor's note: The tables and figures are reproduced here as an appendix to this paper.]

Availability of Abstracting and Indexing Services. Table I, a copy of figure 16 of the Aspen report, shows the percentage of respondents who reported subscriptions to printed abstracting and indexing publications (72.2%). Table II, a copy of figure 18 of the Aspen report, shows the percentage of respondents who reported that they performed on-line searches (13%).

In 1987 results indicated that computerized information sources were not widespread in the survey population.

Microform Collections. Table III, a copy of Aspen's figure 20, shows the percentage of respondents reporting the status of their microform collection. 45.3% had no microform collection. Of those who did, there was a preference for microfiche.

Information Access Problems. Table IV, a copy of Aspen's figure

15, illustrates the relative importance of information access problems. The most important problem was lack of funds to subscribe to needed agricultural research journals.

Subject Discipline Preferences. Although questions were not asked by specific subject area, Table V, a copy of Aspen's figure 5, indicates which international centers' research publications were most important to respondents. Since center research programs are focused on specific areas of research, these results indicate rough subject area preferences.

The 1989 Survey

While the 1987 study provided data on information needs and practices in developing country libraries and documentation centers, and evidence that the CGIAR project should proceed with CD-ROM, it did not answer these questions:

How many sets should be produced for a worldwide market of researchers as well as libraries and documentation centers? With a faster than anticipated spread of personal computers within the research community, it was possible that researchers would comprise a significant percentage of potential clients.

Who would purchase a CGIAR product, for what price? Would sales income support production of supplements to the basic set?

Which subject areas are most important to potential clients?

Would CD-ROM displace microfilm and print products?

How widespread was familiarity with and availability of CD-ROM technology and equipment?

Results of the 1989 Survey

As it included many more questions, this study produced a much larger body of data than the 1987 study. For the purposes of a summary report, we have chosen results of most value to those pursuing similar objectives.

The following tables have been reproduced from CGNET Services' summary report to the CGIAR Secretariat (CGNET Services, 1990). As some of the data in this report are confidential, the full report is not available for public distribution, but those

interested in further information should feel free to contact the authors.

In comparing results of the two studies, it is important to realize that the 1989 sample included two groups that were excluded from the previous study. These groups are individual researchers worldwide and libraries and documentation centers in developed countries. Almost a third of the 1989 survey respondents are libraries. Almost half are research center staff.

Current Information Resources and Practices

Availability of Abstracting and Indexing Services. Figure 3 illustrated the percentage of respondents who subscribe to particular abstracting and/or online indexing publications. Figure 4 illustrates the percentage of respondents who reported use of online services. These results are markedly higher than those of the 1987 study.

Impact of Paper and Microform Subscriptions. Figure 5 illustrates that use of CD-ROM technology would have an organizational impact on current paper subscriptions, in that the ability to have agricultural periodicals and reference material on CD-ROM would somewhat decrease dependency on paper copies. CD-ROM technology was expected to increase Selective Dissemination of Information (SDI) and document delivery activities. Limited effect of CD-ROM availability on microform subscriptions was reported.

Subject Discipline Preferences. Figure 2 indicates the rank order of interests in specific areas of agricultural information. When these results are compared with Table V and Figure 3 above, the data appear to confirm that survey respondents are particularly interested in three areas:

1. What goes into the ground
2. The ground (soil) itself
3. How to maintain both (1) and (2) overtime (CGNET Services, 1990)

Climate for Newer Technologies

A key question is how respondents to the 1989 survey will handle their information needs in the future.

Do they see a value in having information available on CD-ROM, and are they ready and able to purchase and utilize it?

Several messages in this regard come through clearly from the data and follow-up telephone interviews. Rather than reproduce a large number of tables, we have summarized the responses.

Respondents want CD-ROM-based products. They are interested in and familiar with CD-ROM technology and they are ready to use it. Many already have CD equipment and products. They are interested in the products and are planning to buy more. Many indicated that products such as the CGIAR and core journals collection would justify purchase of the necessary equipment.

Most librarians feel their patrons would utilize such systems. As one Australian librarian said in a telephone interview, "...there is a lot more interest in materials in this form than there ever was for materials in print."

Still, the question remains as to whether CD-ROM technology is affordable. Donor funding would clearly help. Many respondents cite the need for "outside" funding.

Yet, their preference for CD use vs. microfilm are clear. When asked about their perception of the relative usefulness of periodicals on CD vs. microfilm, most indicated that CDs would be more or much more useful. Questions regarding comparative pricing and age of materials all placed the preference for and perceived usefulness of the CD product far above that for microfilm. When questioned about preference for use, if equipment for both were available, there was an overwhelming preference for CD-ROM, with a few indicating a need for both.

While the primary reason cited for having microfilm was its space saving feature, over 80% of the respondents have chosen not to have microfilm. And, although the primary reasons cited for this are lack of funds and lack of equipment, lack of patron interest is also a key factor.

In addition, computer based tech-

nologies provide a solution on several counts. They allow bibliographic and article retrieval in the same product, they allow data retrieval on computer, and they save space as well. They leverage the institution's investment in automation, and they appeal to users—all facts that are not lost on those in charge of libraries.

There seems little evidence that these products will have a major negative impact on paper or microfilm subscriptions. The need for both is clear. Yet another indication that the technology has been accepted into the mainstream is the fact that in a growing number of cases, CD-ROM equipment would be funded in the same way as other equipment. There is some concern about the availability of training and technical support for these products, and there is some concern over obsolescence of the technology. Many indicated the importance of a demonstration of the product before making a purchase decision. This would indicate a marketing issue for potential suppliers, in terms of the time and investment necessary in developing the market. The primary concern is the lack of funds or donor funding to support the purchase of such tools and the equipment to use them.

Conclusion

Results of the 1989 market study do indeed reinforce data reported in the 1987 Aspen study. Throughout the world there is interest in and need for information in electronic form. There are some lingering concerns over the permanence of the technology, but these are lessening, and the interest in CD-ROM is much stronger than the current interest in microfilm.

Potential users realize that in many instances outside funding is necessary. And, in many cases, it is likely

that such funding will be available. More and more grant and funding agencies are specifying that monies are to be used for electronic solutions to the traditional library problems of space and document delivery. Users are increasingly techno-literate and are creating a demand for document delivery to match the speed and accuracy that they can obtain with on-line and on-disc index sources.

While product costs are not insignificant, there is a growing realization that product costs are not the only concern. One time investments in products, equipment, and training are being balanced against the ongoing costs of space, collection maintenance, professional support, etc. And, the electronic solutions stack up very well.

Being able to provide a higher level of service to users without additional professional staff time, and being able to deliver documents as well as indexing to customers all in one integrated system provides efficiencies in resource utilization that libraries and documentation centers cannot ignore. Researchers also appreciate access to citations and documents in the same product.

Perhaps the greatest problem faced by CD-ROM publishers and potential customers alike is development of the market. The consumer needs a range of relevant products from which to choose. These products need to be clearly within scope of current research needs, collections and services, they need to be able to satisfy end users, and they need to justify costs while helping to amortize equipment purchases.

From the publishers' point of view, there is a large potential market there, but it has its own inherent problems as well. The products desired are not cheap or easy to produce. They are

products which are large scale and complex. They are products which are pushing many technical development schedules. And, for core journals, they are products that must sort out the whole complex issue of copyright.

CD-ROM versions of full-text publications are products that are not easy to market. Most potential customers have no context in which to understand something which they have never seen, and which is easily confused with an index only system, but at a higher price. Up front investment costs in product, marketing and training are high and the market development timetables are long.

We believe that there is indeed a market for such products. The hurdles are substantial but not insurmountable. Sustainable revenues, tied to a corpus of relevant products within the market appear to be the key issues. Authoritative, affordable, relevant, reliable, timely products seem to be the answer.

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APPENDIX (on following pages)

Table III

Figure 20.
Status of Microform Collections
(Percent of organizations)

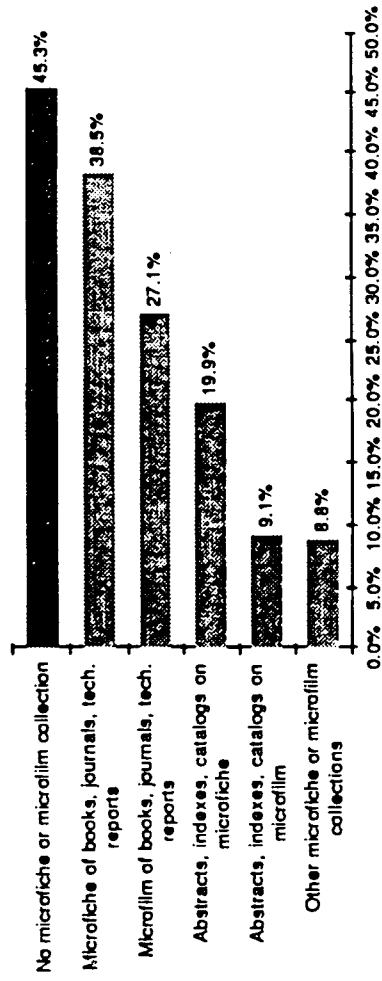


Table I

Figure 16.
Current Subscriptions to Abstracting or Indexing Publications
(Percent of organizations)

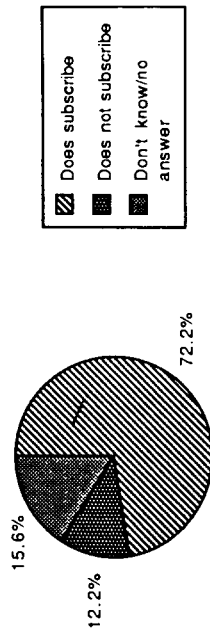


Table II

Figure 18.
Organizations that Perform Online Searches
(Percent of organizations)

