1995

Communicating Agricultural Information in Remote Places, Part II

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Communicating Agricultural Information in Remote Places

PART II

January 23–26, 1995 • Melbourne, Australia
INTERNATIONAL ASSOCIATION OF AGRICULTURAL INFORMATION SPECIALISTS (IAALD)

Aims of the Association

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 500, drawn from eighty 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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Proceedings of the IXth World Congress of the International Association of Agricultural Information Specialists: Communicating Agricultural Information in Remote Places

PART II

Hosted by the Agricultural Information Association for Australasia (AGRIAA)

January 23–26, 1995 • Melbourne, Australia

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. XLI, no. 2, 1996
Instructions to Authors

The Quarterly Bulletin of the International Association of Agricultural Information Specialists (IAALD) accepts articles that are of professional interest to the broad group of IAALD members and readers of the Quarterly Bulletin. Articles should be of regional concern and research should be statistically valid and replicable with the results of broad applicability. Articles submitted will go through a blind review process with an independent reviewer and will be returned to the author for corrections and modifications if necessary. Manuscripts not accepted for publication will not be returned to the author. Electronic submissions are welcome if fully IBM PC compatible on either 5 1/4 inch or 3 1/2 inch diskette. Articles can be accepted unformatted in an ASCII file or in a number of word processing programs. Graphic images may also be sent electronically but the editor must be notified prior to submission to verify that the format is acceptable. Hard copy is required and should accompany the disk.

All Quarterly Bulletin articles are published with a specific tabular style and follow bibliographic conventions as listed in the Chicago Manual of Style 14th edition. References should be complete and tables should comply with the editorial style represented in the Quarterly Bulletin. Two copies of all articles must be submitted with an abstract in English of 150 words or less. Additional abstracts in French, Spanish or German are welcome. Articles submitted should be accompanied with the institutional affiliation and address of each author as well as a brief biography and photograph.

News in the field of bibliography and documentation of agriculture and allied subjects is welcomed. Letters to the Editor will also be published in the Quarterly Bulletin. These items will be accepted in English, French, German, or Spanish. News items can also be submitted electronically to the editor’s address.

Please send all manuscripts by AIR MAIL directly to the Editor:
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This is an excellent way to serve both the organization and the profession without leaving your home town. If you are interested in more information or in signing up, please contact the editor at the address given on the editorial page.

I would like to thank the following people who are donating their time and talent to this process. They have worked hard on your behalf during this past year.

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Dr. Qiaoqiao Zhang
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Conference Overview

COMMUNICATING AGRICULTURAL INFORMATION IN REMOTE PLACES: papers presented at the IXth World Congress, January 23–26, 1995, Melbourne, Australia

PART 1 (in Quarterly Bulletin of IAALD, v. 41, no. 1)

Keynote Address
Pamela Q.J. André / Communicating Agricultural Information in Remote Places

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Thiendou Niang / The Role of CTA in Disseminating Agricultural Information in ACP Countries
Colin Ogborne and Tim Ison / International Partnerships in the Delivery of Agricultural Information to the Developing World
Pierre Dandjinaou / New Technologies in Agricultural Information Centres and Systems in Francophone Africa: Assessment and Prospects

Concurrent Session 1: Sustainable Information Systems
Samba Aw / Agricultural Databases in the Sahel: Situation Analysis, Future Prospects within the Sustainable and Integrated Development Framework of the Region
Margot Bellamy / Planning for a Sustainable Information System in the I.T. Age: Tradition versus Technology
Isabelle Gachie / Producing and Disseminating Information to the Agricultural Producers of CIS Countries

Concurrent Session 2: Information Delivery in Latin America
Elizabeth Goldberg / Information for Research in Sustainable Agriculture—Going to the Source
Edith Hesse / Latin American Agricultural Information Initiatives
Fernando C. Peres; Janeti L. Bombini de Moura, Angela R.P. e Peres, Sonia Correa Darocha, John Luiz Boscariol / Brazilian Agricultural Science Citation Index IBCCAg: Preliminary Results
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Concurrent Session 3: Disseminating Information to Extension Workers and Farmers
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Chris Landon-Lane / Participatory Rural Appraisal Concepts Applied to Agriculture Extension: a Case Study in Sumatra
Puis R. Mishra / A Multi-Media Approach to Nutritional Blindness Prevention Project: A Case Study of Two VDCs in Gorkha District
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Lynn Webber and John P. Brien / Facsimile Technology Improving Access to Agricultural Information in Outback Australia

Concurrent Session 7: Information and Cultural Remoteness
Bruce Cumming, Cengiz Erol, Vicki Mitsos / Addressing Cultural and Language Remoteness in the Goulburn Valley, Australia
Olivier Sagna / The TCP/IP Networks in Sub-Saharan Africa

Concurrent Session 8: Australian Experiences with Electronic Networks
Ian Crellin and Jim Graham / The Australian Telecentres Program: Providing Public Access to Information Networks for People in Rural and Remote Regions
Mandy Curnow / LandcareNet—Australian Farmers' Brush With It
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Jean-Paul Jetté / Communicating Veterinary Information Among Specialists Around the World on Internet
David Stoker and Alison Cooke / Using the Internet to Co-ordinate the Provision of Agricultural Information Sources in UK

Concurrent Session 10: Overcoming Distance with Technology
Chris Addison and Tim Cullen / Harvest from the NET: Benefits of E-mail for Disseminating Agricultural Information in the African Continent

Concurrent Session 11: Taking Information to Remote Locations
Rosemary Blakeney and Doug Stewart / Information Highway or Dirt Track? Challenges in Delivery of Electronic Information Products to Isolate Clients
Ann Hanger / A Partnership for the Future: Better Library Services for Rural Clients through the Collaboration of a Special Library, a State Library and Some Public Libraries
Jodee Kawasaki / Communication of Information to Remote Places Takes Training

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- **Supporting the Information Needs of Agricultural Research Scientists Working in Remote Locations: Implications of Recent Studies and Changes in Technology and Delivery Mechanisms**
  - Peggy J. Beavers, Keith W. Russell, Ted S. Sibia

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  - A. Mangstl, J.M. Pohlmann, H. Friedrich
This volume of the Quarterly Bulletin finishes the publication of the papers of the IXth World Congress held in Melbourne, Australia. It includes the last 20 papers presented along with brief summaries of the poster sessions. We have tried to bring as much of the conference as we could to the IAALD Members who could not attended and provide a useful volume for those people who attended the conference. The two volumes of the conference clearly indicate the diversity and the interests of IAALD Members.

Once again we have tried to include multiple languages where practical. The contents have been translated into two languages as have the descriptions of the poster sessions. The Poster session section is designed to give you enough information to see if you want to contact the presenter for more information. Phone and Fax numbers and email addresses have been provided where possible. All this is designed to promote networking and exchanging of information for IAALD members.

Translating all of the abstracts and the poster session is not an easy task. IAALD is fortunate to be able to take advantages of the services of CIAT. The Spanish translations were provided by Lynn Menéndez of the Translation Unit at CIAT in Colombia, South America. The French translations and any training aids are provided by Marie-Josée Jehl of CTA in the Netherlands. Marie-Josée provides the translations as a service to IAALD. She is committed to IAALD’s tradition of providing multiple languages and donates a great deal of time to this cause. During my term of editorship we have provided a great number of abstracts and other features in multiple languages. Marie-Josée has translated the majority of those abstracts into French. Marie-Josée is also responsible for the training aids that have been issued on an irregular basis. These aids are designed to help information professionals in their day to day work. They focus on a specific topic and are applied in nature. These aids are provided as another IAALD service and Marie-Josée is the architect of that service. I want to publicly thank Marie-Josée for her continued service to the organization and the IAALD membership.

Also included in this issue is an update to the membership list in the Member Handbook. These additions and corrections will be included with each issue of the Quarterly Bulletin to allow you to update your membership list. Once I have the member database created, we plan to issue the membership list annually. Until that time, we will be doing member updates with each issue of the Quarterly Bulletin. If you change your address or wish to provide your phone, fax or email, please contact me at the address below. This is one way IAALD is promoting networking among its membership.

The move to Allen Press has been completed and we hope to see an improvement in the distribution of the Quarterly Bulletin. One of the advantages of moving the printing to Allen Press in Lawrence, Kansas, USA is that they not only do the printing but handle the distribution of the journal as well. I will have only one place to call to find out where the Quarterly Bulletin is in the printing and distribution process and so far they have been quick to print the issue and get it out in distribution. After we have been with Allen Press for a while, we will once again do a distribution survey to see if the distribution of the Quarterly Bulletin has improved with this move. So far I have been pleased with Allen Press and the personnel who have worked on the Quarterly Bulletin. We are continuing to monitor the distribution problem.

With this issue, we will have published more than the equivalent of an entire volume of the Quarterly Bulletin. Our publication budget calls for the printing of 240 type-set pages for a year and once this issue is produced, we will have exceeded that. For that reason (and the fact that there are only so many hours in a day), there will only be one more issue of the Quarterly Bulletin. It will be a catch up issue with all of the news that has accumulated along with descriptions of different types of information centers around the world. It will be an informative and we hope interesting issue.

As always, the IAALD production staff welcomes any comments or suggestions you may have. Send them to:

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ABSTRACT: In his address to the Congress, Derek Tribe calls upon the group to help shape the Internet as an information tool. He warns about the widening gap of the information haves and have-nots and observes that the inequalities in the distribution of knowledge are already wider even than those in the distribution of wealth. He called on the group to inform and convince world leaders and decision makers to give a higher priority to institutions and activities that generate and disseminate agricultural knowledge.

RESUMÉ: Dans son allocution, Derek Tribe a demandé aux conférenciers leur assistance pour faire d’Internet un instrument d’information. Il les avertit du fossé grandissant entre les personnes qui détiennent et celles qui ne détient pas l’information, et observe que les inégalités dans le transfert des connaissances sont déjà plus grandes que dans la distribution des richesses. Il leur a demandé d’informer les décideurs mondiaux et de les convaincre à donner une plus grande priorité aux institutions et activités qui génèrent et diffusent les connaissances agricoles.

RESUMEN: En este discurso para la Sesión Plenaria del Congreso, Derek Tribe convoca al grupo para que ayude a configurar a Internet como una herramienta de información. Previe en sobre la creciente brecha que existe entre las personas que tienen acceso a la información y las que no la tienen, y hace la observación de que las desigualdades en la distribución del conocimiento ya son mayores que las que se presentan en la distribución de la riqueza. Convoca al grupo para informar y convencer a los líderes mundiales y a los funcionarios que toman las decisiones para dar mayor prioridad a aquellas instituciones y actividades que generan y difunden el conocimiento agrícola.
your company. Throughout my life I have often played around on the edges of your profession—as a teacher, an adviser to farmers, a writer and as a talker! But my activities as a disseminator of agricultural information, much though I have enjoyed them, have only been the untutored efforts of an amateur. In this age of computers, I am still an unashamed quill-pen man.

While you all rush up and down your information super-highways in your latest high-tech vehicles, I potter along the information lanes and byways on my bike. I often read of the extraordinary things you professionals get up to and, although I can’t understand it, I marvel at the literature you produce. For example, I read, only the other day, an article that explained that, and I quote,

Available on the Internet are a number of tools including e-mail, listservers, Telnet, the file transfer protocol, gophers, wide area information servers, news services and World Wide Web.

No wonder cyclists are banned from travelling on super-highways—we wouldn’t last five minutes.

Naturally I stand in awe of the mind-boggling advances which seem to be taking place twice daily in your profession. Yet, as I pedal along on my bike, I can’t help wondering whether super-highways are all that they are cracked up to be. It worried me to read in a recent issue of Internet World that:

there is a world of information on the Internet but little of it is easily accessible…. The problem is finding what you need… and distinguishing truthful information from fraudulent information…users are quickly finding out that the Internet is not what they thought it would be….much of the information available in file transfer protocol archives is ‘grey literature’ and many documents are out of date….most information is not yet at the point where it is immediately useful or relevant….the time and costs of using the Internet may be higher than the value of the information gained.

Reading such comments from the experts makes me feel that perhaps my bike isn’t so bad after all. Now please don’t misunderstand me, I am not the Luddite that I may sound. The new electronic information technology is one of the great advances of our time—or, indeed, of any time. But I’m reminded of the story about a visit Queen Victoria made to the Royal Institution in London—to see a demonstration by Michael Faraday of a new physical phenomenon called “electricity”. She watched with interest and then said “But Professor Faraday, what is the use of this thing you call electricity?” “Ma’am”, Faraday is said to have replied, “What is the use of a new-born babe?”

It is now up to you, the parents of the new agricultural information technology to see that your baby turns out to be a Leonardo da Vinci, Albert Schweitzer or Mother Teresa—rather than a Jack the Ripper, Adolf Hitler or Idi Amin. Will your baby live to increase further the differences between the world’s haves and have-nots—or will it close the gap and bring the light of knowledge to all?

The creation and dissemination of knowledge have always been two of the most sublime activities of the human race. However, it has been reported recently that more than 80% of the world’s new knowledge is currently the preserve of less than 10% of the population. The Internet Society estimated a few months ago that the Internet is used by less than half of 1% of the population.

The Director General of UNESCO recently pointed out that:

Today the gap between the poor and the rich is a knowledge gap. There can be no sustainable development throughout the world if there is no increase in the transfer of scientific information.

Inequalities in the distribution of knowledge are already wider even than those in the distribution of wealth—and present policies are making the situation worse, not better. For example, the annual national investment in science and technology in Japan runs at $700 per person, compared, for example, with 22 cents in Nigeria. The reality is that at least 1 billion adults throughout the world are tonight excluded from the benefits of the growth of knowledge because their illiteracy and poverty combine to lock them into their present state of ignorance. Among this mass of uninformed are most of the farmers, foresters and fishermen in the world. Yet these are the people we are asking to perform the extremely difficult trick, during the next 25 years, of protecting their environments while doubling their food production.