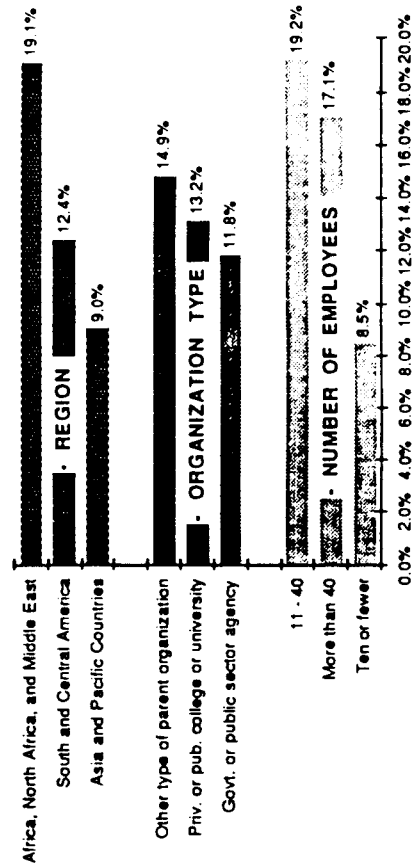
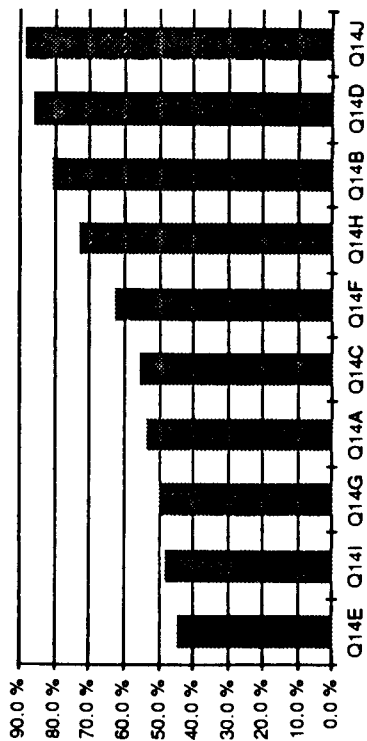


Table IV

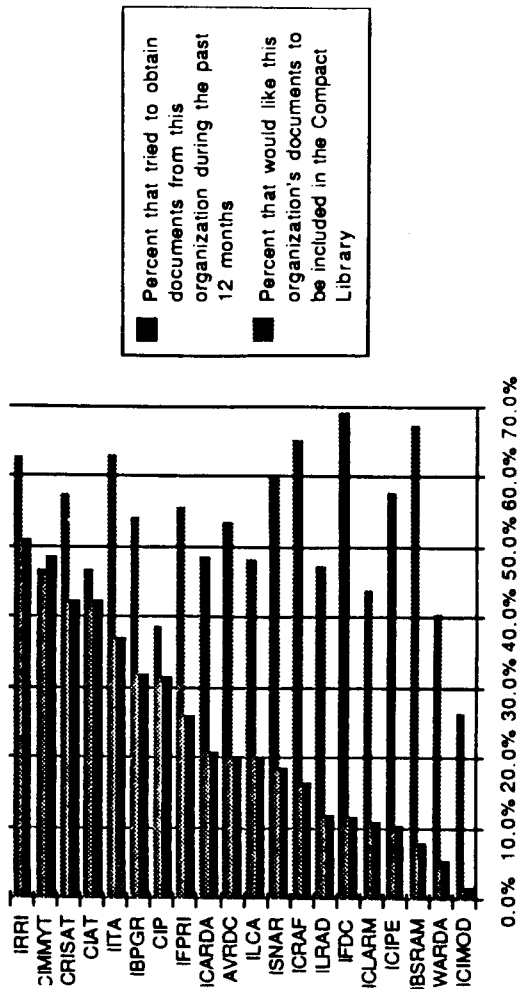
Figure 15.
Information Access Problems that are
"Frequently" or "Sometimes" a Problem
(Percent of organizations)



- Key:**
- Q14A. We cannot locate agricultural research information that is understandable to people with little formal education
 - Q14B. It takes too long for us to get documents containing agricultural research information from other organizations
 - Q14C. We have difficulty obtaining documents containing agricultural research information which are published by other organizations inside our country
 - Q14D. We have difficulty obtaining documents containing agricultural research information which are published by other organizations outside our country
 - Q14E. We have difficulty locating agricultural research information in our own collection due to incomplete or inadequate bibliographic cataloging
 - Q14F. Our own collection of agricultural research information is so small that we are unable to provide the information that our users request
 - Q14G. Our own collection of agricultural research information is so outdated that we are unable to provide the information that our users request
 - Q14H. We are unable to get copies of agricultural research documents identified through use of printed abstracting or indexing publications
 - Q14I. We are unable to get copies of agricultural research documents identified through online computer searches of bibliographic databases
 - Q14J. We do not have enough money to subscribe to all the agricultural research journals that we need

Table V

Figure 5.
Potential Contributors of Documents to the
Compact Agricultural Research Library
(Percent of organizations)



Key:

- AVRDC Asian Vegetable Research and Development Center, Taiwan, Republic of China
- CIAT Centro Internacional de Agricultura Tropical, Cali, Columbia
- CIMMYT Centro Internacional de Mejoramiento de Maiz y Trigo, Mexico D. F. Mexico
- CIPE Centro Internacional de la Papa, Lima, Peru
- IBPGR International Board for Plant Genetic Resources, Rome, Italy
- IBSRAM International Board for Soil Research and Management, Bangkok, Thailand
- ICIMOD International Centre for Integrated Mountain Development, Kathmandu, Nepal
- ICARDA International Center for Agricultural Research in the Dry Areas, Aleppo, Syria
- ICIPE International Centre of Insect Physiology and Ecology, Nairobi, Kenya
- ICLARM International Council for Living Aquatic Resources Management, Manila, Philippines
- ICRAF International Council for Research in Agroforestry, Nairobi, Kenya
- ICRISAT International Crop Research Institute for the Semi-Arid Tropics, Hyderabad, India
- IFDC International Fertilizer Development Center, Muscle Shoals, Alabama, USA
- IFPRI International Food Policy Research Institute, Washington, D.C. USA
- IITA International Institute of Tropical Agriculture, Ibadan, Nigeria
- ILCA International Livestock Centre for Africa, Addis Ababa, Ethiopia
- IRRI International Laboratory for Research on Animal Diseases, Nairobi, Kenya
- ISNAR International Rice Research Institute, Manila, Philippines
- WARDA International Service for National Agricultural Research, The Hague, Netherlands

Figure 2
Rank Order of Interests

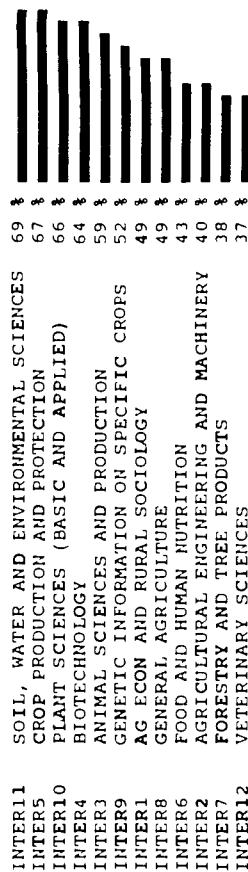


Figure 4
Percentage using online search services

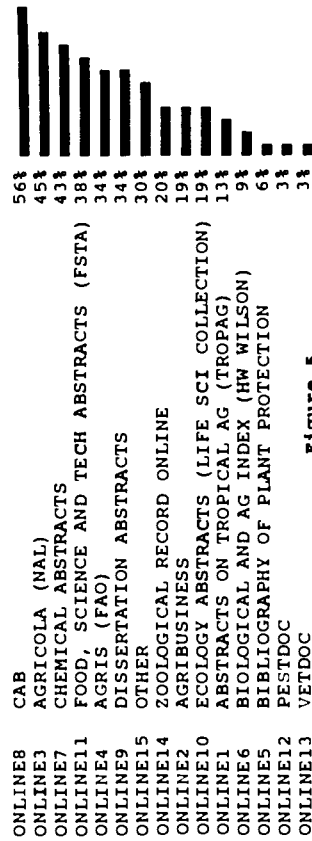


Figure 3
Subscription to Print Abstracting Services

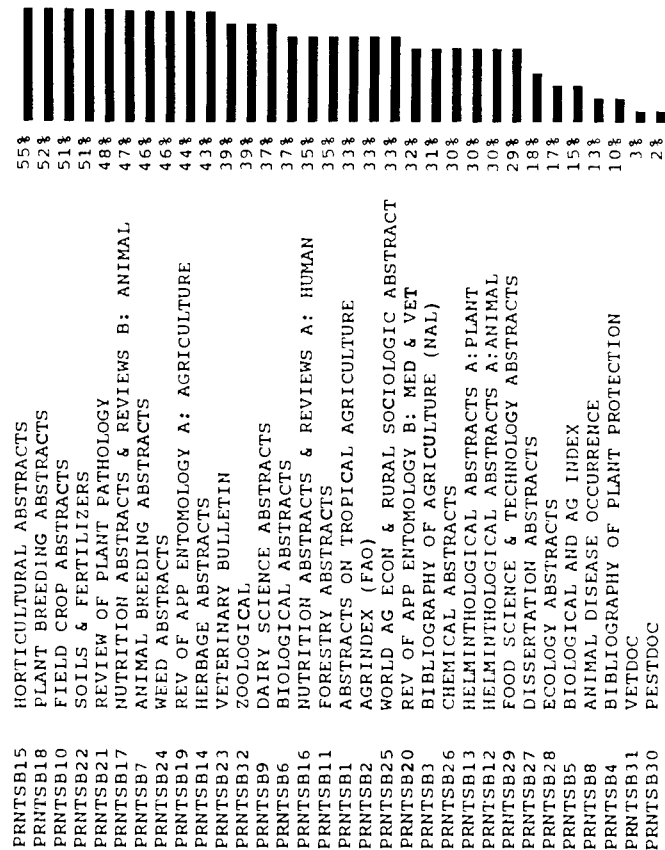
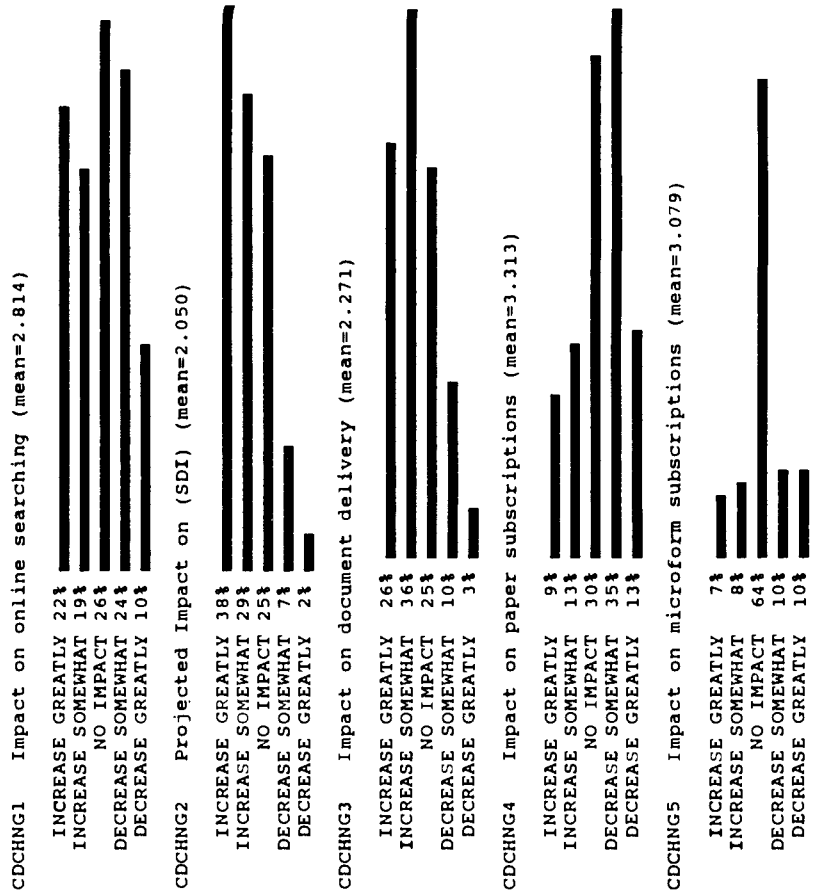


Figure 5
Projected Impacts on Service Delivery



Establishing an End User Searching Service Utilizing CD-ROM and Low Cost On-line Systems:

The Changing Role of the Intermediaries in Providing Access to Information.

Douglas Jones

Keywords: users (information); on-line systems; online searching; information services

ABSTRACT: Given a choice, most scientists would prefer to do their own on-line searching if it were: available at low cost or no cost; convenient in terms of hours and location; and relatively easy to learn the basics of searching. Librarians are now in a position to take advantage of the opportunities presented by relatively low-cost computers, CD-ROM databases available for a fixed annual fee, and the reduced-rate on-line services available on evenings and weekends from vendors such as BRS and DIALOG. By establishing end user search programs, the librarian moves away from the role of directly providing information to users and towards the role of managing or facilitating direct access to information by the user. Major concerns include: identifying user needs and skills; matching those needs and skills with available products and/or services; establishing realistic policies which take into account user needs and limitations on available resources; marketing the program and providing training to end users; monitoring the program to make necessary changes and provide on-going support.

RÉSUMÉ: La plupart des scientifiques si on leur laissait le choix, préféreraient faire leur propre recherche en-ligne si elle était bon marché ou gratuite, pratique au niveau temps et emplacement, et s'il était relativement facile d'apprendre les bases de la recherche. Les bibliothécaires peuvent maintenant prendre avantage des

occasions offertes par les ordinateurs relativement bon marché, les bases de données sur CD-ROM disponibles à un tarif annuel fixe, et les services en-ligne à prix réduit, mises à la disposition les soirs et les week-ends, par les vendeurs tels que DIALOG et BRS. En établissant des programmes de recherche pour l'utilisateur final, le bibliothécaire s'éloigne du rôle de fournisseur direct de l'information pour l'utilisateur, vers un rôle de gestionnaire qui facilite l'accès direct à l'information pour l'utilisateur. Parmi les problèmes majeurs, on trouve l'identification des besoins et des capacités de l'utilisateur, l'ajustement des ces besoins et capacités aux produits et/ou services disponibles, la création de politiques réalistes qui tiennent compte des besoins des usagers et des limitations des ressources disponibles, le marketing du programme et la formation des utilisateurs, la direction du programme pour faire les changements nécessaires et fournir un soutien continu.

RESUMEN: Si se les diera a escoger, la mayoría de los científicos preferirían hacer su propia búsqueda en línea, siempre y cuando este servicio 1) se ofreciera gratuitamente o a bajo costo; 2) resultara conveniente en términos de horario y lugar y 3) si fuera relativamente fácil aprender el procedimiento de búsqueda. Actualmente, los bibliotecarios están en posición de aprovechar las oportunidades que les brindan el acceso a computadores de costo relativamente bajo, las bases de datos en CD-ROM disponibles por una tarifa fija anual, y los servicios en línea con tarifa reducida, disponibles en la noche y durante los fines-de semana, que ofrecen BRS y DIALOG. El establecimiento de programas de búsqueda por el usuario aleja al bibliotecario de la función de pro-

porcionarle información directamente al usuario y lo lleva a manejar o a facilitar al usuario el acceso directo a la información. Los principales factores a considerar incluyen la identificación de las necesidades y habilidades del usuario; el acoplamiento de esas necesidades y habilidades con la disponibilidad de productos y/o servicios; el establecimiento de políticas realistas que tienen en cuenta las necesidades del usuario y las limitaciones en cuanto a disponibilidad de recursos; el mercadeo del programa y la capacitación a los usuarios; y el seguimiento al programa para hacer los ajustes necesarios y proporcionar apoyo continuo.

ZUSAMMENFASSUNG: Vor die Wahl gestellt würden die meisten Wissenschaftler die eigene Online-Recherche vorziehen. Voraussetzung wären allerdings geringe oder keine Kosten, günstige zeitliche und örtliche Bedingungen sowie relativ leicht zu lernende Suchoperationen. Bibliothekare sind jetzt in der günstigen Lage, die Möglichkeiten nutzen zu können, die sich durch relativ kostengünstige Computer, durch CD-ROM-Datenbasen zu festen jährlichen Gebühren und durch den verbilligten Online-Dienst am Abend und Wochenende bei Anbietern wie BRS und DIALOG bieten. Durch die Einrichtung von Rechercheprogrammen für Endbenutzer bewegen sich die Bibliothekare weg von der Rolle der direkten Informationslieferung an die Benutzer und hin zur Rolle der Herstellung und Erleichterung des direkten Zugangs zu Informationen für die Benutzer. Ihre Haupttätigkeiten umfassen: Ermittlung der Benutzerbedürfnisse und -fertigkeiten; Abstimmung dieser Bedürfnisse und Fertigkeiten mit den verfügbaren Produkten und/oder Diensten; Ausarbeitung realisierbarer Methoden, die die

Benutzerbedürfnisse und Begrenzungen durch die verfügbaren Quellen in Betracht ziehen; An- und Verkauf des Programms und Angebot von Schulungen für Endbenutzer; Kontrolle des Programms, um notwendige Änderungen durchzuführen und um eine fortwährende Hilfestellung zu gewährleisten.

Introduction

Librarians and documentalists should have as one of their primary goals making users—whether scientists, researchers, students or the general public—as information literate as possible. That is to say, we should strive to provide to those we serve not only information resources, but also the information seeking skills and an awareness of available information that will make them as self-sufficient as possible in meeting their information needs.

Background

During the last 20 years a standard means of providing access to on-line databases has been for a highly trained intermediary to search for the end user. Databases numbered in the hundreds and were available on a variety of different vendor systems, each with a different command language. Searching costs were high and the training and equipment required were expensive. End users were generally unfamiliar with computers and bibliographic databases. Many were frequently unaware of the great potential available to them through on-line searching.

During the last few years, however, much has changed. Several on-line systems designed especially for the end user have appeared. For example, Dialog's Knowledge Index and the BRS AfterDark systems provide user friendly interfaces with menu-driven command systems and extensive help screens. Equally important, these services are available at significantly reduced off-hours rates. In addition, hardware and software are much more affordable today. Of potentially greater impact is the availability of many of the major databases

on CD-ROM at affordable, fixed prices. This means no more connect time, telecommunications or per citation charges. Many of the databases of greatest agricultural interest are already available on CD-ROM including AGRICOLA, CAB ABSTRACTS, AGRIS, and AGRIBUSINESS. Users, too, have changed significantly. They are generally more familiar with computers, databases, and telecommunications. With this knowledge comes a greater awareness of the potential of computer searching.

Librarians can now take advantage of the opportunities presented by these changes. By establishing end user searching programs, the librarian moves away from the role of directly providing information to users and towards the role of managing or facilitating direct access to on-line information by the user. As a result, users will develop a greater degree of self-sufficiency in meeting their information needs and librarians will be able to serve more people with high quality service.

Establishing a service

In establishing an end user searching service, the librarian must address several important issues and concerns to help insure a successful program.