The way we deal with the related problems of population increase, poverty, hunger and environmental degradation will determine the state of the world during the next century. Increased knowledge about these issues is steadily becoming available from the global research network. The speed at which this is occurring urgently needs to be increased but, even if this is achieved, it will be of no avail unless the new knowledge is made available to those farmers, foresters and fishermen in whose hands the management of the earth’s natural resources primarily rests.

When I meet these farmers, as I often do when pottering along on my bike, I am moved to wonder what the information super-highway is going to do for them. In my own mind, I liken these highways to the main arteries which take the blood up and down the human body. But these arteries function effectively through their two-way connections with the smallest blood capillaries which carry oxygen and essential nutrients to each organ, tissue and even cell throughout the body.

Knowledge is the oxygen which sustains life in the global agricultural body and it, too, can only do its job if it is carried to and from every village and every farm in every
country. An improved supply and circulation of agricultural knowledge are the first requirements if the world’s farmers are both to produce the food we need and to protect the world’s natural resources. Despite the impressive advances of recent years, neither the research base nor the extension, education and training base that are so urgently needed, are presently capable of doing the job. Worse still, in recent years the funding support for both, in most countries of the world, has been declining.

Friends, if there is one activity that, more than any other, needs to be undertaken by you and your Association it is to inform and convince the world’s leaders and decision makers that they must give much higher priority to institutions and activities that generate and disseminate agricultural knowledge.

Sitting on my bike, using my quill pen, I’ve done my best to convey this message—and CABI, bless them, have published the result—Feeding and Greening the World. But will the right people get the message? Will they believe it? Will they act on it?

Optimistically, I like to think they will—provided this message is taken up in a chorus that echoes up and down the super-highways, as well as the country lanes. The message is irrefutable, the target is unmistakable, and you, the professionals, have the expertise, the technology and the contacts to make sure that the message hits the target. Go to it!

Thank you again for having me with you tonight. I wish you well in all the various information and extension activities which you together undertake on the highways and in the country lanes. They are all important—and I would like to propose a toast to the future success of your national and international associations and to all who sail in them.

DEREK TRIBE is the author of Feeding and Greening the World: the Role of International Agricultural Research published by CABI in 1994.
Invited Paper

AGRIS and the Internet

H. Schmid and W. Ziegler

ABSTRACT: In 1992 the International Atomic Energy Agency (IAEA) where the FAO’s AGRIS Processing Unit (APU) is located has become a full Internet node, with e-mail, FTP, TELNET and gopher services, and a WWW (World Wide Web) server in preparation. About a year ago APU started to use Internet services for AGRIS operations. The submission of AGRIS input data via FTP has proved more reliable than via e-mail. Remote access via TELNET to AGRIS on-line will bridge the gap between the last AGRIS CD-ROM and the actual production. In IAEA’s gopher menu AGRIS is a separate entry menu item which leads the user to “AGRIS information” and “VIC Master menu” (for AGRIS on-line access). At present “AGRIS information” is restricted to some basic AGRIS documents (e.g. fact sheets) but further developments are planned. FAO is reviving the AGRIS-L electronic discussion group for the participating centres to discuss matters of common interest. IAEA is in process of implementing a WWW server which allows the storing of hypertext databases. An AGRIS application will be the implementation of the various language versions of AGROVOC with possible hypertext links to CIRAD, Montpellier, where the French version of AGROVOC is available under WWW as an Oracle hypertext database on an experimental basis. Another planned application is to make available the AGRIS system manuals.

RESUMÉ: En 1992 el Organismo Internacional de Energía Atómica (OIEA), donde está ubicada la Unidad de Procesamiento de AGRIS (APU, su acrónimo en inglés) de la FAO, se ha convertido en un nodo completo de Internet, con correo electrónico, FTP, servicios TELNET y gopher, y un servidor WWW (World Wide Web) en preparación. Hace casi un año, la APU comenzó a utilizar los servicios de Internet para las operaciones de AGRIS. La presentación de datos de insumo de AGRIS vía FTP ha resultado más confiable que vía correo electrónico. El acceso remoto vía TELNET a AGRIS en línea cerrará la brecha entre el último CD-ROM de AGRIS y la producción actual. En el menú gopher del OIEA, AGRIS es un elemento separado en el menú de acceso, conduciendo al usuario a la “información sobre AGRIS” y al “menú maestro de VIC” (para el acceso en línea a AGRIS). Actualmente la “información sobre AGRIS” está restringida a algunos documentos básicos de AGRIS (por ejemplo, hojas informativas), pero se planean otros adelantos. La FAO está resoluciendo el grupo de discusión en medio electrónico AGRIS-L para que los centros participantes puedan discutir asuntos de interés común. El OIEA está en el proceso de implementar un servidor WWW que permitirá almacenar bases de datos en hipertexto. Una aplicación de AGRIS será la implementación de las versiones de AGROVOC en idiomas diferentes, con posibles enlaces en hipertexto a CIRAD, Montpellier, donde la versión en francés de AGROVOC está disponible bajo WWW como una base de datos en hipertexto en Oracle, al nivel experimental. Otra aplicación planeada pondrá a disposición de los usuarios los manuales del sistema AGRIS.

AGRIS has been in operation for 20 years. In these 20 years, increased computing power, better price performance ratios and two major developments in the field of data processing, have had a strong impact on how users access databases, how AGRIS Participating Centres have prepared and submitted their input, and how this data has been processed at the AGRIS Processing Unit in Vienna.

The first of these two major developments was the introduction and evolution of the personal computer. The personal computer, which in most places has evolved to a workstation on a LAN, has not only placed cheap computing power on our desk tops but, it has revolutionized computing to a great degree. In order to sell hardware and software to virtually everybody, the hardware and especially the software industries have had to come down with prices and make their products more user-friendly. They had to respond to the challenge of providing products geared to users wanting better performance with new types of computers. Not everything is user-friendly in the area of computing, but user-friendliness was never at such a high level as it is now within the PC area. It was within the PC world that graphical user interfaces emerged, and as a result, users are able to perform tasks on their desk...
top computers which would have been inconceivable just a decade ago.

The second major development with great impact was an upsurge in computer networking. Networking between computer systems started as early as 1969 in the United States (ARPANET—Advanced Research Projects Agency—Network). However, this type of networking was still restricted to certain institutions and their elite users. The real quantum leap to modern networking, as we know it now on the Internet, came in the last few years. This unprecedented development was made possible as a result of the following elements:

- the introduction and general acceptance of a set of data transmission protocols, especially the Transmission Control Protocol (TCP) and the Internet Protocol (IP)
- the enormous growth of a telecommunication infrastructure
- the existence of enormous computing power distributed all over the world with microcomputers as intelligent terminals on our desktops.

Internet is not a new network. In fact, it is not correct to say Internet is a network of networks. Internet is the denomination of all computer communications which correspond via the TCP/IP protocol. In 1994, more than 3,000,000 host computers and over 32 million users were connected via the Internet. The system is said to double every 7 months!

Programs, respectively services, which run on the Internet are built according to the Client/Server concept. Client/Server means that program functions are split between the desktop computer (the Client) and the Server (usually a more powerful machine which is part of the network). As opposed to LANs (Local Area Networks) the server need not be in the same organization, or even in the same country. The client program renders certain services to the user independently from the server.

Communication with the server is only started when data or services are needed which are not available on the client.

**Computer Names and Numbers in Internet**

Networking requires a unique identification for each computer. This unique identification in Internet is a worldwide unique name (domain name) and a number (IP number). The correspondence of these names and numbers is kept in a “so-called” name server. A central organisation (the InterNIC Registration Service) assigns unique ranges of addresses and domain names to requesting organizations. FAO has been allocated all addresses beginning with 168.202 and 193.43.36, as well as the domain name fao.org. The IAEA’s Internet computer has the domain name nesirs01.iaea.or.at. with an IP number 161.5.64.10.

**Internet Services at FAO and IAEA**

AGRIS is coordinated by the AGRIS/CARIS Coordinating Centre of the Food and Agriculture Organization of the United Nations (FAO) with its headquarters in Rome, Italy. The AGRIS Processing Unit (APU) is hosted at the International Atomic Energy Agency (IAEA) in Vienna, Austria, through an Interagency agreement. As a result, AGRIS has access to both Internet services, namely the services offered at FAO and those at IAEA. APU has started to use them as soon as they became available.

FAO had been operating electronic mail (E-Mail) for many years on the mainframe computer via the EARN/BITNET network. After a pilot period in cooperation with CGNET, FAO has recently installed a Gopher server (identification gopher:fao.org), a WWW server (with universal resource locator URL http://www.fao.org) and an SMTP server for electronic mail (the e-mail address of an FAO staff member takes the form firstname.lastname@fao.org). Additional services are being planned or are under consideration, such as FTP (File Transfer Protocol), Discussion Lists (listserv), Newsgroups, as well as access to searching mechanisms (Archie, Veronica and WAIS, which are not discussed in this paper).

The IAEA has also been operating electronic mail on the mainframe (via EARN/BITNET) and more recently on a UNIX platform (with e-mail addresses name@nepo1.iaea.or.at). A Gopher server (identification nesirs01.iaea.or.at), FTP and WWW servers as well as discussion lists are in a test phase.

**Internet Basic Services and Its Use in AGRIS**

AGRIS uses in its daily operation the following basic Internet services:

- Electronic Mail
- FTP
- TELNET

**Electronic Mail (E-Mail)** – Electronic mail is probably the most used service on the Internet. The Internet protocol for E-Mail is called Simple Mail Transfer Protocol (SMTP) specified in 1982 and supports messages in ASCII characters only.

In order to use electronic mail the local PC has to be connected to a mailbox computer (mail server), where a mail box server program is active. On the local PC an appropriate client program must be active, for example POPmail or Microsoft Mail. Each user of electronic mail has a unique address, usually in the form name@mailserver. If the address is more complicated, the user is most probably connected via a gateway to Internet mail services.

FAO and the IAEA, both use Microsoft Mail. FAO uses the MS-DOS and the Windows version, IAEA the Windows based version only. The client software is installed on nearly all PCs in the two organizations. FAO has an SMTP gateway between their internal mail users and their central mail-hub which also serves as an SMTP gateway to

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the Internet. This permits all users to be addressed as name@fao.org irrespective of the internal mail service they use. IAEA has a similar setup. APU belongs to the mail server nepol.iaea.or.at.

AGRIS has been using E-Mail for communication with their participants for many years. In 1992, the AGRIS Coordinating Centre began encouraging AGRIS participants to submit input data via E-Mail. However, we encountered some problems.

The reason for these problems were the following. When exchanging data with E-Mail, it is not possible to define file attributes such as record sizes or record formats. E-mail deals with pure unstructured text, and it transports this text in portions which may be longer or shorter than the original length of a text line. For a message it does not matter if the line width is 60, 80 or 100 characters but it does for data. Pure text within E-Mail means standard ASCII text. Diacritical characters or special non-ASCII characters may be changed or misinterpreted during transmission.

Furthermore, E-Mail is designed to handle data lines of the size of a letter or chapter of a book. It is therefore not possible to transmit large batches of input. Even if the limits have increased over the years, the transmission of large files still leads to problems. In general, AGRIS accepts input in two forms, namely in a tag/text format, also called line format, and in an ISO 2709 format. As the tag/text format has almost no structure, no problems were encountered if the data was reasonable in size and did not contain special characters. The opposite was the case with data in ISO 2709 format (output of Micro CDS/ISIS and the AGRIS exchange format). In this format, the structure is important and uncontrolled line breaks (insertion of carriage return and line feed characters) destroy the sensible format.

Nowadays, modern electronic mail programs provide for so-called enclosures or attachments. Data is encoded and converted into characters which can be transmitted without problems via the networks. If the sender and receiver use the same mail software encoding and decoding is done automatically, but, if they communicate with different software usually an explicit encoding or decoding step has to be added. Microsoft E-Mail uses UUENCODE and UUDECODE, and attachments which arrive encoded by UUENCODE will be automatically decoded. Attachments have proven to be a good method for transmitting data of small to medium size batches (up to 200 references) to the AGRIS Processing Unit (APU) in Vienna.

So far, AGRIS has not encountered any problems concerning length, character set or line format for data sent via an attachment. Also diacritical characters are transmitted correctly, a requirement for those input centres which request the computer-assisted translation service at APU (Spanish to English, and French to English which is being tested). Another method for encoding data is MIME (Multi-purpose Internet Extension). APU has received and successfully processed first test data encoded by MIME.

At present, more than 10 AGRIS centres send their data via attachment to the APU. Input submission via E-Mail is much appreciated since no time-consuming diskette handling with AGRIS data is involved (checking for viruses, returning of diskettes to owner, etc.). As part of standard AGRIS production, APU prints and sends, on a monthly basis, error lists for information and action to the participating centres. The use of E-Mail for this activity is being investigated.

**FTP Service -- FTP** (File transfer Protocol) was designed for sending and receiving data files and executable programs across the network. In order to initiate a file transfer, one has to start an FTP session, that is one has to log-in on the host computer with a valid log-in name and a user password. Some hosts also allow one to start the session anonymously by accepting the word “anonymous” as log-in name and no password. Usually users are expected to enter their e-mail address as password. Computers which offer files under FTP service are called FTP sites. A worldwide searching facility for computer files available under FTP is ARCHIE. All kind of files may be transmitted via FTP such as text files, documents, pictures, images, or executable computer codes.