First, user needs must be assessed. Some librarians may feel that they know their user community so well that this will be a simple task. Others who work with perhaps larger or more complex organizations may find it useful to spend some time trying to identify user needs. Work done at this stage may prove especially useful if one must carefully justify the appropriateness and costs of a new program. One may want to examine on-line searching statistics over the past year to identify which on-line databases were most often used. In an academic environment, one might well look at which courses have the greatest enrollment or which research programs are receiving the greatest emphasis. It is also useful to look at the distribution of searching statis-

tics. Is there a heavy concentration in one or more files or subject areas? Or is it spread out across many different files? This information can help determine whether to purchase a CD-ROM, provide access to an end user on-line system, or whether some combination of the two is appropriate.

Next, the skills of users should be considered in order to plan for appropriate training. A small organization with scientists and technicians who regularly use computers will have very different training needs than a university with undergraduate students who have not had extensive experience with computers, although this situation is changing rapidly. Frequently, a wide range of skills must be accommodated. Also, it is sometimes the case that those with extensive technical computer skills have difficulty grasping the strategies necessary to search effectively large, bibliographic databases filled with imprecise and ambiguous words.

Once user needs and skills are assessed, one can begin the process of matching those needs with available products and services, and skills to appropriate training programs. One CD-ROM workstation with a microcomputer, hard disk drive and CD-ROM player with the necessary controller boards and cables can cost from \$2000 to \$3000. An annual subscription to a CD-ROM database can cost from \$500 to \$5000 per year. If demand for a single database is not too great, a single workstation may be used to provide access to two or more databases on a shared basis. Multi-user systems utilizing LAN technology are available at a significantly greater cost. A high level of demand is normally necessary to justify the initial equipment cost plus the annual subscription charges. Of course, in those areas where telecommunication is a problem and reliable access is highly desirable, it may be easier to justify.

Suppose, however, that the user needs assessment shows use of a broad range of databases, or use of databases not available on CD-ROM; then, one may want to consider the

special reduced rate services. These services provide access to over 80 different databases covering a broad range of subjects including the basic sciences, agriculture, medicine, engineering, business, economics, education, etc. Quick response time, multi-file searching and context sensitive help screens are highly desirable features.

In some organizations, particularly large ones, it may well be the case that a combination of these two options is most appropriate. There may be several databases for which the demand is great enough to justify purchasing a CD-ROM workstation as well as enough demand for a broader range of databases to warrant providing access to the on-line system.

Once a decision has been made about the general configuration of the service to be offered, thoughtful and realistic policies should be developed in conjunction with all staff and units likely to be involved. These policies should take into account both user needs and limitations on available resources. Among the concerns which such policies and guidelines should address are the following. Who will be allowed to use the service? Will everyone have access to the system? Or will it be restricted to institutional members or even certain categories of institutional members? What hours will the service be available? Should it be available all hours the facility is open? Or only those times when reference or other staff are available to help answer questions and change disks? How long will each user be allowed to use the system? It is important to try to balance the needs of the many to have access to a limited resource with the need of each individual to get the information required for a particular need. In the case of the off-hours on-line systems this may well be a question of how much can be budgeted for this particular option. A corollary concern is whether or not reservations will be available or will the service operate on a first-come, first-serve basis. Other issues include who will change the CD-ROM disks. Or in the case of the on-line systems,

who will facilitate logging users on and off or changing databases? The provision of printers is an important consideration. Most users consider a print-out critical to their use of the system but printers frequently prove to be both costly and troublesome. Security of the hardware and software may present a problem in many environments where the desire to make the service as available and visible as possible also means making it vulnerable. Who will be responsible for technical installation and maintenance? Of course, a key consideration is who will be responsible for general management of the service. One classic problem that is bound to be discussed is whether the service should be available free or for a fee. If for a fee, how much? Should the fee reflect full cost recovery or should the service be partially subsidized? Each institution must make its own choice based on prevailing philosophies and economics.

As an example of how one organization has addressed some of these issues, let me share with you the policies developed for the Science-Engineering Library at the University of Arizona. We have four public use CD-ROM workstations located in the center of our reference area near the reference desks. Currently eight databases are available on a total of 18 disks. The workstations are available all times that the reference desk is open, which is normally 8 am to 10 pm weekdays and 8 hours on Saturday and Sunday. Users are asked to sign up in half-hour blocks with a maximum of 2 blocks (1 hour) of reserved time per day. However, if no one else has requested to use the system, a user may continue until closing. To maximize security and minimize disk and player problems, librarians or designated student assistants currently change disks. In addition, we offer 18 hours of access time per week on QuickSearch, our end user on-line service. Appointments are required in half-hour blocks for three hours Sunday through Thursday evenings and on Saturday afternoons. Users may reserve only one

half-hour time slot every two weeks; however, open slots or cancellations are available on a walk-in basis. This service is restricted to current faculty and students and a one hour training session is required to be eligible to search.

These policies are designed to make the systems as available as possible to users while maintaining flexibility and controlling costs. Since Dialog charges a flat \$24 per hour connect charge for access to Knowledge Index with no additional database or per citation charges, the policy in effect creates a fixed annual fee for which we can budget. Of course, the different mix of users, philosophies and economics at each institution will require different policies to address these concerns, but the same issues must be addressed.

Marketing and providing appropriate training are critical components in establishing an end user searching system. Strategies must be devised to make all those who should benefit from the program aware of it. Different organizational environments will mean different approaches, from newsletters to instruction sessions. A straightforward, visual approach such as placing the workstation(s) in a prominent place in the library maybe most effective for in-house users. As the service begins to be used, the most effective marketing will be done probably by word of mouth from user to friend or colleague.

Designing appropriate training is one of the most challenging issues to be addressed. Of course, all the CD-ROM systems and end user on-line systems include extensive descriptions and help screens. However, because of the wide variation of individuals' knowledge and the need to help users maximize the potential of services available to them, additional training is normally highly desirable. Generally speaking, training in whatever format should address three aspects of searching. First, users should be given an understanding of what a bibliographic database is and how Boolean operations help retrieve information. Second, a basic set of system specific commands should be

taught. Third, a basic awareness of the scope and limitations of the databases to be searched must be taught, otherwise users may search only one database or an inappropriate database and feel they've "searched the literature". The depth, breadth and approaches to training will depend on the users and the systems chosen.

At the very least one should consider brief, introductory handouts and point of use guides with basic information. Beyond that, options will vary considerably based on user needs and available staff time.

The last and critical need is to monitor the program carefully and provide ongoing support. Give users

and staff time to evaluate the system and explore its usefulness. Many users will welcome the challenge but others may require supportive encouragement and personal assistance. The most important goal is to give users the skills and confidence to make them as self-sufficient as possible.

Summation of the VIIIth IAALD World Congress with Directions for Future Developments

Syed Salim Agha

Keywords: library profession; library services; development

ABSTRACT: Conference highlights were summarized including education, training and upgrading of skills of information professionals; the use of microcomputers; positive and beneficial use of CD-ROM and its potential for developing countries; and the user and the complexities surrounding constantly changing needs. Concerns expressed included survival of information centres; survival of agricultural publishing; improved communication of information to users; interest in the sharing of resources and cooperative plans in view of limited resources; large database publishers may hinder the development of specialised information centres; and the need to popularise and cooperate in the use of the CDS/ISIS software and its enhancements. Problems that need attention are the support for information infrastructure; the inequity that exists between the developed and the developing world in the access to information; the low level of the information profession in his organization; the design of services and product in response to user needs; lack of meaningful co-operation at the global level; isolationist and self-centred attitude particularly of international agricultural information systems; lack of appropriate methodology in the distillation and digesting of information for targeted use; failure to utilize technology to advantage; failure to analyze documents such that concepts, ideas and factual information be analysed and linked together in ways which will enable retrieval of information suited to the need. Solutions are proposed and include creating a new sense of community where people work together and partial involvement of the information intermediary in seeking and forwarding solutions to problems.

RÉSUMÉ: Les principaux points de la conférence, y compris l'éducation, la formation et l'amélioration des compétences des professionnels de l'information ont été examinés; l'utilisation des micro-ordinateurs; l'utilisation positive et profitable du CD-ROM et son potentiel pour les pays en voie de développement; enfin l'utilisateur face aux complexités qui accompagnent les changements constants des besoins. Des inquiétudes ont été émises en ce qui concerne la survie des centres d'information; l'amélioration de la diffusion de l'information destinée aux utilisateurs; l'intérêt d'un échange des ressources et des projets coordonnés eu égard aux ressources limitées; les grands éditeurs de bases de données peuvent entraver le développement des centres d'information spécialisés; et la nécessité de populariser et de coordonner l'utilisation du software CDS/ISIS et favoriser son perfectionnement. Les problèmes qui requièrent une attention spéciale sont l'appui à des infrastructures d'information; le déséquilibre existant entre le monde industrialisé et les pays en voie de développement en ce qui concerne l'accès à l'information; la faible proportion de professionnels de l'information dans cette organisation; la conception de services et de produits adaptés aux besoins des utilisateurs; le manque de coopération significative à un niveau global; une attitude individualisé et auto-centrée plus particulièrement des systèmes d'information agricole internationaux; le manque d'une méthodologie appropriée en ce qui concerne la diffusion et la collecte de l'information en vue d'une utilisation ciblée; l'échec à analyser des documents comme des concepts, des idées et l'information factuelle qui devraient être analysés et liés pour retrouver toute information en accord avec la demande. Des solutions sont proposées comme la création d'un nouveau concept de communauté où les gens travaillent ensemble dans la recherche de l'information et des solutions aux problèmes.