FTP in its native mode is a set of UNIX commands. These commands are very powerful but not user-friendly. Krol in his Internet Guide said in 1992: “FTP was designed before ‘user-friendliness’ was invented”. At the IAEA, the Windows based program Pathway Access (copyright by The Wollongong Group) is used which allows all operations in a user-friendly way (the actual FTP commands can be made visible on the screen).

For the moment, FTP is the best method of sending AGRIS data to Vienna. Even large input quantities have been transmitted without any problems. However, it should be noted that when transferring large files we recommend that centres use a compression technique (APU can process PKZIP copyright by PKWARE Inc. and ARJ copyright by R.K.Jung, Norwood, Mass.) in order to keep the transmission times short. So far, six AGRIS centres have been using FTP for input submission on a regular basis.

FTP provides two-fold possibilities, either getting a file into an individual computer or putting a file on the server. However, due to security considerations at the IAEA, like at many other places, measures are in place that restrict users in writing data onto IAEA’s computer system.

For AGRIS input submission, APU therefore has to fetch the data from the participating centre. The participating centre has to send an E-Mail in the style of the AGRIS Input Submission/Acknowledgment...
Form. This electronic form contains the standard information (the range of TRNs, number of references, date of shipment) and the detailed instructions on how to pick up the file via FTP (the Internet computer name or IP number, log-in name and password, the file name with the path). We recommend that log-in name and password provide access to AGRIS data only, although some centres give us access to all data.

FTP knows two types of data, namely ASCII and binary. ASCII means that a specific character is transmitted as this character, even if its binary representation in the transmitting computer is different from the receiving computer. Binary means that each byte is transmitted bit per bit without interpretation of its meaning. Consequently, plain text data should be transmitted as ASCII, and non-text data such as executable files, word processing files, image and audio files must be sent as binary files. Since we accept only ASCII data, it should be transmitted using ASCII mode. This mode also takes care of the different way of coding line breaks in the various microcomputers and UNIX machines.

Technically, there is no difference between normal FTP and anonymous FTP. Anonymous FTP is a way of giving access to the public without password restrictions. Currently, all AGRIS data on IAEA’s FTP server is available under anonymous FTP. For example, the English version of AGROVOC (structured, single column, ASCII) can be fetched by anonymous FTP from the server <servername>.

TELNET Service – Access to remote computers can be done on the Internet by using TELNET. TELNET is a client program which allows using a PC as a terminal to the remote host computer. At the IAEA, TELNET is included in the Pathway Access software. Between host and terminals there may be different standards for control characters, for example IBM 3270 or VT100 terminal emulation. TELNET client programs usually permit the selection of a communication mode and the terminal emulation.

Via TELNET services, remote users can get access to the last two years of the AGRIS database (free of charge). But access at present is not easy. The database is still on a mainframe computer under the retrieval system STAIRS. To start a TELNET session to the AGRIS database, connection should be done either to the IAEA’s Internet computer <servername> or to the mainframe machine <servername>. Terminal emulation should be set to VT100 for the Internet computer and TN3270 for the mainframe machine. A log-in name and a password is available from the AGRIS Processing Unit at no charge. Nevertheless, users may still experience difficulties with the special control keys, like <enter> and <backspace> or the function keys. The IAEA plans to install the system Personal Librarian on a UNIX machine with easy access through Internet. Various databases, including the last 6 months of the AGRIS database, will be made available Under the Personal Librarian. This procedure will bridge the gap between the most recent CD-ROM and the actual production run.

Internet Advanced Network Services and Its Use in AGRIS

The basic services FTP and TELNET are very powerful, but difficult to handle, specifically for the inexperienced user. However, several advanced services have been developed over the last few years. They are partly built on the above mentioned basic services, while advanced network services are a main reason for the enormous growth in the usage of the Internet. The awareness of this growth has in turn stimulated more services with more information sources into the Internet. As an example, during the first week in January 1995, 33 gopher, 20 TELNET and 80 WWW servers were added to the network.

One can find the most varying types of information on the Internet: graphically presented economic data, weather forecasts, discussion lists, video clips, puzzles, children’s games and so forth. The user only needs to know how to find it. This, however, is not always easy, “Lost in Cyberspace” happens easily to Internet users. One can also easily be carried away by coming across interesting data one originally did not even look for. Only four of the advanced services will be mentioned here, as these are in use or in a planning stage at AGRIS, namely discussion lists, newsgroups, gopher and WWW (or W3).

Discussion Lists – Discussion lists are a variant of electronic mail. Using normal E-Mail, the message is sent to a specific user. In actuality, the message is sent to the mail server to which the user is connected and stays there till the recipient is willing to read his/her mail. With discussion lists, the message is also sent to a mail server, which distributes the message to all partners on the list (electronic circular letters). Discussion lists can be set up as moderated or as unmoderated lists. With moderated lists, the moderator (list owner) has to clear each message before the computer will send it to the list members. In an unmoderated list the computer sends it off without human intervention. Furthermore, one can distinguish between open and closed discussion lists. In open discussion lists, everybody may subscribe. In closed discussion lists, where privacy is an issue, subscriptions have to be accepted by the list moderator.

A well known group of discussion lists are operated by a program called “listserv”, originally developed for EARN/BITNET, but also available via Internet. With listserv, it is important to distinguish between the administrative address (which takes the form <listserv@<servername>>) and the posting address (usually of the form <listname@<servername>>). The first one is used to send administrative
commands to the list, like SUBSCRIBE and UNSUBSCRIBE; the second is used to post messages to the list participants. The distinction of these two addresses sometimes poses a problem to the inexperienced user.

At APU, we have subscribed to the discussion list SPIN-L of SilverPlatter, a discussion forum which is recommended to all SilverPlatter CD-ROM users. In order to register with SilverPlatter’s SPIN-L one has to send an E-Mail to listserv@silverplatter.com with the message subscribe SPIN-L <name of sender>. SPIN-L contains items concerning retrieval and installation problems, as well as news from the SilverPlatter company itself. For example, via SPIN-L we were informed about training material made available by SilverPlatter and that the files containing that material may be retrieved via FTP from their FTP site. We were also informed about a WWW server (see below) that SilverPlatter has started and were invited to read the WWW SilverPlatter home pages. To IAALD members, the discussion lists of CGNET with its administrative address listserv@cgenet.com are probably well known.

During two years the AGRIS Coordinating Centre operated an open discussion list AGRIS-L on an FAO computer in Rome. Following the evaluation of that experience, it was decided to temporarily close it down. It will be resumed as an unmoderated, closed list named agris-caris-l@fao.org. The subject scope cover AGRIS and CARIS matters, FAO documentation databases, FAO field documentation activities, AGLINET, AGROVOC, vacancies and consultancy opportunities in the FAO’s Library and Documentation Division (GIL), jobs and contractual opportunities at the AGRIS/ CARIS national, regional and international centres. Subscriptions will be restricted to AGRIS and CARIS centres, GIL consultants, AGRIS/ CARIS supporters and cooperative institutions, AGLINET libraries, FAO documentation projects and components, and selected information specialists.

Newsgroups – Another type of discussion forum on the Internet are the newsgroups. They are offered by so-called news servers. Contrary to discussion lists, users have to actively pick up the contributions according to their interest. In order to read the articles, users need a client software on their computer, called newsreader. A newsreader usually offers the possibility of replying to the author or to all registered newsreaders. For test purposes, the news server of the Vienna University of Economics as an entry point (news.wu-wien.ac.at) has been used at APU. About 4000 such newsgroups can be consulted from the Vienna University. Recently, in cooperation with the Austrian company EUNET, the IAEA has installed at news server news.iaea.or.at.

A large range of subjects are discussed in these news groups, from scientific items in many disciplines to cooking recipes and children’s games. Like discussion lists, newsgroups can be run as open or as closed groups. The relevance of newsgroups to AGRIS and CARIS is being investigated.

Gopher – In order to get data via FTP or TELNET, the user has to know exactly the address of the host computer, like domain name or IP number. It can be very cumbersome to find out the address of sites which contain information one is interested in. The development of Gopher (developed at the University of Minnesota in 1991) was a step to relieve the user from this effort.

Gopher is an information delivery system presented to the user as a set of menu lines. Each such line can either point to a further Gopher menu, to a text data file, to an FTP connection or to a TELNET session. The type of menu line is usually marked by an icon or a symbol depending on the gopher client software. Any menu item can point to information on the same host computer or on any other host connected to the Internet and equipped with a Gopher Server. Gopher is also based on the Client/Server architecture. When the client software is activated, a connection is made to a standard Gopher (home Gopher) and an initial menu is displayed. FAO and IAEA both operate Gopher servers (gopherfao.org and newsrls01.iaea.or.at). The main Gopher menu of both servers allow switching from one to another UN Gopher or to go to the details of FAO or IAEA respectively.

Below the IAEA main Gopher entry there is a Gopher item on AGRIS where basic information on AGRIS can be obtained (AGRIS fact sheets, FTP to AGROVOC file in ASCII format, VIC master menu which allows a TELNET session to the AGRIS database). It will be a major task in the coming months and years to complete this information. Most likely, the information on AGRIS will be transferred to FAO’s Gopher and the IAEA will only point to this Gopher. For agricultural information, the CGNET Gopher should also be consulted (gopher.cgenet.com). It offers links to a variety of resources related to agriculture, animal health, biology, economics, environmental research, and Latin America studies.

To facilitate finding information via Gophers, a database is maintained containing details of all the Gopher Servers and menu titles in the world. This database is being updated constantly. A searching tool, known as Veronica, allows one to search this database for information.

WWW (World Wide Web) – The latest and perhaps most striking development on the Internet horizon is the World Wide Web, generally referred to as WWW or W3. It allows multimedia applications, supports text, graphics, sounds, images and videos. It links information present at different places all over the world and creates a net or a web of information links.

In order to be able to work with WWW one needs:
• a WWW client software,
• a standard Internet connection, and
• the Internet address of one WWW
server as an entry point into the web.

APU has experience with Mosaic
(version 2.0 Alpha of NCSA, Uni-
versity of Illinois) and, on an exper-
imental basis, with Netscape (ver-
ion 0.9 Beta of Netscape Communica-
tion Corporation).

Connecting to a WWW server
brings the so called ‘home page’ up
on the screen. The home page, as
screen pages in general on WWW,
are a mixture of text and graphics.
WWW pages could be compared
with pages of an illustrated book or
journal. The hypertext links on such
a page are clearly shown by a differ-
ent presentation. Mostly they are
words in a different colour and font
or ‘sensitive areas’ in a picture. If
the mouse pointer is brought over
such a word or area the arrow
changes into a hand with an indicat-
ing finger. With just a mouse click,
the user receives the information
behind that link, which could be
fetched from the same document or
database, from another document or
database on the same server or from
any other WWW server worldwide.

As WWW is a multimedia appli-
cation with the client software run-
ing under Windows, powerful PCs
are needed to exploit the possibili-
ties of WWW. The recommended
configuration is a PC 486DX2-66 or
higher with good network access,
8MB or more RAM, a powerful
graphics card, some 100 MB of free
disk space, and, if one intends on re-
cieving sound data, a sound card
with speakers. If a PC is not power-
ful enough or transmission speeds
are slow, both WWW client pro-
grams mentioned above allow the
exclusion of graphics on the screen
pages. However, even if the graph-
ics are not always needed, by ex-
cluding them, one might lose a lot
of pleasure.

Recently, FAO has installed a
WWW server (www.fao.org) with
the FAO home page. Work is in
progress to make documents and
other data available under WWW.
At the IAEA the situation is similar.
A prototype of a home page is avail-
able on nesir01.iaea.or.at.

At AGRIS, we plan to offer ac-
cess via WWW to a number of doc-
uments, such as manuals, directo-
ries like the list of AGRIS/CARIS
participants and the list of AG-
LINE libraries and AGROVOC.
Since AGROVOC is too large for
sequential browsing it will be im-
plemented as a searchable database
with a proper retrieval engine.

CIRAD in Montpellier (an AG-
RIS centre) has done pioneer work
in this field. They have set up the
French version of AGROVOC as an
ORACLE database. As a pilot and
study project, they linked it with
their WWW server and it is now ac-
cessible worldwide. By connecting
to their home page, one can switch
to AGROVOC by a mouse click and
search for any descriptor or non-de-
scriptor (even with right-hand trun-
cation). Within a wordblock each
word in turn contains the link to its
own wordblock. This allows a very
comfortable usage of the thesaurus.

As said above, if one is connect-
ed to an initial WWW server with
proper setup, one does not need to
bother with addressing details.
However, it may happen that a user
wants to address a WWW server di-
rectly. For such cases, one needs to
know the URL. URL stands for uni-
versal resource locator and contains
the address information needed in
WWW for the connection. Most
WWW client allow saving these
addresses for later use (called set-
ing of bookmarks).

The URL of CIRAD is http://
www.cirad.fr/. Another home page
important for agricultural informa-
tion is the one of CGNET. Its home
page can be addressed under http:

Other Client/Server
Applications in Internet

Apart from gopher and WWW,
there are other client/server applica-
tion on the Internet. For an agricul-
tural user, the SilverPlatter system
may be relevant. SilverPlatter has
developed a client/server application
of the SPIRS software. The client
software can be downloaded via FTP from SilverPlatter’s FTP
site. After installation of this soft-
ware on the user’s PC, the user is
given access to one of the servers
with SilverPlatter databases. At pre-
sent there is one server in Norwood,
UK, with some 20 databases. In the
near future about 20 servers with
some 100–150 databases will be
available. AGRIS will be included.
These databases will be on sub-
scription only (the first month being
free of charge) with a rate compar-
able to the CD-ROM. With this set-
up, SilverPlatter plans to update the
databases as they receive updates
from the databases producers. For
AGRIS, this means monthly up-
dates.

Overlap of Services in Internet

Client software of the various
services in Internet overlap to a cer-
tain extent. For example, one may
access via Mosaic or Netscape a
Gopher site and use the WWW
client software for Gopher services.
One may also access newsgroups
via a gopher client software, but one
cannot submit discussion contribu-
tions from a Gopher. One can also
access by TELNET a mailserver
and use UNIX commands for elec-
tronic mail services.

Working Sectors in Internet

Computer networking and the
possibilities on the Internet will de-
velop further. It will affect the way
people run their daily tasks in the
offices more and more. It will also
affect private life increasingly. Some
authors compare the impact of the
Internet and its services to the im-
 pact of the invention of the printing
press 500 years ago. And, besides
the strength of the impact, there are
also striking similarities in the struc-
ture between the two media.

People around conventional pub-
lishing can be divided into three
groups. The target group are the
readers. The other two are the ones creating the product for the target group, namely, the authors and editors on the one hand, and the printing people on the other. Within the Internet one could similarly define a structure composed of three groups.

• The users are the target audience. Services are set up for their use and they have to be able to find and use the information.
• The information providers, like authors and editors, have to provide the data. That involves writing, extracting and compiling the text and defining the layout. This includes tasks like setting up menus in Gophers or pages (text and images) in WWW, and providing the links to the information.
• The computer specialists provide the technical infrastructure in which the above tasks are running. That includes the telecommunication sector, the development of hard and software, the setting up of servers and clients, the linking to the network, and the development and installation of software for usage by the two groups above.

Conclusion

AGRIS work with Internet has proven very successful and we are looking forward to further developments in this area. An increase in participating centres that have access to the Internet will mean a higher value of services to the entire AGRIS community. It is therefore strongly recommended that centres make every effort to link up to Internet.

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The National Institute for Agronomical Research (INRA) (France): Survey and Prospects in the Field of Scientific and Technical Information (STI)

Christine Silvy

ABSTRACT: The activities and the traditional structures related to the production, dissemination and use of scientific and technical information at the National Institute for Agronomical Research (INRA) are going through great changes. This is due to factors external to INRA (increasing interdisciplinarity of research, status of the scientific publication, technological development) and internal factors [evolution of both INRA research and internal policy on scientific and technical research (STI)]. The major challenges facing INRA include:

- The purchasing policy of periodicals in European countries.
- An activity of dissemination of STI and training has been initiated in the Eastern European countries.

INRA is going to continue linguistic plurality and proposes to develop more interpretation and terminology. An activity of dissemination of STI and training has been initiated in the Eastern European countries.

RESUMEN: Las actividades y las estructuras tradicionales relacionadas con la producción, la difusión y el uso de información científica y técnica (ICT) en el Instituto Nacional de Investigación Agronómica (INRA) están sufriendo grandes cambios. Esto se debe tanto a factores externos al Instituto un mayor interdisciplinariedad de la investigación, el nivel de publicación científica, el desarrollo tecnológico como a factores internos la evolución de la investigación y de la política interna del INRA sobre ICT. El INRA enfrenta los siguientes retos: 1) La política de adquisición de publicaciones periódicas de bibliotecas europeas y de bibliotecas regionales. Debe existir mayor colaboración entre las bibliotecas y deben establecerse convenios de adquisición. Se realizará un programa de sistematización de las bibliotecas del INRA. El Instituto participa también en un proyecto nacional para desarrollar una base de datos sobre literatura gris y ponernla a disposición del público. 2) El análisis de las necesidades en ICT y su evolución. Esto incluye un seguimiento de tecnología, la coproducción de bases de datos bibliográficos, el desarrollo de una base de datos en multimedia y de sistemas de información sobre actividades de investigación, y el uso de servidores de información. 3) Continuación de la pluralidad lingüística. El INRA se propone desarrollar más las actividades de interpretación y de terminología. Se ha iniciado una actividad de difusión de ICT y de capacitación en los países de Europa Oriental.

INRA was created in 1946 and is a national scientific and technological establishment, under joint supervision of the Ministry of Research and Higher Education and the Ministry of Agriculture and Fisheries in France. The INRA mission is answering the needs of Society in an efficient agriculture, a competitive agro-food industry, quality foods, keeping rural areas alive, and preserving the environment.
Three major trends are emphasized in the main themes and scientific programmes in 1994: to adapt the agriculture to its new context and to its new constraints; to extend our knowledge of the living organisms at their different levels, from the genome to the complex populations; and to control the quality of food products. Three hundred research laboratories, 170 experimental units in 22 research centers are well integrated into the regions and cover the whole country. Each unit is part of a scientific department; there are 23 scientific departments belonging to 6 scientific sectors (Physical Environment and Agronomy; Plant Production; Animal Production; Agricultural and Food Industries; Social Sciences and Agricultural Development).

There are five administrative directions: human resources; programmes and finance; legal matters; general and common administrative services; and accountancy department as well as five relational directions: general policy; international relations; industrial liaison and commercial applications; scientific information and communication and computer science.

The 1993 budget was 3.026 MF (=US$605 million): 86% originated from the Ministry of Research and the salaries are included (about 80%). On January 1st, 1993, 8626 people were working in INRA (1760 scientists, 2057 engineers, 3988 technicians, 821 administrative people). The head office of scientific information and communication covers three sectors: documentation, publications and communication. The Documentation department is organized around 16 regional units in the main research centers and two central units around Paris, one for vegetal production and the other for animal production. These two units represent the hard core of the INRA documentation network; besides most laboratories have a specialized library, but their structure, organization and management are heterogeneous.

Survey and Prospects in the Field of Scientific and Technical Information

The traditional activities and structures linked to the production, dissemination and use of Scientific and Technical Information (STI) will still drastically change in the next few years. Among the most obvious reasons for these changes are some factors external to INRA: the increasing interdisciplinarity of research, the status of the scientific publication, the technological mutations observed at the level of the editorial and documentary chain. In addition, some internal factors such as the evolution of our institute’s research and our STI policy have also influenced these changes. This evolution, which was expected, must also be precisely defined, as it will induce some changes in functions, structures, and competencies.

INRA has analysed the current situation and has pointed out some mid-term objectives: the libraries, Europe and the Regions; the needs in STI and their evolution; the languages and Francophony. The field of publications and edition will not be mentioned here, but it is now an important activity, as INRA is an official publisher.

The Libraries, Europe and the Regions – As collective structures, the research libraries not only ensure dissemination of information, but also perform a general cultural role. As they essentially manage collections of journals, they have more difficulties in managing the contradictions of the editorial chain: more journals, that are more expensive and less consulted. They work within a network to share their resources, and they have to provide more photocopies for the exclusive use of one user. They are recognized as the favoured structures in the dissemination of culture and information, they are involved in European programmes and are used to be integrated in regional innovative technostuctures (such as AGROPOLIS in Montpellier). In INRA, a study of the current library situation is being carried out because of the financial problems facing library services.

Purchase: Evaluation, Funding – The policy of purchasing a collection of periodicals, and to a lesser extent the monographs by the libraries is a major issue. The two central documentation units are keeping major long-term collections, thus ensuring continuity since the last century. These collections include both some journals necessary to the laboratories and those necessary to maintain the bibliographic databases. As their cost is increasing and as the documentation budgets are decreasing, this organization must be justified.

We must realize that the central units can no longer guarantee the conservation of some journal series. Several approaches to the problem have been studied since 1992. These include the analysis of budgets, the analysis of the scientists’ needs, the development of evaluation methods for purchasing in the central units and a bibliometric study, linking purchase and position of the journals in the Science Citation Index, has been initiated. In one of the central units, a computerized programme follows the photocopy requests and can therefore analyze the number of titles requested.

The present conclusions lead to the yearly purchase of a core of journals within the central and regional units. In the case of financial restrictions, the purchase of journals should be coordinated by these units. In one center, a network of libraries has been organized, allowing a reasoned management of purchasing. Other centers should be encouraged to do the same. The study should be completed by the analysis of the cost of this purchase compared to the request of multiple photocopies to INRA, and chiefly to other organisations whose prices are much higher than ours though quicker.

Computerization of the Libraries – A study of the changing tech-
techniques of both processing and transferring texts and images within libraries has been initiated. The development of high speed computer networks (data motorways) allows the production, storage and dissemination of documents different from those used currently (“digital libraries”). A pilot project concerning the INRA non conventional literature is being initiated in the frame of the national project of databases on non-conventional literature. An internal working group will be created in order to elaborate on the automation programme for all the INRA libraries. This work was initiated 10 years ago with the development of internal collective databases on periodicals, books and on the inventory of all the libraries.

The central libraries of INRA are facing both qualitative and quantitative problems in document delivery. Some libraries have specific journals which are not the “best sellers” but whose access must remain easy. As they cannot afford the development of electronic reading and digitizing systems of all their collections, they will be obliged to keep a paper service that is a longer and more expensive service. The central libraries of INRA are involved in a policy of commercial rationalization – Since 1970, INRA has been involved in a policy of co-production of bibliographic databases with some partners specialized in this activity (INIST, PASCAL basis), FAO (AGRIS), and develops this last work within a national network of data exchanges (RESAGRI). INRA is considered as a major information supplier at the international level though is not involved in a policy of commercial production like other large international centers of agronomical documentation. The conditions of production are now too precarious to carry on such an ambitious policy, and a realistic analysis is currently being carried out in order to reorganize this activity. An internal study has been carried out since the end of 1993 resulting in a project with INIST of the production of a database on the French-speaking scientific and technical agronomical literature. This project has been submitted to the relevant ministries and funding has been requested. This project will also increase the supply of French records into AGRIS.

Multimedia Databases – As these databases will be the future information systems, it is essential that INRA acquires competency with them. A policy is being developed in this field. In 1993 and 1994, INRA has been the French coordinator for a European programme, HYPP, in crop protection. This multimedia database combines fixed images and texts in 8 different languages. Some other projects are emerging from the scientific sectors (such as Animal Physiology) and the solicitations of external publishers are strong. These multimedia bases and the development of digitized images dissemination systems, will better meet the professional and educational requests. However, the legal issues concerning the property of images and data of these bases, as well as in the distant transmission of images, prevent the developing of these productions. That is why
INRA is closely associated with the Ministry of Research and Higher Education’s study on the image banks.

Information Systems on Research Activities and Expertise – At the request of the European Community (EC) at the end of 1993, INRA initiated the production of NEW AGREP, that is a database describing the main research themes of the laboratories of the European Agronomical Research Institutes. INRA will be the national coordinator for France if the EC provides money: negotiations are being carried out. A working group was created in 1993 in order to conduct the inventory and describe the activities in terms of objectives, resources, results, collaborations and the individual competencies, and to supply the internal processes (evaluations, directories and so forth).

A Server on the Internet, Telematics – The quick development of INTERNET and the scientists’ enthusiasm for this type of communication make the follow up of the creation of new info-services necessary for documentalists. Concerning telematics, the development and modernization of this service (open to the public) must be carried on as its access is still limited to just a few scientists.

Languages and Francophony – It is clear that the current rules of scientific communication oblige the researchers to use English more often than other languages. That is not the same in the technical and educational fields. INRA has never ceased to defend the linguistic plurality and concretely illustrates its policy: a team of linguistic specialists integrated in the institute, an editorial sector including journals and review books. This multilingual policy has induced many international and francophone collaborations.

Translation and Terminology – In 1988, a report on “INRA and the foreign languages, a unique European market, a multilingual market” proposed the bases of a multilingual policy, based on the necessity to respect scientific expression in the French language and to help communication, especially within the E.C. It was proposed to develop not only translations already provided in INRA, but also interpretation and terminology. The linguistic service of INRA is carefully studying the linguistic tools (systems of computer-assisted translation) and is developing a sector of terminology and some computer aspects. This work has led to the publishing by INRA of dictionaries (for example A Glossary of Molecular Genetics and Genetic Engineering). Some firms are now interested in the know-how of INRA in the field of terminology. The necessary training has been acquired in 1990 in Canada, at the French language office. INRA thinks that this policy will guarantee the presence of French speaking scientific and technical expression in the communication systems of tomorrow. Moreover, this approach is the more efficient as the translators/terminologists teams work closely with the research units, thus making the scientists sensitive to these issues. In INRA, the pressure for translations requests remains high, both from the researchers and from the Direction of Information (publishing, book translation, communication). It is necessary to keep such an activity to guarantee the quality of development actions.

Francophony – On the request of the government, the Direction of Information has developed a program of information dissemination and training of STI in the East European countries and more recently in the Maghreb. In the East European countries, it is a major issue. Francophony is very present. The information and documentation needs are very high as they have to make up for more than 20 years of lost time. INRA has developed an integrated strategy of STI, based on the knowledge of the precise scientific relationships with France and the expertise of some selected places. This help consists in providing relevant information, books, helping to the structural and functional organization of STI, creating some information centers aimed at coordinating scientific information programmes (Romania, Albania). In the Maghreb, two visits were made in 1994 to Morocco and Tunisia. A network of STI coordinators will be created.

Conclusion – INRA has developed a modern system in the field of STI and its competence is well acknowledged by the government and the private firms concerned by STI at the national and international levels. The relationships with many foreign countries contribute to make INRA an international reference source in the field of agronomical information.

The INRA Scientific Documentation Within the National and International Networks

An Example – The Project of a Common-Use Documentation Center for Biological Control in Montpellier (South France) – The three following laboratories, the European Biological Control Laboratory (USDA), the Biological Control Research Unit (CSIRO, Australia) and the French team’s Common Laboratory will be established on a same international campus in Montpellier. They are a part of the CILBA (the International Biological Control Complex of AGROPOLIS) and are aimed at studying and developing biological control of crop pests.