RESUMEN: Se presentó un resumen de los aspectos destacados del congreso, incluyendo la educación, capacitación y mejoramiento de las habilidades de los profesionales de la información; el uso de microcomputadores; el uso positivo y benéfico del CD-ROM y su potencial para los países en desarrollo; y la relación entre el usuario y los factores que determinan constantemente los cambios de sus necesidades. Se expresaron inquietudes en torno a la supervivencia de los centros de información y de las publicaciones agrícolas, el mejoramiento de la transmisión de información a los usuarios, el interés en compartir recursos y planes cooperativos en vista de las limitaciones de recursos, el hecho de que los grandes editores de bases de datos pueden obstaculizar el desarrollo de los centros de información especializada y la necesidad de divulgar y colaborar en el uso y perfeccionamiento del programa CDS/ISIS. Los problemas que requieren atención son el apoyo a la infraestructura de información, la desigualdad en el acceso a información entre los países en desarrollo y los desarrollados, el nivel bajo de los profesionales de la información en las organizaciones, el diseño de servicios y productos en respuesta a las necesidades del usuario, la falta de cooperación valiosa a nivel mundial, la actitud aislacionista y auto-centrada de los sistemas internacionales de información agrícola en particular, la falta de metodología apropiada para condensar y descomponer la información para darle el uso proyectado, el no poder beneficiarse de la tecnología, y la falla en el análisis de los documentos, tal que los conceptos, las ideas y la información objetiva se analicen y asocien en formas que permitan recuperar la información que se ajuste a las necesidades del usuario. Se proponen soluciones, que incluyen la creación de un nuevo concepto de comunidad en donde las personas trabajan conjuntamente, y la participación parcial del intermediario de información en la

búsqueda y en el fomento de soluciones a los problemas.

ZUSAMMENFASSUNG: Der Verfasser bringt ein Resümee der Konferenzhöhepunkte wie Ausbildung, Weiterbildung und Aktualisierung der Fähigkeiten von Informationsfachleuten, Einsatz von Microcomputern, positive und nützliche CD-ROM-Anwendung und Möglichkeiten ihrer Anwendung in Entwicklungsländern sowie der Benutzer und die Komplexität im Zusammenhang mit konstant sich wandelnden Bedürfnissen. Angesprochene Probleme sind das Überleben von Informationszentren, das Überleben landwirtschaftlicher Verlage, der Verbesserte Informationsaustausch mit dem Benutzer, das Interesse and der gemeinsamen Nutzung von Ressourcen und Kooperativplänen im Hinblick auf begrenzte Ressourcen, eine mögliche Behinderung der Entwicklung von spezialisierten Informationszentren durch große Datenbasenvertreiber und die Notwendigkeit der Popularisierung und Zusammenarbeit bei der Nutzung von CDS/ISIS-Software und ihre Weiterentwicklungen. Probleme, die der Aufmerksamkeit bedürfen, sind die zwischen den Entwicklungs- und Industrieländern beim Informationszugang besteht, das niedrige Niveau des Informationsberufsstandes in seiner Organisation, die Gestaltung der Dienste und Produkte in Reaktion auf Benutzerbedürfnisse, der Mangel an bedeutungsvoller weltweiter Zusammenarbeit, die isolationistische und egoistische Haltung besonders von internationalen landwirtschaftlichen Informationssystemen, der Mangel an geeigneter Methodologie bei der Auswahl und Verarbeitung von Informationen für die angestrebte Nutzung, das Versäumnis die Technologie voll zu nutzen, die Unterlassung der Analyse solcher Literatur, die Konzepte, Ideen und Tatsacheninformationen so analysieren und zusammenfügen, daß ein den Bedürfnissen angemessenes Informationsretrieval ermöglicht wird. Lösungen werden vorgeschlagen, wie die Schaffung eines neuen Gemeinschaftssinnes für die Zusammenarbeit und die teilweise Einbeziehung der Informationsvermittler bei der Suche nach und Lieferung von Problemlösungen.

Overview

As I stand here today I am reminded of the IAALD World Congress held in Manila in 1980 when the late Mr. Herbert Buntrock gave an accurate and enlightening summary of the congress. It was the first world congress that I had attended and his rendering left its mark on me. I was mentally inspired to great heights

by that summation. I would like to express my sincere thanks to Mr. Ernest Mann for having given me this honor to present the highlights of the deliberations of the VIIIth World Congress over the past four days and to point the way to the future. If I am able to half inspire at least one young professional today as the late Mr. Buntrock did me then I believe I will have achieved at least partly the objective of this summation.

To do justice to this summation exercise I shall, using a conceptual mapping display, highlight the subject areas on which papers were delivered and enumerate some of the concerns that were expressed. Since the theme of the Congress is on the user I shall first summarize briefly results of reviews on information needs and uses then go on to state some of the problems we currently face and gaps that exist in our information world. I shall then conclude with indications to possible future directions that we should strive for and which should be given due consideration.

Rather than summarize the contents of each paper, I would like to draw your attention to areas that have inadvertently been highlighted at the Congress using the conceptual mapping display diagram. A summary of the highlights is as follows:

1. The education, training and the upgrading of skills of information professionals particularly in the developing countries was emphasized. A great need was expressed for such programs with special focus on the development of appropriate curricula. The role of professional associations to enhance such activities has been demonstrated.

2. It was reiterated directly and indirectly that the microcomputer, the pervasive instrument that it is, is being utilized more and more by information centers particularly in developing countries. In this regard and to enhance meaningful usage while adhering to common standards, recommendations were made on the use of Unesco's CDS/ISIS software for database management. In the light of

difficulties experienced in the use of software while also being aware of creative methods devised to overcome software use problems and the development of various enhancements to the software, it was recommended that IAALD should take adequate measures to enable effective communication on a global basis among those interested in the exchange of information, experiences and problems related to its use.

3. One message that came through clearly during the Congress was the positive and beneficial use of CD-ROM particularly its potential for the developing countries. The fact that it works in conjunction with a microcomputer further underscores the importance of the two technologies to information systems in developing countries. Seemingly CD-ROM has suddenly become the popular medium for activities including publishing, preservation, for the storage of core literature, thesauri, databases and databanks. The user friendly nature of the use of CD-ROM products adds to its popular appeal and its use has increased over the years. There seems to be great potential in using CD-ROM to resolve problems related to document access and document delivery.

4. Attention was drawn to the user and the complexities surrounding his constantly changing needs. The role of the information professional in attempting to understand user needs was addressed. Related to the use was the measurement of the value of information. It was urged that more efforts be made to develop methods of measuring the value of information. There must be efforts also to bring it to bear on top management, who should be made aware of its value and accord information and the agencies that collect, store, process and disseminate it, the importance and the priority deserved.

Concerns Expressed

In the course of the presentation of papers the following concerns were expressed:

1. Survival of information centers.

2. Survival of agricultural publishing.

3. General consensus that there should be improved communication of information to the user.

4. Increased interest in the sharing of resources and cooperative plans in view of limited resources.

5. Fear expressed that large database publishers may hinder the development of specialized information centers.

6. The need to popularize and cooperate in the use of the CDS/ISIS software and its enhancements.

The review of literature on information needs and uses may be summarized as follows with a rallying call for alternative paradigms for research on the information needs and uses.

- Information systems could serve users better—increase their utility to their clients and be more accountable to them.

- To serve clients better, user needs and uses must become a central focus of system operation.

- Serving clientele better may require implementation of a system redesign mandate.

- Information systems have not capitalized on technology to help them serve clientele better.

The above call is not surprising when one observes that the analysis of most research done on the topic is system oriented. It could be said that the “information needs assessments” the needs of interest are system needs not user needs. Alternative approaches to studies on information needs and uses calls for a shift from “what approach” to the “how approach”. The “what approach” is interested in identifying the people who use information, the type of sources and services they use. The “how approach” emphasizes how people define needs in different situations, how they present the needs to systems and how they make use of what systems offer them”. There is a demand for inventing new ways of looking at users and linking systems to them.

Problems that Need Attention

Matters that must be addressed if we are to effectively resolve our common problems include, among others, the following:

a. All concerned pay tribute to the importance of information. Yet support for information infrastructure suffers. Something is amiss between the two. This requires serious investigation.

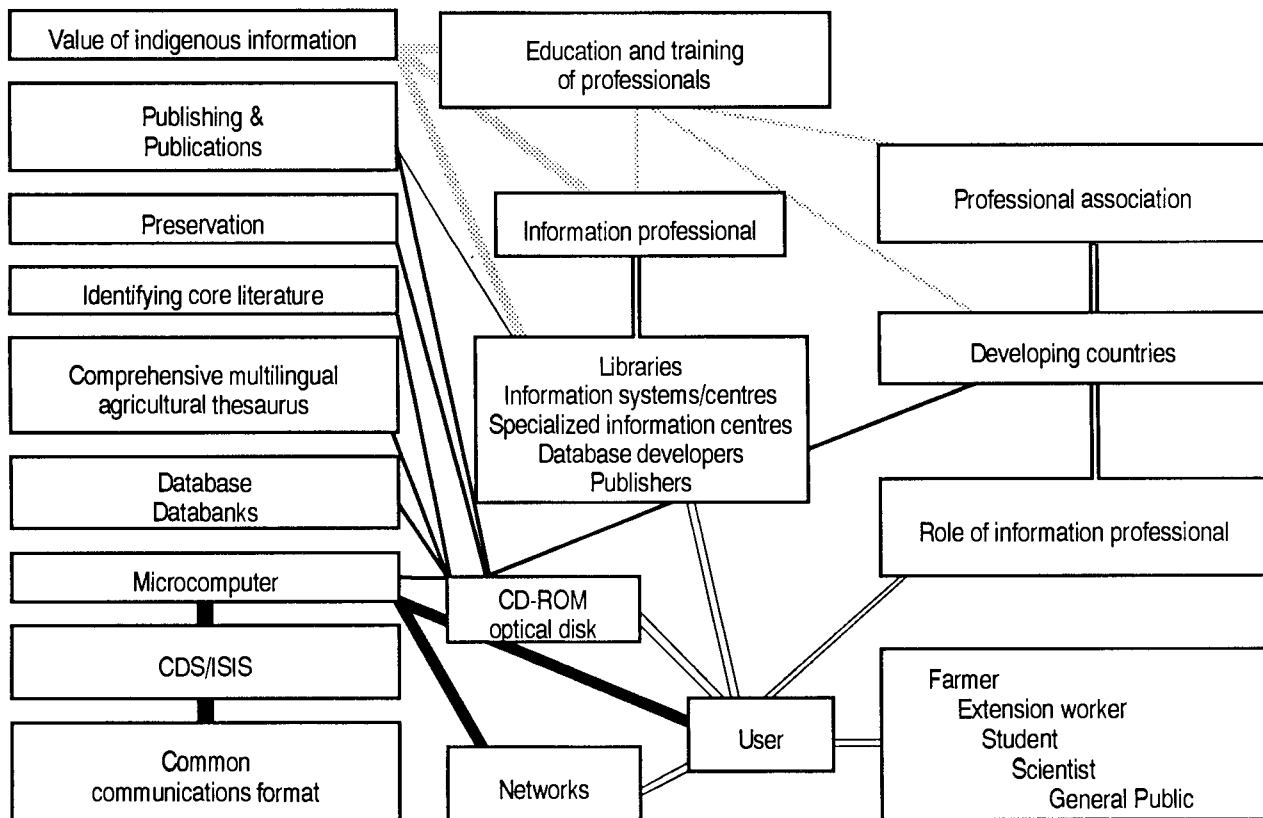
b. The inequitable situation that exists between the developed and the developing world in the access to information. Everyone acknowledges this state of affairs but very little is being done to alleviate the situation.

c. The low level of importance of the information professional in his organization.

d. Learning to design services and products in response to user needs.

e. Lack of meaningful co-operation at the global level.

f. Isolationist and self-centered attitude particularly of international agricultural information systems.



g. Lack of appropriate methodology in the distillation and digesting of information for targeted use.

h. Failure to utilize technology to advantage. Currently its use may be described as "giant matching machines".

i. Failure to analyze documents such that concepts, ideas and factual information be analyzed and linked together in ways which will enable retrieval of information suited to the need.

Proposed Solutions

We must create a new sense of community where people work together to accomplish things that they could not achieve alone. The ethic of self interest that dominates social interaction today can be moderated by a concern for collective interests on a global basis. A balance can be struck between local solutions to global problems and centralized efforts to deal with the same issues so that the strengths of each approach can complement each other. We must strive to develop a global vision for co-operation in agricultural information. Such a vision will establish broad directions of development of agricultural information systems at national and international levels. Even though the momentum of the late sixties on global co-operation in agricultural informa-

tion died a long way back, signs of survival are apparent with the proposed development of a multi-lingual comprehensive agricultural thesaurus as one indicator.

In any society, political and economic power gravitates to those who solve problems. The information intermediary does not solve problems. His is an apathetic, uninvolved and reactive role in the problem solving process. Approaches that go beyond pro-activity bordering on to partial involvement in seeking and forwarding solutions to problems may enhance his value to the organization and thereby his importance.

Ladies and gentlemen, the picture that has been painted based on the presentations made and issues raised may be likened to a jigsaw puzzle with lots of missing pieces. I do not for one moment believe that we can, on an individual basis, put the puzzle together. However, we can strive towards that objective *together* provided we gear ourselves to accept that we have *to work together* for mutual good. In order to work together we have *to adopt similar lines of thinking* so that *We may plan together*. As our thinking and planning would be governed by our attitudes, it is essential that *a similarity of attitudes prevails*. Regardless of our individual likes and preferences we must accept the guiding philosophy that

we must think and act in global terms. If our individual action is not beneficial to society at large or detrimental to it then we must cease and desist from taking that action. There is a strong momentum today that we must all protect our environment across the globe and the realization that what we do in one part of the world affects the other directly or indirectly, immediately or in due time. Similarly in the information world and in particular in agricultural information to offset any global ill effects in the future, it is necessary for us to *act together* for mutual benefit. Our eventual goal is to bring together, within a specified time frame, the required human experience and the user who needs it. Let us therefore overcome the odds that face us by working together to achieve our goal.

Thank you.

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Dervin, Brenda and Nilan, Michael. "Information Needs and Uses." *Annual Review of Information Science and Technology (ARIST)* vol. 21, 1986, pp. 3-33.

EDITOR'S NOTE:

This paper was originally published as part of the 1990 Conference section of the Quarterly Bulletin of the International Association of Agricultural Information Specialists, 35(3):159-162.



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Index

Author entries are followed by (A). References to Tables are followed by (T).

A

AACR2, 42
Abildgaard, P.C., 43
Abstracts on Rural Development, 102
Abstracts on Tropical Agriculture, 12–13, 102
access to information, 128
ACCT, 53–54
Acid Rain, 138
ACP countries, 52–53, 101, 103
action survey, 84
ADSP, 112
adult farmer education, 20
Africa, 21
African, Caribbean and Pacific Countries
 See ACP Countries
Aga Khan Rural Support Programme, 28
Agent Orange, 137–138
Agha, S., 132
Agha, S. (A), 150
AGLINET, 42, 68
AGREP, 42–43
AGRES II, 113
AGRIBUSINESS, 147
AgriCat, 135
Agricola, 5–6, 8, 12–13, 15, 18, 66, 81–82, 102, 104, 116, 134, 147
Agricultural Development Support Program
 See ADSP
Agricultural Information Bank for Asia, 95
Agricultural Information Dissemination Programme, 38
Agricultural Libraries Association of the Philippines
 See ALAP
agricultural personnel (T), 21
Agricultural Science Committee [Malaysia], 49
agricultural skills, 24
Agriculture Canada, 134
Agriculture Canada. Central Library, 134–135
Agriculture Canada. Field Libraries, 134–135

AgriDoc, 135
AGRINDEX, 130
AgriNet, 135
AGRIS, 2, 5, 13, 15–16, 42–43, 66, 81–82, 102, 129–132, 147
AGRIS Processing Unit
 See APU
AgriSearch, 134
agro-industrial complex
 See AIC
Agroforestry Abstracts, 15
AGROINFORM, 2
AGROVOC, 42, 81–82
AGU, 112–113
AIBA, 130
AIC, 98–99
Ailin Ton, I. (A.), 36
Aina, L.O. (A), 20
ALAP, 95–96
ALBA, 42–43
Albert R. Mann Library, Cornell University
 See Mann Library
All-Union Research Institute of Information and Technical-Economic Studies of the Agro-Industrial Complex. VASKHNIL, 78
American Chemical Society, 6
analog telecommunications, 119
André, P.Q.J. (A), 136
appropriate technology, 24
APU, 129
Aquaculture, 138
Arabian Gulf University
 See AGU
Arid Lands Information Center, 60
Arizona. University
 See UA
ASCII, 120–121
Aspen Report, 140–142
Aspen Systems Corporation, 140
ATA
 See Abstracts on Tropical Agriculture
Attaullah (A), 105

B

Bahrain, 111–113

Bain, A., 119
Baldwin, C. (A), 110
Barclay's Bank, 18
Barile-Frias, M. (A), 94
Bátai, T. (A), 87
Beecher, J.W., 60
Beecher, J.W. (A), 59
bibliographic databases, 128
Bibliography of Agriculture, 13
Biological Abstracts, 134
BIOSIS, 13, 15
bit-mapped, 120
bit-mapped format, 120
bit-mapped images, 120–121
BITNET, 120
Blue Ribbon Panel (U.S.), 60
Boast, C., 60
Botswana, 22, 111, 113
Botswana Agricultural College, 113
Botswana Ministry of Agriculture Library, 113
Botswana. Department of Agricultural Research Library, 113
Brandin, D., 5
BRS, 6
BRS AfterDark, 147
BRS software, 5
Buntrock, H., 151
Burkina Faso, 102

C

CAAS, 128–129, 132
CAB ABSTRACTS, 15, 76, 81–82, 102, 104, 147
CAB Thesaurus, 15, 81–82
CABI, 2, 5, 13, 15, 53, 66, 76–79, 81, 91, 129–131, 134
CABI Eastern European Serials Scope (T), 77
CABI Editorial Expertise (T), 77
CABI Institute of Biological Control, 79
CABI Institute of Entomology, 79
CABI Institute of Mycology, 79
CABI Institute of Parasitology, 79
CABI Product Distribution (T), 76
CABI Review Conference, 79
CALERA compound document processor, 137

Cameroon, 102
Can/Ole, 134
CAP, 57–58
CCF, 64
CCITT, 120, 137
CCOD, 12–13
CD-ROM, 12–13, 18, 101–104,
137, 140–142, 147–148, 151
evaluation (T), 13
information retrieval (T), 12
use by type (T), 12
user satisfaction (T), 12–13
CD-ROM drive, 102
CDS/ISIS, 103, 112, 129–130,
151–152
Census data, 5
Central Food Research Institute
[Hungary], 87
Central Scientific Agricultural
Library of the V.I. Lenin
All-Union Academy of
Agricultural Sciences
See CSAL of VASKHNIL
Centre de Coopération Technique
Agricole
See CTA
Centre for Agricultural Publishing
and Documentation
See Pudoc
Centre Technique de Coopération
Agricole et Rurale
See CTA
Centro Internacional de la Papa
See CIP
CERES-WHEAT (growth model), 33
CGIAR, 81, 102–103, 137–141
CGIAR Preservation and
Dissemination Project, 140
CGNET, 120–121, 140–141
Chaudhry, A. A. (A), 24
Chemical Abstracts, 5–6, 134
China, 55–57, 128
Chinese Academy of Agricultural
Sciences
See CAAS
CIP, 81
Climod, 6
CNRADA, 113
Committee of Higher Learning and
Scientific Publishers [Malaysia]
See PEPET
Common Communication Format
See CCF
Commonwealth Agricultural
Bureaux International
See CABI
Communication Types Necessary
to Support CAP, 58
Compact Library [CGIAR], 102