The three laboratories have initiated the project for a common-use Documentation Center for Biological Control. The objective is to start a close cooperation between these laboratories by combining their resources and competencies with regard to scientific and technical documentation on biological control. The objectives are: to respond to the needs of the researchers, to achieve substantial savings (salaries, subscriptions to magazines and data-
bases, purchasing of books) and to facilitate communication between research teams from different cultures.

There is a complementarity of competences: the American and Australian laboratories concentrate their efforts on the traditional principles of introducing species into the States and/or Australia. The French research is concentrated on biopesticide research. Furthermore, the American and Australian laboratories also have a confirmed expertise with regard to biological control of weeds, which is not a well researched topic in Europe, where efforts have concentrated on insects.

The U.S. National Agricultural Library (NAL, Beltsville) has, since the beginning, stated its interest in this project and stated that “the NAL, as the premier resource for agricultural information for the United States, is committed to playing a key role in the development and operation of a shared library.” Contacts have also been developed with the Black Mountain Library of Canberra and discussions are planned with European documentation centers (CABI in the UK, and PUDOC in Wageningen) as well as with the IOBC (International Organization of Biological Control) Palearctic West Regional Section. The geographical localization of this project in Montpellier, at the crossing-point of developed and developing countries, offers a large influence zone for this biocontrol complex in countries that are sensitive to these problems. The first priority of this documentation Center will be to serve the information needs of researchers of the three laboratories. However, discussions have already begun to focus on future broader responsibilities of the documentation center with the rest of the world. The objective is also to use both all the international electronic resources and the documentation resources available all around Montpellier in the different establishments members of AGROPOLIS. AGROPOLIS is an association in Montpellier, which includes 21 research and education-
Reload of CAB Abstracts: Issues of Quality versus Quantity

A.J. Powell and S. G. Dextre Clarke

ABSTRACT: The need to replace its obsolescent hardware presented CABI with the opportunity to rethink the production system for CAB Abstracts and introduce a new field structure. A new structure implies incompatibility with the old, and hence presents a need to reformat the entire backfile, in this case 2.5 million records. Faced with this prospect, CABI reviewed the many requests registered by users over the years for new database features or for improving data entered in the past. The present paper describes the complex project that was undertaken to “clean up” and reformat the whole CAB Abstracts database, comparing the size of the effort with the expected quality benefits for users. It will also discuss the use made of new technologies such as barcoding, computer networking and automated validation processes to improve the speed and accuracy of the database, and to strengthen CABI’s position as a leading electronic publisher and information provider.

RESUMÉ: Comme le CABI doit changer son équipement vétuste, il profite de l’occasion pour revoir le système de production de CAB Abstracts et introduire une nouvelle structure de champs. L’incompatibilité avec l’ancienne structure nécessite le reformatage de tout le fichier, et dans ce cas précis, de 2,5 millions de références. Face à cette perspective, le CABI a passé en revue les nombreuses requêtes enregistrées dans le passé, faites par leurs utilisateurs, pour demander de nouveaux champs ou pour améliorer les anciennes données saisies. Le présent article décrit le projet complexe entrepris pour “nettoyer” et reformater toute la base de données de CAB Abstracts, en comparant la taille de l’effort avec les bénéfices en qualité attendus pour les utilisateurs. Il étudiera aussi l’utilisation des nouvelles technologies telles que les codes barres, les réseaux électroniques et la validation automatique pour améliorer la rapidité et la pertinence de la base de données, et renforcer la position du CABI en tant que leader en publication électronique et en fourniture de l’information.

RESUMEN: La necesidad de reemplazar sus programas ya obsoletos le dio al CABI la oportunidad de repensar el sistema de producción de los resúmenes analíticos del CAB, e introducir una nueva estructura de campos. Esta nueva estructura es incompatible con la vieja y, por tanto, requiere que se reformatee el archivo acumulado hasta ahora, que consta de 2.5 millones de registros. El CABI, enfrentado con esta perspectiva, revisó las numerosas solicitudes hechas por los usuarios en el transcurso de los años respecto a nuevas características de la base de datos o mejoramiento de los datos insumados anteriormente. El presente trabajo describe el complejo proyecto que se emprendió para “depurar” y reformatar toda la base de datos de resúmenes analíticos del CAB, y compara la magnitud del esfuerzo con los beneficios esperados en cuanto a la calidad del servicio para los usuarios. También se discute el uso que se hace de tecnologías nuevas por ejemplo código de barras, desarrollo de redes de computadores, y procesos de validación automatizados que mejoran la velocidad y la exactitud de la base de datos y fortalecen la posición del CABI como uno de los principales proveedores de publicaciones e información en medio electrónico.

Editor’s Note: The full paper was not received for publication.
Effective Use of New Media Communication Systems in Remote Places:

Strategic Sales and Shipping System in Isolated Areas of Japan

Kohki Shio and Takemi Machida

ABSTRACT: The agricultural characteristics of isolated areas are: delay of shipping to markets in central cities; difficulty of collection of produce because of the problems of distance; and lack of information to and from central areas. New media communication systems can help solve these problems in isolated areas. Yubari City in Hokkaido, Japan is an example of this solution. The Yubari Agricultural Cooperative collects information data from farmers such as planting area and growth data by a facsimile communication system with OCR which is called New Media Communication. At harvest before shipping, shipping data are summarized in the information center to make the decision of final shipping markets. By using these data, transportation methods are chosen and packing is done properly and packing materials are prepared properly. Simultaneously, the shipping data go to the markets directly two days before the produce and the data are used to predict future marketing. The agricultural cooperative provides the local information on the produce to consumers in central areas by personal computer communication and also by means of antenna shops in central areas. The information center in Yubari constructs the customer’s management system and it is used for communication with consumers and farmers.

RESUMEN: Areas aisladas presentan las siguientes características agrícolas: retraso en el despacho a los mercados en las ciudades del centro del país; dificultad para recolectar la producción debido a problemas de distancia; y falta de información hacia y desde las zonas centrales. Los nuevos medios de comunicación pueden ayudar a resolver estos problemas en zonas aisladas. El pueblo de Yubari en Hokkaido, Japón, ilustra este recurso. La Cooperativa Agrícola de Yubari recolecta información de los agricultores mediante un sistema de comunicación por facsimil (vía fax) con OCR que se llama Nuevos Medios de Comunicación. En el momento de la cosecha, antes del envío, se resumen los datos de mismo en el centro de información para decidir cuáles serán los mercados destinatarios. La utilización de estos datos facilita la elección de los métodos de transporte y un empaque adecuado, y se preparan oportunamente los materiales de empaque. En forma simultánea, los datos de envío van directamente a los mercados, llegando dos días antes que los productos y permitiendo así predecir el mercadeo futuro. La cooperativa agrícola proporciona información local sobre productos a los consumidores en zonas centrales mediante comunicación en computador personal y también a través de las tiendas de antena en esas zonas. El centro de información en Yubari es la base del sistema de manejo del cliente, y se utiliza para comunicarse con consumidores y agricultores.

WHAT ARE THE MERITS OF INTRODUCING COMPUTERS IN AGRICULTURE AND PROMOTING THE USE OF INFORMATION?
The answer to this question is not so simple. The purpose differs in between farmers introducing computers and agricultural organizations introducing computers. Among farmers, the use of information varies from management and products. The excessive expectations of the usefulness of the computer is likely to be followed by despair and finally the farmer’s computer lying idle.

In Japan, agricultural information
has been promoted in various stages. The introduction of the computer is the same as the introduction of any enterprise, the farmer must have clear goals for the use of the computer. It is important to consider who, where, why, what, and how farmers use computers. This is the principle of 5Ws and 1H. The introduction of the use of computers to provide information to the farmer is known as agricultural “informatization.” This is a term coined by the authors to describe this process.

From the viewpoints of authors about the results of computer introduction, the merits of agricultural “informatization” can be classified into the following seven items. When people want to make clear the purpose of agricultural “informatization,” it is important that they focus on the items below.

Merits of Agricultural “Informatization”:
- Improvement of office work: Labor saving and speedy processing of office work, labor saving of accounting.
- Improvement of management: Design of production planning, problem solving by management analysis.
- Improvement of production: Cost reduction, labor saving, energy saving, improvement of production control.
- Improvement of quality: Quality control, speedy quality check.
- Improvement of information transportation: Reception and utilization of managerial and technical information, information provision from rural areas.
- Improvement of marketing: Strategic market sales, direct sales from production area.
- Promotion of exchange: Information exchange between cities and rural areas, creation of friendly agricultural groups.

In the listed items above, improvement of office work, management, production and quality are the merits of “informatization” which have been popular, and there are many successful cases of computer introduction. They are a labor saving and cost reduction tool and have been successfully used in production organizations. Many software packages to support these applications are available. The recent progress of information communication technology has made information exchange possible not only inside of agricultural management organizations but also in outside organizations. This is the appearance of new media such as: personal computer communication, CATV, Videotex, Off-Talk communication, fax communication, high-speed digital communication and satellite communication have been widely used.

Fax communication can be operated by everyone easily, so the use of fax has spread rapidly. In Japan, fax communication systems have been introduced in more than 200 cities and town. Using fax systems with OCR or OMR systems, strategic marketing sales described below has been realized in Yubari City, Hokkaido. Yubari City has conquered the handicap of producing melons in a remote place, and it has achieved the advantageous marketing sales by “informatization.”

The Production of Yubari Melons

Yubari City is located almost in the center of Hokkaido which lies 1200 km north from Tokyo. (Figure 1) It was developed as a coal town from 1888, but the coal industry was completely abolished in 1990. The population decreased from a peak value of 110,000 to less than 20,000. The main agriculture for many places in the city has been vegetables, but because of the small agricultural area (3% of total city area) surrounded by mountains, the management scale is small. Because of volcanic ash, land productivity is low. The temperature difference is

Figure 1 – Location of Yubari City
extreme so weather conditions are not good for general agricultural production. For these reasons the growing of melons was promoted in 1955.

In Yubari City there are 217 farming families, 372 ha planting area and about 44 billion melons produced, which is 93% of total agricultural production of the city. Yubari melons are considered the highest quality melons because of distinct control of seeds and quality. About 4% of shipping quantity is for gifts which are delivered to consumers directly, and the rest is for market shipping including 20% to metropolitan areas of Tokyo and Osaka by using air transportation.

**Introduction of a Melon Shipping System**

Yubari Agricultural Cooperative introduced a computer system in 1991 to improve the shipping process with the financial support of 40 million yen from the Agricultural Ministry. Figure 2 shows the make up of the introduced system. The system consists of three personal computers for summing up data with OMR (optical mark sheet reader), fax mail system which provides fax data to and from farmers and a terminal fax in the farmers’ houses.

The number of melons to be shipped to the agricultural cooperative are sent via fax in the form of a shipping sheet. The number of farmers and shipping amount which are written on the sheet are read by OMR, and after summing up the result by computers, the total number of daily shipping is calculated. Farmers must send the shipping sheet by 12 o’clock, and data processing finishes around 12:30. Then summed up results are used for the collection of melons, standard test of grade, arrangement of containers, tracks and airplanes, and delivering plan.

**Effect of System Introduction**

Figure 3 shows how shipping conditions changed by the introduction of the information system. Formerly, a shipping procedure was estimated by the shipping result of the day before, so adjustments from the market were uncertain and unbal-
anced. In the case of melons, shipping amounts can be influenced by weather conditions so daily shipping amounts varied. Because of this unbalance, allocation to markets was difficult, remote air transportation was arranged and the rest of the melons were shipped to near places. These shipping procedures led to bad relations with gift traders, transportation companies and consumers.

After the system introduction, planting, growing and cultivation conditions could be obtained in a timely manner. In demand terms, melons could be provided stably. On the shipping day, by getting fax shipping sheets, the shipping amount of the day could be found before sales, and then gift shipping and market shipping could be allocated properly, so melon producers can accept the needs of the markets and consumers in a timely fashion. Stable provision and price maintenance have been improved and the price of melons rose 30% by appropriate allocation planning.

Formerly, the total amount of shipping from farmers was received by 20:00 hours. Then, containers and airplanes for transportation could not be kept. In marketing, people who keep containers can be a winner. After the introduction of the system, total shipping amounts could be known by 12:30, then airplanes and containers could be utilized efficiently and speedily. The collection of melons was carried out intentionally because quantity and places were known. By the introduction of fax system, highly technical information for melon production was provided to farmers. Besides, information about production materials, growth data, market and life are provided to farmers, so good communication between farmers and the agricultural cooperative has been achieved.

REFERENCES


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Facsimile Technology Improving Access to Agricultural Information in Outback Australia

Lynn M. Webber and John P. Brien

ABSTRACT: This paper discusses recent research conducted with wool producers in the semi-arid rangelands of western New South Wales, Australia. In collaboration with pastoralists, a participatory agenda setting process for Research and Development funding was designed. This involved the use of facsimile technology in a modified Delphi agenda setting process following interviews with pastoralists exploring their use of facsimile technology. Pastoralists were invited to reflect on how they sought information for decision-making and in their day to day management of their remote properties. Pastoralists discussed the development of telephone into facsimile and the nature of advantages this mode of communication has over other options. Pastoralists also talked about changes in their ways of working since they have used facsimile technology for seeking or sending information. Other supporting technologies, such as the introduction of mains electricity, were also identified as enhancing the popularity of facsimile technology among pastoralists in this area.