Computer Readable Databases
Directory, 7
computer simulation, 32–33
Consultative Group in International
Agricultural Research
See CGIAR
cooperative acquisition, 56
Cooperative Acquisition Program
[China]
CAP, 57
Core Literature Project, 123
Cornell University Entomology
Library, 84
Cornell University Libraries, 86
Cornell University. Albert R. Mann
Library
See Mann Library
cost effectiveness, 90
CRIS, 13
Crosstalk XV1 [software], 135
CSAL of VASKHNIL, 98–99
CTA, 19, 22, 52–54, 81
Current Contents on
Diskette—Life Sciences
See CCOD

D

DANDOK, 42–43
DANDOK database, 42
Danish Agricultural and Veterinary
Research Council, 42
Danish Committee for Scientific
and Technical Information
and Documentation
See DANDOK
Danish Computer Center for
Research and Education
See UNI*C
Danish Registration of Agricultural
Research, 42
Danish Veterinary and Agricultural
Documentation Center, 42
Danish Veterinary and Agricultural
Library
See DVAL
DanMarc format, 42
database, 66
database design, 29, 62
database producers, 66
Datacentralen, 42
DATEX-P Hauptanschluß der
medizinische Dokumentation
und Information
See DIMDI
dBase [computer program], 9, 130
dBase [software], 135
dBase IV [software], 135
Demas, S. (A), 83

Denmark, 41
Denmark, Ministry of Agriculture, 42
Denmark. Royal Veterinary and
Agricultural University
See Royal Veterinary and
Agricultural University
Deselaers, N., 81
developing nations, 101, 122
development, 150
Dialog, 6, 42, 72, 134
Digital Publications, 140
digital technology, 119
DIMDI, 42, 72
DLRC, 112
document delivery, 60, 118
Document Transmission
Workstation, 121
DUENGEPLAN (computer
program), 32
DVAL, 42–43

E

EAP, 112
East, Harry, 53
Eaton, N., 60
Ecole Internationale de Bordeaux
See EIB
Economic Questions of Food
Industries, 87
editing, 87
EEC, 17–18
cooperation, 18
EIB, 53–54
ELFIS, 15–16
ENVIROLINE, 15
EPIC, 6
EPIdemics, PRE-diction
and PREvention
See EPIPPE
EPIPPE (computer program), 34
ERIC, 8–9
Ethiopia, 22, 102
EUROLUG, 81
European Economic Communities
See EEC
European Online Users group
See EUROLUG
Evaluation Assistance Project [Niger]
See EAP
Expert Group on Biotechnology
[Malaysia], 49

F

FAMA, 37
FAO, 16
Farm and Home Advisor
See FHA

Farm Land Values, 6
 farmers (T), 21
 Farmers Organization Board [Malaysia], 37
 Fastback Plus [software], 135
 fax, 68, 118–120
 fax [Group I], 119
 fax [Group II], 119
 fax [Group III], 119–120
 fax [Group IV], 119–120
 fax machines, 19
 Federal Agricultural Marketing Authority [Malaysia]
 See FAMA
 Federal Land Consolidation and Rehabilitation Authority (Felcra) [Malaysia], 37
 Federal Land Development Authority (Felda) [Malaysia], 37
 fertilizers, 32
 FGP, 24
 FHA, 27
 Fiji, 102
 FINFOR, 16
 Fixed Disk Organizer [software], 135
 Food and Agricultural Organization of the United Nations
 See FAO
 Food, Agriculture, and Science [CD-ROM], 140
 Foreign Production, Supply and Distribution of Agricultural Commodities, 6
 Forest Products Abstracts, 15
 Forest Research Institute Malaysia
 See FRIM
 Forest Service Photograph Collection [videodisk], 137
 forestry, 14
 Forestry Abstracts, 15
 Forstliche Umschau, 15
 FPG, 24
 French Agence de Coopération Culturelle et Technique
 See ACCT
 Frias, Marina Barile
 See Barile-Frias
 Frierson, E. (A), 139
 FRIM, 38–39
 FS-INFO, 16
 fund raising, 114
 Future Growth Potential
 See FGP

G

Gallyas, C. (A), 69
 gateway systems, 62
 Geac, 134

Genbank, 5–6
 General Programme for the Training of Agricultural Information
 See PROGEFIA
 Geoecology Database, 6
 George, M., 60
 Ghana, 22
 Godwin Nitrogen Simulation Model, 33
 GOP, 106
 Government of Pakistan
 See GOP

H

Harvard Graphics [software], 135
 HERB-OPT (computer program), 34
 herbicides, 32
 Herpay, E. (A), 44
 Hewlett-Packard minicomputer, 12
 Hill Food Production Project, 27
 HORDEPROG (computer program), 34
 Howard, J.H., 60
 HP 3000 [computer], 129–130
 Karolyi Mihaly National Agricultural Library, 2
 Hutchinson, B.S. (A), 110

I

IAALD, 15–16, 45, 54, 66–67
 IAALD Regional Conference, 130
 IAALD World Congress (Manila, 1980), 151
 IAALD World Congress (VIIth, Ottawa, Canada), 66, 81
 IAPG, 48
 IBM AT, 102
 IBM PS/2, 102, 129
 IBM-XT microcomputer, 112
 ICIMOD, 25
 ICPSR, 6
 ICRAF, 16
 IDRC, 128–132
 IFIS, 2
 IGP, 24
 IK, 25–26
 Immediate Growth Potential
 See IGP
 indexing, 62
 India
 Hindu Kush-Himalayas, 24
 Indigenous Knowledge
 See IK
 information centers, 114
 information dissemination, 69, 75

Information Institute of Guangdong Provincial Academy of Agricultural Sciences, 128
 Information Institute of Hebei Provincial Academy of Agricultural Sciences, 128
 Information Institute of Hubei Provincial Academy of Agricultural Sciences, 128
 Information Institute of Jiangsu Provincial Academy of Agricultural Sciences, 128
 Information Institute of Liaoning Provincial Academy of Agricultural Sciences, 128
 Information Institute of Shaanxi Provincial Academy of Agricultural Sciences, 128
 Information Institute of Sichuan Provincial Academy of Agricultural Sciences, 128
 information management, 4, 52, 75, 110, 122
 information needs, 1
 information needs (agriculture) (T), 22
 information networking, 59
 information networks, 55
 information retrieval, 71
 information seeking, 44
 information services, 4, 11, 17, 133, 146
 information services [Hungary], 1
 information sources, 14
 information storage, 122, 136
 information technology, 105, 118
 INMAGIC [software], 106–107
 innovation, 105
 Inter-university Consortium for Political and Social Research
 See ICPSR
 Interagency Planning Groups [Malaysia]
 See IAPG
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 See ICIMOD
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 See ICRAF
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 See IDRC
 International Food Service
 See IFIS

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for Agricultural Science and
Technology
See AGRIS
International Irrigation
Management Institute, 121
International Plant Protection
Information Symposium
[CABI], 130
International Symposium on
New Horizons in Agricultural
Information Management, 132
International Telegraph and
Telephone Consultative
Committee, 119
International Union of Forest
Research Organizations
See IUFRO
Internet, 120–121, 137
Iowa State University, 137
Islamia College, Department of
Agriculture, 106
ISO 2709, 63
IUFRO, 15–16
Ivory Coast, 102

J

Jehl, M-J (A), 52
Jiang Xiangdong, 132
Johnson, J.S. (A), 105
Jones, D. (A), 146

K

Kaiyang, L. (A), 128
KATI, 16
KAWARE 2 [software], 137
Kempf, A. (A), 14
Kennedy-Olsen, J. (A), 4, 122
Kenya, 22, 102
KIT, 102–103
Knowledge Access, 137
Knowledge Index, 147–148
Koninklijk Instituut voor de Tropen
See KIT
Kotler, P., 115

L

Lang, W. (A), 62
laser printer, 102
LaserData, 137
Laux, W. (A), 66
LCSH, 17
Lenin All-Union Academy of
Agricultural Sciences
See CSAL of VASKHNIL
less developed countries, 52
LGP, 24
Li Kaiyang (A), 128

librarians, 94
librarians attitudes, 4
library administration, 90
library associations, 94
library automation, 105
library collection development, 55,
122
library collections, 83
library development, 101
library education, 94
library management, 4
library networks, 94
Library of Congress Subject
Headings
See LCSH
library planning, 4
Library Preservation Survey
Results—Entomology (T), 84
library profession, 150
library services, 41, 150
Africa, 20
library surveys, 83
Long Distance Telephone Rates
(T), 118
Lotus 1-2-3 [software], 135
Lotus [software], 135
Low Growth Potential
See LGP
Lynch, C., 137

M

Machine Readable Cataloging
Record, 106
MAFF, 91
MAFF Library, 91
Maize Germplasm Bank, 102, 104
Malaysia, 36
Malaysia. Department of
Agriculture, 37–38
Malaysia. Department of Fisheries,
37
Malaysia. Department of Forestry, 37
Malaysia. Department of
Veterinary Services, 37
Malaysia. Information Ministry, 37
Malaysia. Ministry of Agriculture, 38
Malaysia. Ministry of Information,
38
Malaysian Agricultural Research
and Development Institute
See MARDI
Mali, 102–103
Mangstl, A. (A), 32
Mann Library, 5–9, 84, 123, 126
Mann, E., 81, 151
MARC, 106
MARDI, 37–39

Maryland. University
See University of Maryland
mass media, 36
Mathiesen, I. (A), 41
Mauritania, 111–113
Mauritania Agricultural Research
Project II
See AGRES II
Maxton WORM, 137
Maxwell Online, 6
Medical Sciences Committee
[Malaysia], 49
Medline, 5
MICRO-ISIS, 63–65
microcomputers, 62, 133
MINISIS, 130
MINISIS [software], 112, 129
Ministry of Agriculture, Fisheries
and Food [United Kingdom]
See MAFF
Minzu, Z., 132
models, 97
Morton, M.L. (A), 133
Mouchet-Rougelot, M-J (A), 29
MS-DOS, 102–103, 135
MS-DOS 3.1 [software], 137
MS-DOS 4.0 [software], 135
MS-DOS extensions, 102
Muhiddin, R. (A), 46
Mutewera, L. (A), 17

N

NAL, 60, 81, 86, 115–116, 121,
137–138
NATDP, 137
National Agricultural Library (U.S.)
See NAL
National Agricultural Text
Digitizing Project
See NATDP
National AGRIS Center of China,
128–131
National Agronomic Research
Center [Mauritania]
See CNRADA
National Farmers Organization
[Malaysia], 37
National Institute for Development
Research
See NIDR
National Library of Medicine
See.nlm
National Research and Education
Network
See NREN
National Resources Inventory, 5
National Science Center [Malaysia]
See NSC

Nepal, 24
rural extension, 24
networks, 14
networks [computer], 118
New Scientist [magazine], 49–50
NIDR, 113
NIDR Library, 113
Niger, 111–113
Niger Ministry of Planning, 112
NLM, 60
North Carolina State University,
121, 137
North Yemen, 111–113
North Yemen. Documentation
Learning Resource Center
DLRC, 112
Northwest Frontier Province
Agricultural University
See NWFP AU
Norton Utilities [software], 103
Norton, T. (A), 90
NREN, 120
NSC, 50
NWFP AU, 106–108

O

OALS, 111–113
Objectives of CAP, 57
Ochs, M. (A), 118
OCLC, 5–6
OCR, 120, 138
Office of Arid Land Studies
See OALS
Ogbourne, C. (A), 75
Olsen, Jan Kennedy
See Kennedy-Olsen, J.
Olsen, W.C. (A), 122
Omni [magazine], 49
online searching, 71, 146
online systems, 146
optical character recognition
See OCR
optical data disks, 139
optical disks, 136
optical scanners, 136
optical scanning, 118, 120
Oracle (computer program), 33

P

Pakistan, 105
Gilgit, 28
Kalam, 26
Palm Oil Research Institute
Malaysia
See PORIM
Pan Suchun (A), 128
Papua New Guinea, 102

PASCAL, 15–16
PC AT 286, 137
PC Tools [software], 103
PC/AT [microcomputer], 121
PEPET, 39
PEPET-IDRC Programme, 39
Personal Editor II [software], 135
Personal Librarian [software], 137
Peshawar. University [Pakistan]
See University of Peshawar
[Pakistan]
Philippine Department of
Agriculture, 95–96
Philippines, 94
Philippines, University
See University of the Philippines
PHYTOMED, 15, 71–72
Pillai, S. (A), 46
PORIM, 38–39
Pozdnjakov, V.G. (A), 97
preservation, 83
Pro-Cite [software], 135
professional development, 52, 133
PROGEFIA, 22, 53–54
Project of the Chinese Agricultural
Information Services, 132
PROLOG (programming
language), 34
publishing industry [Hungary], 69
PUDOC, 81

Q

Qiaoqiao Zhang (A), 55

R

Radio, Television Malaysia
See RTM
Research Institute for Plant
Quarantine, Moscow, 79
Research Institute of Biological
Methods in Plant Protection,
Kishinev, 79
Research Libraries Group
See RLG
review [information survey], 87
RICOH [laser printer], 137
RICOH [scanner], 137
RISDA, 37–38
RLG, 120
Royal Tropical Institute
See KIT
Royal Veterinary and Agricultural
University, 42–43
Royal Veterinary and Agricultural
University, Copenhagen, 42
RRIM, 38–39
RTM, 49

Rubber Industry Small Holders De-
velopment Authority [Malaysia]
See RISDA
Rubber Research Institute Malaysia
See RRIM
rural extension, 20, 24, 36
Russell, K.W. (A), 114

S

SACCAR, 19, 54, 113
San Isidro Rural Systems
Development Project
See SIRSDDP
SAS, 9, 33
Scholz, M. (A), 71
Science [magazine], 47
science and society, 46
Science Digest [magazine], 47,
49–50
Science 80 [magazine], 49
Science News [magazine], 47, 49–50
Science, Technology and Environ-
ment Ministry [Malaysia], 50
Scientific American [magazine],
47, 49
scientific and technical
information, 41, 46, 75
scientific literacy, 46
SCISEARCH, 15
SDI, 15, 130
SDIC, 128–129, 132
search strategies, 71
Selective Dissemination of
Information
See SDI
serials, 87
shared library resources, 55
Shuchun, P. (A), 128
Sierra-Leone, 22
SilverPlatter, 13, 104
SIRSDDP, 27–28
Sison, J.C., 132
Sixth Malaysia Plan, 50
Smarterm, 135
Smarterm 240 [software], 135
Social Sciences in Forestry, 15
Southern African Centre for Cooper-
ation in Agricultural Research
See SACCAR
Spikman, G. (A), 11
SQL, 33
staff development, 133
Statistical Analysis System
See SAS
Strategic Issues in Agricultural In-
formation with Special Refer-
ence to Developing Countries
See IAALD Regional Conference

Structured Query Language
 See SQL
subject index terms, 80
Sudan, 102
SURANET, 121
Suriname, 102

T

T & V, 27
Tanzania, 102, 104
technical assistance, 110
Technical Center for Agricultural
 and Rural Cooperation
 See CTA
technological literacy, 105
technology transfer, 36, 101
Technology War, 5
telecommunications, 118
telefacsimile
 See fax
telefax
 See fax
TEXTWARE [software], 137
thematic documentation, 87
thesauri, 80
Thomas, S.E., 61
Thomas, S.E. (A), 80
Toxic Release Inventory, 6
training, 52
Training and View System
 See T & V System
Trinidad and Tobago, 102
Troll, V. (A), 32
TROPAG & RURAL, 102, 104

U

UA, 112
UK Online Users Group
 See UKOLUG
UKOLUG, 81
UNDP, 112
UNESCO, 1
UNI*C, 42
UNIBASE, 137
Union of Soviet Socialists Republics
 See USSR
United Kingdom. Ministry of
 Agriculture, Fisheries and Food
 See MAFF
United Nations, 137
United Nations Development
 Programme
 See UNDP
United States
 See U.S.
United States Agency for
 International Development
 See USAID

United States Agricultural
 Information Network
 See USAIN
University of Arizona
 UA, 111
University of Arizona Arid Lands
 Information Center
 See Arid Lands Information
 Center
University of Arizona's Office of
 Arid Lands Studies
 See OALS
University of Botswana, 113
University of Georgia, 60
University of Illinois, 106-107
University of Maryland, 121
University of Peshawar [Pakistan],
 106
University of the Philippines at
 Los Baños Library, 95
University of the Philippines,
 Institute of Library Science, 95
University of Vermont, 137
University of Zimbabwe
 See Zimbabwe (University)
UPS/SPS, 102
USAID, 106, 112-113
USAIN, 60-61
USDA, 60, 116
use studies, 97
user needs (information), 44, 66,
 71, 94, 97, 139
user satisfaction (information), 11,
 71, 90
users (information), 146
U.S. Agency for International
 Development
 See USAID
U.S. Animal Welfare Information
 Center, 116
U.S. Congress, 116
U.S. Department of Agriculture
 See USDA
U.S. Department of Education, 137
U.S. National Library of Medicine
 See NLM
U.S. National Agricultural Library
 See NAL
U.S. National Commission on
 Preservation and Access, 86
USSR, 97
Utrecht University
 Veterinary Faculty, 18

V

V.I. Lenin All-Union Academy of
 Agricultural Sciences
 See CSAL of VASKHNIL
Vágó, J. (A), 1

van Boven, M.C.A. (A), 11
van Hartevelt, J.H.W. (A), 101
Vardy, R. (A), 110
Vermont. University
 See University of Vermont
Vertical Sectors of the Chinese
 Information System, 56
veterinary medicine, 17
videodisk, 137
videotext, 32, 34
vocabulary development, 80
Vogels, J. C. (A), 32

W

Wageningen Agricultural University
 Library, 12
Wang Xianfu (A), 128
Western Samoa, 102
WordPerfect, 135
WordPerfect [software], 102, 104,
 106-107, 135
World Agricultural Economics and
 Rural Sociology Abstracts, 78
World Bank, 112, 137, 139

X

Xianfu, W. (A), 128
Xiangdong, J., 132
XtreePro [software], 135

Z

ZALINET, 57
Zambia, 22, 102-103
Zeng Minzu, 132
Zhang, Q. (A), 55
Zhejiang Agricultural Library and
 Information Network
 See ZALINET
Zimbabwe, 17, 22, 102
Zimbabwe (University)
 Veterinary Faculty, 18
 Veterinary Library, 17
Zimbabwe Veterinary Association,
 18-19
Zimbabwe Veterinary Journal, 18
Zoellick, P.A. (A), 139
zomo, 26



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Fifth World Congress of Agricultural Librarians and Documentalists. Mexico City, 1975. Proceedings. México, D.F.: Instituto Nacional de Investigaciones Agrícolas, 1978. 485 pp. Price: £4.00 to non-members. Obtainable from Secretary/Treasurer (address inside front cover).

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- Revista AIBDA.* Semiannual. Asociación Interamericana de Bibliotecarios y Documentalistas Agrícolas, Secretaria Ejecutiva, c/o IICA-CIDIA, Turrialba, Costa Rica.
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- Mitteilungen der Gesellschaft für Bibliothekswesen und Dokumentation des Landbaues (GBDL),* c/o Sekretariat der GBDL in Paracelsusstr. 2, D-7000 Stuttgart 70, BRD.
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