RESUMÉ: Cet article étudie les recherches récentes faites avec les producteurs de laine en les praderas semi-áridas de la zona occidental de Nuevo Gales del Sur, Australia. En collaboration avec les éleveurs de moutons, un processus participatif a été élaboré. Cela a nécessité l’utilisation du facsimilé sous forme d’agenda d’entretiens avec les éleveurs qui avaient pour but d’explorer l’utilisation faite de la technologie du facsimilé. Les éleveurs ont été invités à réfléchir sur la manière dont ils recherchent l’information qui leur permet de prendre des décisions et de gérer chaque jour leurs propriétés isolées. Les éleveurs ont parlé du développement du téléphone au facsimilé, et des avantages de cette technologie sur d’autres options. Ils ont aussi discuté des changements dans leurs méthodes de travail depuis qu’ils utilisent cette technologie pour chercher et envoyer de l’information. D’autres technologies de soutien, telles que le conducteur principal d’électricité, qui ont contribué à la popularité du facsimilé parmi les éleveurs de cette région, ont aussi été identifiées.

RESUMEN: Este documento discute investigaciones recientes realizadas con productores de lana en las praderas semiáridas en el oeste de Nuevo Gales del Sur, Australia. En colaboración con los criadores de ovejas, se diseñó un proceso de planificación del financiamiento de investigación y desarrollo, con un enfoque participativo. Esto involucró el uso de tecnología de facsimil (fax) en un proceso de planificación utilizando una modificación del método Delphi, después de entrevistar a los criadores de ovejas para explorar el uso que estos hacen de la tecnología de facsimil. Se invitó a los criadores a reflexionar sobre la forma en que buscaban información para la toma de decisiones y para el manejo diario de sus propiedades remotas. Los criadores de ovejas discutieron la evolución del teléfono en medio facsimil y las ventajas que este modo de comunicación tiene respecto a otras opciones. Hablaron también acerca de los cambios que ha habido en su forma de trabajar desde que están utilizando tecnología de facsimil para buscar o enviar información. Se identificaron también otros desarrollos tecnológicos, como la introducción de conductores principales de electricidad, que han aumentado la popularidad de la tecnología de facsimil entre los criadores de ovejas en esta región.

Editor’s Note: This paper was edited for publication. The references cited include references for the entire paper. For a copy of the complete paper, contact the authors.

THE AURA OF OUTBACK AUSTRALIA as geographically remote and socially isolated has contributed to perceptions that communicating agricultural information in remote places is a challenge. However, most literature focusing on communication in agriculture is concerned with how “information” from experts gets to, and is applied by farmers (Brendlinger, 1992 p. 86). Emphasis is placed on farmers receiving information from a knowledgable source, the focus of interest being the effect of a linear, one-way flow of “information” from the source through a channel of communication to the receiver (Shannon and Weaver, 1949). The perceived challenge of communicating agricultural information is based on a concern for “transferring knowledge”, reflected in the Transfer of Technology (ToT) paradigm which underpins such notions.

This paper explores underpinning assumptions of the Transfer of Technology paradigm relating to the notion of “communicating knowledge as information”. The following discussion of research focuses on pastoralists’ sources and accessibility to “potential information” or “data” in their construction of knowledge. That is, how pastoralists seek, send or receive potentially relevant informa-
tion for decision-making in daily management of their geographically remote properties, and accessibility of this data in the utilisation of communication technologies. Discussion of the developments of telephone to include facsimile technology involves an exploration of the advantages and disadvantages of this mode of communication over other options such as mail, and the development of other supporting technologies which enhances its utility.

**Outback Australia**

An initial exploration was undertaken with pastoralists of their experiences of mass media, personal interaction and communication technologies-in-use and their accessibility to sources of potential information. This offered an opportunity to gain understanding and insight of options and considerations to inform the design of a research and development prioritisation process which would not require face-to-face interaction at every stage of the process.

This research process was designed and implemented in collaboration with pastoralists living in a remote region of western New South Wales, Australia (see Figure 1). This semi-arid rangelands area forms a transect from Wilcannia north to Wanaaring and pastoralists undertake wool production enterprises as a major economic activity. Property sizes in this area range from 68,000 to 500,000 acres and families are geographically isolated from one another.

The overall aim of this research was to design and implement a process which would improve pastoralist participation in the identification and setting of priorities for research and development in the wool industry, even in the most geographically remote places. This research was supported by the Australian Wool Research and Promotion organisation (AWRAP).

**Methodology**

In the course of collaboration with pastoralists in the design and conduct of the participatory process for prioritising research and development, interviews were undertaken on two separate occasions with pastoralist families using Semi-Structured Interviews (SSIs) techniques.

**“Selection” of Interviewees**

“Active participation” (Rhaman, in Salas et al, 1989 p. 49) was a cornerstone of this research, and with recognition of individual world view (and therefore multiple realities), limiting the invitation to participate would “lead to limited, confined perspectives through restricting the opportunity for others to offer their understandings” (Webber and Ison, 1995 p. 112). In view of this, the “selection” of interviewees took the form of an invitation extended to the population of pastoralist families in the research area designated by the established transect.

A population is “the aggregate of all cases that conform to some designated set of specifications” (Kidder and Judd, 1986 p. 145). In this case the specifications were pastoralist families who undertook wool production enterprises on properties in the designated research area. All families in the area were involved in wool production enterprises to some extent, and 34 of the 36 families invited to participate in the research process were interviewed.

**Semi-Structured Interviews**

Semi Structured Interviews (SSIs) refer to a situation in which the interviewer has a series of broad topics or issues which they wish to discuss with the interviewee (Dowsett, 1987 p. 50). SSIs seek to invite the interviewee to narrate a “rich picture” of their experiences and attributed meaning of interest to the interviewer and the interviewee. The dynamics of each interview will be different as individuals bring their own experiences and world views into the situation.

Prior to interviews being undertaken, a series of broad sub-themes with a common thematic thread are established, rather than a prescriptive set of questions to be asked in a pre-determined sequence which requires limited responses to be replicated at each interview. The thematic nature of SSIs offers an interview process which allows exploration of themes in any sequence, giving a more “conversational” flavour to the interview and offering space for unintended (but critically important) insights to emerge and be explored. SSIs also have flexibility to accommodate a range of interview dynamics, in recognition of different inter-
viewees and family approaches to interviews (Webber and Ison, 1995 p. 118). Interview protocols are designed in an attempt to recognise imbalances of power in the interviewer/interviewee relationship and attend to ethical process rather than simply emphasising standard procedures for the purpose of collecting objective data.

SSIs have been used by a number of researchers in many different contexts to investigate social processes and relationships, including Rapid Rural Appraisals (Beebe, 1985) and Participatory Rural Appraisals (Webber and Ison, 1995).

**Thematic Development of SSIs**

In the first SSI, a theme of the interview was to explore pastoralists’ access to different sources of potential information. Within this thematic framework, sub-themes were nominated for exploration: the nature of the media (for example, mass media and personal interaction), the differences between sources of potential information, how different sources were used for what purposes, whether sources were actively sought, solicited, unsolicited (not sought) and experiences of the perceived usefulness of these different sources.

A theme of the second SSI was to explore pastoralists use of different communication technologies in accessing potential information and communicating with other people off the property, particularly in relation facsimile technology. Within this thematic framework, sub-themes nominated for exploration included pastoralists’ perspectives on communication and sense of remoteness, changes in experiences with use of communication technologies, communication technologies and the nature of their use, advantages and disadvantages.

**Analysis and Discussion of Interviews**

Interviews were typed as transcripts and analysed thematically with reference to sub-themes developed prior to the interview. These were presented to pastoralists as part of a draft booklet sent to them by the authors in a multi-media format (written and audio-tape) to invite any clarifications, corrections and additions in light of reading or listening to their own and other pastoralists’ perspectives on these (and other) themes. These themes were finalised as a booklet and audiotape designed for pastoralists according to their preferences of presentation.

**Accessibility of Potential Information**

Potential information was of two major forms, based on pastoralists opportunities for interaction. These were mass media forms (print, radio, television, video and cassette) and personal interaction—both face-to-face and technologically mediated (mail, radio transceiver, telephone and facsimile) (see Figure 2).

**Mass Media and Communication Technology - In-Use** — Non-interactive mass media sources such as print, radio and television were nominated by pastoralists as sources of potential information accessible to them. However, a number of dimensions restricted their perceived relevance and potential usefulness a source of potential information. Other mass media included the use of videotape (in combination with television) and audiotape (in combination with cassette recorders).

**Print Media** — Magazines and newspapers were specifically sought by subscription (see Table 1). They were at least “read through”, but many pastoralists read them “cover

<table>
<thead>
<tr>
<th>Publication</th>
<th>Description of Publication</th>
<th>Number of Pastoralists Nominated Receiving</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Land</td>
<td>National weekly rural newspaper</td>
<td>21</td>
</tr>
<tr>
<td>Stock Journal</td>
<td>South Australian monthly rural newspaper</td>
<td>12</td>
</tr>
<tr>
<td>Farmer &amp; Grazier</td>
<td>South Australian monthly rural newspaper</td>
<td>3</td>
</tr>
<tr>
<td>Farm Journal</td>
<td>State-wide monthly magazine</td>
<td>3</td>
</tr>
<tr>
<td>Weekly Times</td>
<td>National monthly rural newspaper</td>
<td>1</td>
</tr>
<tr>
<td>WA Grower</td>
<td>Western Australian monthly rural newspaper</td>
<td>1</td>
</tr>
<tr>
<td>Agriculture Today</td>
<td>Rural regional monthly magazine</td>
<td>1</td>
</tr>
<tr>
<td>Cross Country</td>
<td>Rural regional monthly magazine</td>
<td>1</td>
</tr>
<tr>
<td>Western Grazier</td>
<td>Monthly regional magazine</td>
<td>1</td>
</tr>
<tr>
<td>The Bulletin</td>
<td>Monthly national magazine</td>
<td>1</td>
</tr>
</tbody>
</table>
to cover”, in some cases taking on “biblical” importance. Other pastoralists had reduced their reading of newspapers, referring to them as “doom and gloom papers” often containing depressing news and at times, contradictions. Some pastoralists had terminated their subscriptions to newspapers as finances became tighter with the downturn in the wool industry.

Some printed journals newsletters were sent to pastoralists as members of societies, associations, levy payers or clients of stock agents and woolbrokers (see Table 2). The “Wool Corporation” (now the Australian Wool Research and Promotion organisation or AWRAP) was nominated by pastoralists as a potential source of information. Many pastoralists considered that they did not receive much news directly from this organisation, although more than half reported that they received the Wool News. Research and development activities and financial statements of expenditure of wool tax money (which all wool producers pay to support the organisation’s activities) were nominated by pastoralists as areas which they received very few, if any, reports.

Other print media was sent to pastoralists on request because they were seeking potentially useful information, keen to understand more about a particular issue or topic (see Table 3). An example cited by one pastoralist involved the design and construction of new sheep yards where they had requested “fact sheets” from the local agricultural service institution among their avenues of exploration.

Print media was seen by pastoralists to have strengths and weaknesses. Pastoralists cited advantages of written material as having substance and detail that could be re-read at a convenient time. Written material also provided an opportunity for pastoralists to make sense of what they read at their own pace and with their own interpretation:

(I)f you get it person to person, I think everyone can read something and 50 per cent have one view on it and somebody else can have another view. If word’s passed on somebody will say ‘well I think this about what they said’, but they could be interpreting it wrong. Whereas if you’ve got a piece of paper at least you know—you can dissect it yourself.

Some pastoralists said they picked up some good ideas from reading written material; other pastoralists explained written material was useless to them because they didn’t read. One pastoralist discussed difficulties in understanding complex written material:

I’ve said to a lot of other people everything is too technical to understand, I get very frustrated...[...].if it was just set out in simple English you could do a lot more. You get that way ‘what do they mean?’ Unless you can get someone to explain it to you—we never go anywhere—we need an interpreter!...[...].I open them and I don’t read them all through because I get to the stage where I can’t understand it, so I put it aside.

A large majority of pastoralists sought subscriptions to weekly newspapers and received them by mail no less than a week late. Pastoralists who did not read well were restricted in their accessibility to this form, however, it was largely the time factor in restricted accessibility that influenced the perceived relevance of this written material as a source of potential information. In two cases pastoralists reported they received news from mass media sources by facsimile in the form of the Wool News. Reducing the time-frame to improve accessibility to print media through the use of computer modems was not nominated as a potential way of improving accessibility.
Despite this, newspapers still maintained importance as an accessible source of potentially useful information for many pastoralists because it offered more in-depth content than other mass media sources. As a written form, newspapers could be studied and re-read, even put down and picked up at a convenient time and place. Audiotapes (cassettes) offer a means by which pastoralists could have greater accessibility to potential information of content, avoiding the pro-literacy bias of print media. Audiotapes offer accessibility to potential information, which pastoralists do not report having experienced to any significant extent. Accessibility to potential information of content can be improved through addressing the pro-literacy bias of print media, which is the predominant means by which potential information of content is expressed. A large amount of unsolicited print media sent to pastoralists by mail created a sense of “data overload”. Pastoralists also reported receiving a lot of “junk mail” along with their important letters. As one pastoralist explained:

the worst thing they can do is put something ‘to the grazier’, because it just goes straight in the bin. (It needs) my name or ‘from the AWC’—there’s a lot of junk mail. The most important thing in the office is your rubbish bin.

Data may only be perceived as relevant if there is or has been some personal dimension involved, for example pastoralists having taken action to seek subscription for the purpose of receiving a newspaper or experiencing personal interaction beforehand which was relevant and worthwhile.

Some pastoralists saw sending unsolicited pamphlets as better than having somebody call around. People stay away and you don’t want the nuisance, but if they send out a pamphlet—if they’re (the pastoralist) not interested, well you haven’t wasted your time.

But other pastoralists add:

Then again, if we did have a person come out sometimes, we would be here—you can discuss a bit more, you ask questions you might be interested in that they haven’t covered.

Other pastoralists saw pamphlets as having insufficient content:

If they’re going to condense it and print it, it really doesn’t have its full meaning or potential there in the condensed form that the everyday farmer can understand—what’s the point in sending it?

Radio – Radio programs were seen as a potentially useful source of up-to-date information (see Table 4). Discussions by agents of the current market situation for wool and other commodities pastoralists may be looking to sell was nominated by pastoralists as an important positive feature of some radio programs.

Radio programs listened to by pastoralists were all morning programs, mainly to update on the latest news, current affairs and stock or wool prices. Pastoralists said they could listen to the radio whilst having breakfast and getting ready for work.

Pastoralists also saw advantages in radio in that they could listen to it from their vehicles whilst they were working in concurrent activity—driving out to paddocks and fencing were examples given. On the other hand, as one pastoralist explained—people like to see it written, though—then they can re-read it. When you hear it on the wireless, you’re not listening completely if you’re out mustering—if it’s written you’ve got it in front of you.

Radio was also seen as less substantial than written material:

(You need) something you can bite into—on the wireless you can’t get half of it, there’s not enough time.

Audiotape (Cassettes) – Two pastoralists nominated they had listened to audiotapes containing potentially useful technical information from the “Wool Corporation”. Cassette players were commonly used by pastoralists in their home stereo systems and motor vehicles. They have some useful features of print media in terms of being able to offer content, be replayed and turned on and off at convenience. Stand alone they cannot be used to present diagrams or drawings, but can be used interactively with print media to achieve this form of expression. Pastoralists saw advantages in that

<table>
<thead>
<tr>
<th>Potential Information Sought</th>
<th>Source</th>
<th>Number of Pastoralists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wool Sales Report</td>
<td>AWRAP</td>
<td>2</td>
</tr>
<tr>
<td>The Woolgrower</td>
<td>AWRAP</td>
<td>1</td>
</tr>
<tr>
<td>Weather Maps</td>
<td>Bureau of Meteorology – Melbourne Telecom Infotax</td>
<td>3</td>
</tr>
<tr>
<td>Ag Facts</td>
<td>NSW Agriculture</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Number of Pastoralists Nominating</th>
<th>Time of Listening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country Hour</td>
<td>6</td>
<td>Morning</td>
</tr>
<tr>
<td>Breakfast Show</td>
<td>1</td>
<td>Morning</td>
</tr>
<tr>
<td>Agent’s Hour</td>
<td>1</td>
<td>Morning</td>
</tr>
<tr>
<td>Stock Reports</td>
<td>1</td>
<td>Morning</td>
</tr>
<tr>
<td>Prices Reports</td>
<td>2</td>
<td>Morning</td>
</tr>
<tr>
<td>News</td>
<td>2</td>
<td>Morning</td>
</tr>
<tr>
<td>Rural Report</td>
<td>3</td>
<td>Morning</td>
</tr>
<tr>
<td>Total Nominating</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>
they did not have to read written material and it was more detailed than a pamphlet, however there was no written material or diagrams they could follow or go back to. There were no other reports of using audiotape.

Television and Video – Television was seen by many pastoralists as having improved dramatically since the introduction of satellite television in the area. Prior to this, pastoralists did not have access to television, some only two weeks before being interviewed in October 1992.

Pastoralists saw benefits in television in that the news was current (like radio), contained stories of national and international events beyond their immediate world and to some extent reduced their sense of geographic isolation and being “behind the times”. Television also had visual advantages in that programs which involved the demonstration of techniques or presentation of diagrams which would otherwise require extensive explanation, were easier to understand. Pastoralists explained that they didn’t get to see much television besides the news and current affairs programs in the evening (see Table 5):

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Number of Pastoralists Nominating</th>
<th>Time of Viewing</th>
</tr>
</thead>
<tbody>
<tr>
<td>News</td>
<td>2</td>
<td>Evening</td>
</tr>
<tr>
<td>Current Affairs</td>
<td>2</td>
<td>Evening</td>
</tr>
<tr>
<td>Weather</td>
<td>3</td>
<td>Evening</td>
</tr>
<tr>
<td>Countrywide</td>
<td>5</td>
<td>Sunday</td>
</tr>
<tr>
<td>Landline</td>
<td>4</td>
<td>Sunday</td>
</tr>
<tr>
<td>Documentaries</td>
<td>2</td>
<td>Evening</td>
</tr>
<tr>
<td>Total Nominating</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

There isn’t much on TV I get to see—usually they’re on at the wrong time. They put the rural programs on out of prime time, usually on Sundays, so I never get to see them—you would have to have a generator going to video them and we haven’t got a video anyway.

Rural programs such as Landline were seen as potentially useful sources of information on current rural issues, many of which could affect their production enterprises.

Television being dependent on electrical power was reflected in the lack of video use for recording programs of interest during the day for viewing later on. However, two pastoralists reported they watched videos supplied by a ram stud to learn more about sheep classing and found it to be a most useful source of information on this topic, particularly suited to someone who was not a big reader.

Pastoralists saw weaknesses in the non-interactive nature of mass media they experienced, particularly in television. As one pastoralist explained:

you can’t have your say with the TV—you can’t argue with it. You disagree with what he says, I want to say ‘right, I don’t understand that’. (They) use words I’ve never heard of before….

This reflects limited opportunities for many pastoralists to interact on more technical issues in conversation with people beyond the local community, partly related to geographic isolation and remoteness from other people who would be interested in discussing such topics. The cost of telephone calls from these remote properties to some extent also tempered the enthusiasm of pastoralists to initiate discussions of such a nature. Pastoralists also point to reductions in service institutions such as NSW Agriculture and Conservation and Land Management (CaLM) as reducing opportunities for face-to-face interaction due to their lack of presence in the area.

The time-frame for access to sources of potential information is reduced to some extent (although pastoralists still sought more current weather reports using fax) but the lack of in-depth content reduced its perceived relevance as data of content: “they don’t have much time to go into depth.” Some pastoralists saw opportunities for developing television to include interactive television and computers for education in remote places, especially children involved in distance education, where they could interact in a classroom of children on the television.

Personal Interaction as an Opportunity to Access Potential Information – “The grapevine” was the term used by pastoralists to describe their involvement in networks of communication with other people.

As one pastoralist explained:

We find out most of our information about what’s going on from someone else telling us. In actual fact, it’s not on a piece of paper from the Wool Corporation, you just hear things on the grapevine.

Pastoralists identified a wide range of people they saw as potentially useful sources of information in a variety of circumstances (See Table 6).

Other Pastoralists – Local social events were seen by many graziers as opportunities for face-to-face discussions—“talking sheep” with other wool producers in the area. These events included local gymkhanas, horse races, field days and social opportunities at more formal community meetings for other purposes (such as the rural power scheme meetings). Some pastoralists saw these local interactions as useful in initially hearing new ideas, which are then followed up in discussions with people beyond the local network and with other experiences which may offer further insight. As one pastoralist explained:

(I) get the information from the locals first, who tend not to know a hell of a lot, but then talk to the wool people….[…]those blokes at Dalgety’s in Sydney—
<table>
<thead>
<tr>
<th>Description</th>
<th>Group</th>
<th>Nominated Personal Interaction</th>
<th>Nature of Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Institutions Staff</td>
<td>NSW Agriculture</td>
<td>15 yes / 11 not much</td>
<td>Planning for a computer course</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suspected worms in lambs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suspected feed toxicity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lice problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Assist in brucellosis testing of rams</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Assist with sheep classing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Assist with ram buying</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discussing problems</td>
</tr>
<tr>
<td></td>
<td>Conservation and Land Management</td>
<td>7 yes / 8 not much</td>
<td>Contour ploughing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Through Rangecare</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Through work on other Boards</td>
</tr>
<tr>
<td></td>
<td>Rural Lands Protection Board</td>
<td>6 yes</td>
<td>Relatives on Board report news</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Member of Board</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discussions with RLPB Ranger</td>
</tr>
<tr>
<td></td>
<td>Western Lands Commission</td>
<td>1 yes</td>
<td>Staff visit when passing through</td>
</tr>
<tr>
<td></td>
<td>Universities and CSIRO</td>
<td>4 yes / 3 not much</td>
<td>Some researchers working out here try to tell us what they’re doing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>School field trips to study rangelands.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fowler’s Gap research is not much heard about here, except through family.</td>
</tr>
<tr>
<td>Private Institutions Staff</td>
<td>Wool Brokers</td>
<td>10 yes</td>
<td>Selling wool</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clip preparation</td>
</tr>
<tr>
<td></td>
<td>Stock Agents</td>
<td>2 yes</td>
<td>Ram buying</td>
</tr>
<tr>
<td></td>
<td>Studs</td>
<td>3 yes</td>
<td>Ram buying</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Breeding flock purchases</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Videos on classing</td>
</tr>
<tr>
<td></td>
<td>Woollen Mills</td>
<td>3 yes</td>
<td>Direct selling to processors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clip preparation</td>
</tr>
<tr>
<td>Pastoralist Groups</td>
<td>Rangecare Groups</td>
<td>14 yes / 4 no</td>
<td>Member of group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Downturn in wool industry affecting activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not member because no group formed to date</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>On boundary of two groups so haven’t joined yet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Involvement in this group is an admission that land has been damaged—have not joined</td>
</tr>
<tr>
<td></td>
<td>National Farmers Federation</td>
<td>2 yes</td>
<td>Attend meetings</td>
</tr>
<tr>
<td></td>
<td>Country Women’s Association</td>
<td>2 yes</td>
<td>Attend meetings</td>
</tr>
<tr>
<td>Contractors</td>
<td>Shearing, Woolclassing, Lambmarking/mulesing and fencing</td>
<td>4 yes</td>
<td>Different and new techniques</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clip preparation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Woolclassing</td>
</tr>
<tr>
<td>Other Pastoralists</td>
<td>Neighbors</td>
<td>28 yes</td>
<td>Use “the grapevine” all the time, source of most news.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Watch how they do things</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discuss topics of mutual interest</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discuss how they do things</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Children who are studying, worked or travelled abroad</td>
</tr>
<tr>
<td></td>
<td>At field days</td>
<td>6 yes</td>
<td>Catch up with people outside immediate community</td>
</tr>
<tr>
<td></td>
<td>At social events</td>
<td>3 yes</td>
<td>Talking sheep</td>
</tr>
<tr>
<td></td>
<td>At sales</td>
<td>1 yes</td>
<td>Discuss prices</td>
</tr>
<tr>
<td>Family</td>
<td>Partners</td>
<td>5 yes</td>
<td>Discuss issues they’ve heard about</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Seek their opinions</td>
</tr>
<tr>
<td></td>
<td>Children</td>
<td>2 yes</td>
<td>At school or university</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Experience on the property</td>
</tr>
<tr>
<td></td>
<td>Other Relations</td>
<td>2 yes</td>
<td>Working on other properties or other rural contexts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Working on research stations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Living in closer settled areas with better access to potentially useful information</td>
</tr>
<tr>
<td></td>
<td>Friends</td>
<td>6 yes</td>
<td>Working in areas of interest</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Better access to potentially useful information because they live in closer settled areas or have jobs with access to potentially useful information.</td>
</tr>
</tbody>
</table>
they’re pretty good. They’d be the most useful source of information when you’re selling.

Other graziers nominated local social events as places where they discuss what they have read in newsletters with other people.

Limited face-to-face discussion due to geographic isolation was seen by some pastoralists as advantageous in that there was more variety of ideas because people were more independent thinkers and not inhibited in their ideas and inventions. As pastoralists explained:

• It’s hard for people to get together very often and have a good discussion, and I think that’s one reason why people’s ideas—there’s such a variety of ideas. Everybody’s isolated geographically from one another, and therefore their ideas are a bit isolated from one another too.

• …out here, people spend a lot of time on their own, driving around and working their properties and when you’ve got to go to a meeting, there’s such a broad spectrum of ideas.

Neighbours were seen as important potential sources of information by many pastoralists, who particularly value the opportunity to “watch how they do things” in addition to discussing aspects of their work. Pastoralists talked with neighbours “all the time”—not always face-to-face but over the telephone, and used fax to send written material. Neighbours children who were studying or working outside the local area were also seen as important potential sources of information because they had different experiences and perspectives.

**Government Institutions Staff** – This refers to federal and state government institutions with educational, service, research, extension and/or regulatory functions nominated by pastoralists in the area.

Contact by pastoralists with NSW Agriculture staff took the form of services such as brucellosis testing of rams, sheep classing, planning a computer course for property record keeping, and in groups such as Landcare and the Rural Lands Protection Board. Field days were nominated by many pastoralists as being useful venues for meeting with other pastoralists and service institutions staff. Some pastoralists reported they took the opportunity pick up Ag Fact pamphlets to read later, whilst others examined new equipment. A dimension of field days which frustrated face-to-face interaction by some pastoralists was that “there are too many others talking to person you want to talk to.”

Many pastoralists in the area did not consider they had much personal contact with NSW Agriculture or Conservation and Land Management staff. Pastoralists reported that “they don’t come out much”, attributing their absence to staff cutbacks and as one pastoralist observed “one guy to cover a vast area—it’s a bit like throwing a jellybean in a haystack”. Experiences of lack of veterinary staff availability and frustration at attempts to describe symptoms over the telephone to veterinarians were related by pastoralists to exemplify access to this source of potential information as limited in its current form. Pastoralists also saw these experiences as important lessons in maintaining independence in such geographically remote contexts.

Pastoralists saw some relevance in discussions with NSW Agriculture staff, based on them having “see(n) a lot of people operate—although they are often wrong the information is handy”. Other pastoralists are critical of a perceived lack of interest by staff to interact in “dialogue” or discussions which involve mutual acceptance and valuing of different perspectives. This is reflected in such comments as:

I don’t have a lot of contact with NSW Ag or Soil Con. I think extension officers in the departments seem to be tunnel vision. If you come up with a new technology or new ideas, they don’t seem to be all that interested somehow or other—‘this is the way you do it, this is how it should be done, you’re only a farmer and we know’—that’s the impression I get I’m afraid.

The Australian Bureau of Agricultural and Resource Economics data was sought by some pastoralists for its Clip Estimates (which affects the selling price of greasy wool). Fowlers Gap Research station was nominated by pastoralists as a potential source of information, although some pastoralists reported they did not hear “a lot” from Fowlers Gap.

**Pastoral Houses, Stock and Station Agents, Woolbrokers, Wool Mills and Studs** – Many pastoralists saw woolbrokers as important potential sources of information, especially when pastoralists were selling wool. In some cases, stock agents were seen as part of life and were relied on for opinions and advice.

Some pastoralists received a report on their woolclassers performance in classing their clip, which they found to be useful in improving the quality of classing at the following shearing.

**Woolclassers, Shearers and Contractors** – Studs were seen as useful in helping pastoralists select suitable rams for their breeding programs, matching flocks, improving fibre diameter and frame. Shearers and woolclassers were seen as potentially useful sources of information because they had seen a lot of different operations and had broader experiences in this way. Many pastoralists also said that woolclassers brought the latest news on clip preparation.

**Pastoralist Groups** – Landcare groups (known as Rangecare in this area) were nominated by some pastoralists as potentially useful sources of information. Discussions face-to-face, over the telephone and by facsimile offered a variety of opportunities for interaction around issues and activities of similar concern. Rangecare groups also worked together in the preparation of reports and submissions to government. Rangecare groups were seen to be
useful in regard to funding of pastoralists’ land care activities and being “heard” by politicians and policy-makers over issues of concern.

Pastoralists have noted that their involvement in Rangecare had provided access to more potentially useful information which had been available but they had previously not known about. This potentially useful information was now available “first-hand”, rather than relying on having it told to them “second-hand” via service institutions or mass media. As a pastoralist explained:

Most of the information we get access to is only through the media, and quite often that can be distorted. But since this bad dry spell and the rural recession I’ve been fairly heavily involved in submissions through federal and state governments through Landcare groups. [...]. We have discovered, and other people, that there is a lot of things and a lot of information available that we never even knew about, purely and simply because we weren’t told. Rangecare has been good for that sort of stuff.

Rangecare was also seen as a potentially useful organising system for printed material in the form of a library which could hold material which had been gathered for use by other pastoralists. Other pastoralists had formed themselves into groups to deal with issues of concern to them. Without external funding, a group of pastoralists in the area had formed to deal with feral pig problems affecting them. This required co-ordination and commitment by pastoralists to organise a baiting program, seen by pastoralists involved as a positive experience in community learning and action.

Family and Friends – Family and friends were nominated by pastoralists as a source of potentially useful information, particularly when they worked in an area of interest to pastoralists. Examples included family members who had travelled abroad and visited woollen mills, worked with researchers on research stations examining best fencing materials and techniques, and friends working on other commercial properties in other areas. Families living in more populated areas with better access to newspapers were seen as important potential sources of information by way of them posting newspapers on to pastoralists or filling them in on news considered by these families to be important enough to pass on during face-to-face discussions, telephone conversations or in letters.

Most partners (such as brothers or husbands and wives) saw themselves as a team and very important for offering different perspectives for consideration when discussing issues and making decisions. Children were also seen as important in this role, when they were older they could contribute to the discussion. Children were seen to offer different experiences in discussions, particularly those who had been away from the property for schooling or work and those who worked on the property for their experience “running the place”.

Many pastoralists discussed the importance of younger pastoralists learning from the previous generation, the lessons based on experiences over time being “passed on” to the next generation. As one pastoralist observed:

A lot of learning is done by passing it on to the next generation. People learn as they go and pass it on—it has a lot to do with the management. The best teacher’s experience.

Own Studies – Pastoralists had their own topics of interest that they were keen to learn more about. In some cases this involved private study or formal course through the Technical And Further Education (TAFE) Centre in the closest city by correspondence or short courses. Correspondence courses were seen by some pastoralists as difficult to undertake because they were more “hands-on” practical types rather than big readers.

NSW Agriculture was also supporting a plan for a computer course for property record keeping to be run in the area. Many women have a large role in property record and book keeping. Many pastoralists were keen for learning opportunities in this area. An important observation made by one pastoralist about computers for property record keeping was young, educated people doing all sorts of bookwork—about four times as much as I do, being cultivated by people in ag economics going around teaching them how to do cash flows. The strange part, with this wealth of detail, that they were drawing no conclusions. [...]. they didn’t know what it all meant. Their tutors assumed that once they were in possession of the figures, that they would relate them to their affairs.

This highlights the importance of recognising the difference between data and information in that meaning is attributed to an experience.

Pastoralists were keen to have more access to educational courses which were practical, hands-on and updated them in the latest techniques. These were seen to offer the most potential if they were run over a few days in locations such as small town which they could travel to in a reasonable time. Suggestions regarding computer courses as to how this could be done included a travelling teacher who could visit and spend some time going through the basics and then could be contacted to discuss any questions or problems. Practical courses on the latest techniques with woolclassing and selection of breeding lines could be conducted over a few days on conveniently located properties in the area.

Face-to-Face and Technology Mediated Personal Interaction –

The nature of pastoralists’ experiences in personal interaction differs from those which are face-to-face with the use of communication technologies mediating interactions.
Face-to-face personal interaction has increased within local communication networks, attributed by pastoralists to improvements in the speed, reliability and comfort of motor vehicles and greater acceptability of socialising. However, the greatest transformations of experiences in social interaction both within and beyond pastoralists’ immediate networks have occurred with the utilisation of radio transceiver, telephone and facsimile technologies. Although remaining geographically remote, technology-in-use has transcended social isolation in improving access-ability of pastoralists in their personal interactions within existing and new communication networks.

Many pastoralists observed there have been great changes with respect to communication off the property, with improvement in their ability to access potential information through interaction with other people. Although pastoralists remained geographically remote, they saw themselves as less socially isolated and attributed this in part to the use of communication technologies which enabled them to interact with other people without having to forego time and money to travel long distances to meet face-to-face or wait long periods of time for mail to be sent and delivered. Pastoralists discussed a number of dimensions in the development of communication technologies in this remote context and the nature of changes in its use.

Mail – From 1873, a mail service operated once weekly between Wilcannia and Bourke via Tilpa taking one week return to complete. From 1883, Cobb and Co. secured the mail service contract and the frequency of the service increased to twice weekly (McInerney and Middleton, 1980 pp. 40–41) Mail was delivered by horse coach up to 1915, and after that by motor vehicle (although horses had to be on standby in case of rain or mechanical troubles). Aeroplanes were at first used during floods to deliver the mail, but became the usual method of delivery. Today deliveries and pickups are made once a week to more remote properties by aeroplane landing at a centrally located station.

The mail service provided a means for non face-to-face interactive communication which was private. Pastoralists said that until the private telephone system, mail was the only means of private communication with people who were distant to them. This meant conducting business by mail, which was a slow process in such a geographically remote area. Travel to town was often undertaken for the express purpose of conducting business and pastoralists said this took them away from their work on the property for quite a deal of time, especially in earlier days when transport was slower and less reliable.

Pastoralists reported they still used the mail service to send non-urgent correspondence, packages and business requiring paperwork, particularly if they did not have access to a facsimile. However, the mail service was the major communication technology in use by mass media, and solicited and unsolicited sending of written material to pastoralists.

Radio Transceivers – The introduction of the overland telegraph to the area in the early 1880’s added another dimension to communication as messages could be encoded for transmission in morse code, decoded by telegraph staff and then despatched through the mail service. Privacy was seen as an important feature of some communication technologies by pastoralists in earlier times and even today, particularly in relation to conducting business. A petition raised by pastoralists in 1907 in protest to the substitution of the Morse code telegraph with a telephone line reflects their values on privacy:

…the privacy which is so desirable in telegraphic messages will not be possible if such messages have to be despatched from Tilpa by Telephone. (The)

want of such essential privacy may at any time prove a source of serious inconvenience and annoyance to the sender of a message. This particularly applies at shearing time when large numbers of men are employed on the surrounding stations and when in the event of labour troubles arising the absolute privacy of the Telegraph Office is the most desirable from all points of view. (in McInerney and Middleton, 1987 p. 54)

Radio transceivers were seen by pastoralists as offering an opportunity to establish a sense of community in such a geographically remote area—creating a context for social interaction in a public domain to the extent of its radio range:

When we first c(a)me here we never had a telephone, we had a transceiver. The women would talk at half past eleven in the morning, you’d chat away about what you did—just trivial sorts of things, but you caught up with everybody — everybody knew where everybody was and what everyone was doing.

Some pastoralists said they felt less socially isolated with the transceiver because as they did not go anywhere for weeks they needed to talk with other people.

Radio transceivers offered pastoralists in remote areas one of the first communication technologies that could offer instant interaction, enabling conversations over shorter periods of time. The ability for two-way communication more quickly was seen by pastoralists as particularly useful in emergencies, as contact could be made quickly with the Royal Flying Doctor Service for medical assistance. Pastoralists still used Ultra High Frequency (UHF) transceivers for property work (such as mustering) and communicating with neighbours within radio range in emergencies and to discuss non-private matters which did not warrant the cost of a private telephone call.

Telephones – With the inception
of radiophone, instant communication with people outside the immediate area was now possible. However, this took place in the public domain and the importance for private communication (particularly in business) still remained, as one pastoralist explained:

We used to get telegrams, but then we got the radiophone on that where you could ring up people, but you couldn’t talk any business or anything because every man and his dog could hear you.

The use of the mail service was still seen as an important means of private communication for business even though it was considered slow, and many pastoralists said they continued to make trips into the town or city to conduct their business.

The introduction of the “party line” telephone took the form of a central “exchange” service at the post office with groups of stations on “party lines”. A call would be made to the telephone exchange and the caller would then be connected by an operator to the correct party line, followed by a series of rings to denote who on the party line should answer their telephone. This was considered by pastoralists to be more private than the radiophone, however it was possible for the operator at the exchange and other stations on the party line to listen in to calls. Pastoralists were restricted to the time they could use the telephone by the Post Office opening hours. Pastoralists experienced telephone equipment itself to be unreliable, as one pastoralist explained:

I didn’t have a secret phone—I had an old wind up party line phone that worked about ten per cent of the time….

Many pastoralists now have private analogue telephones, although some experienced them as unreliable:

I think they call it an analogue system and they’re putting in a digital system, and they say it’s going to be wonderful. It will be very interesting to see if it is!

You sort of believe them—we do have trouble with that—I just tell people to keep trying, five or ten times.

Digital telephone systems were being installed with pastoralists looking forward to improved reliability. Use of solar energy to power telephone systems and satellite technology was seen by pastoralists as important contributions to improving communication technology.

Pastoralists observed that with the introduction of telephones, people did not use the transceiver community network much any more:

(T)hen the phones came in and everybody gradually dropped off—you might go weeks without hearing from your neighbour—it’s a shame really.

Other pastoralists also noted that in the past it was less socially acceptable to travel for the purposes of meeting someone for a discussion or conversation, but these days this was less the case. With improvements in the comfort and speed of motor vehicles, people got together in town more often than they used to.

Facsimile (Fax) – Facsimile was seen by many pastoralists as offering a further dimension to improving their accessibility to potential information. The use of facsimile technology by pastoralists has increased during the course of this research to 19 pastoralists families having facsimile, 3 using their neighbours facsimile and 12 without facsimile by 1994. Pastoralists nominated a number of advantages, disadvantages and changes that use of facsimile technology brought to their experiences in comparison with their current communication options of mail, UHF radio transceiver and private telephone. The dimensions of the advantages and disadvantages nominated by pastoralists as improving their accessibility to potential information highlighted the nature of changes that facsimile technology-in-use brought to their experiences. These dimensions took the form of seven main themes: time, economics, social, ease of use, quality of potential information, spatial expression and written expression (see Figure 3). Comparisons were also made between experiences using facsimile and other communication technologies (see Table 7).

Time was nominated as an important dimension in the use of facsimile technology by pastoralists. For example, pastoralists using facsimile reported this dramatically sped up their interactions in business that required paperwork to be used, which otherwise they would have to rely solely on a once weekly mail ser-
service. Pastoralists estimated that previously paperwork requiring signatures or company stamps took four weeks minimum to complete business, whereas with facsimile was a matter of minutes. Pastoralists also saved time waiting for phone calls to be returned, trying to contact people, waiting for people they called getting organised and wasted less time arguing with people over the phone. Decisions could be made at night by pastoralists when doing their bookwork which could be sent immediately for action. Faster interactions compressed the time frame of activity, bringing geographically distant parts of their (potential) information networks closer. Pastoralists remained geographically remote but less socially isolated. Sense of immediacy about doing things gives a sense of close proximity.

Economic advantages were cited by many pastoralists in their use of facsimile technology. These included the cost of facsimile machines and paper being considered as paying for itself in the amount of money saved in trips to town and in business emergencies. Dealing with banks more quickly meant that money could be kept in pastoralists accounts longer earning interest. Costs relating to telephone calls were also nominated by pastoralists as economic advantage in: avoiding telephone small talk, as one pastoralist explained:

("T)he phone bill’s picking up while you’re talking about the weather and everything. After ten minutes you decide to find out your information!

Other examples included questioning accounts which involve the discussion of figures and waiting for the other end to get organised. A disadvantage was pastoralists receiving of long faxes (especially from accountants) that used large amounts of facsimile paper.

Social dimensions in the use of facsimile included pastoralists being able to send written information around to their neighbours quickly so they could study it for later discussion. The local networks of conversation were also improved in the access to information and involvement in local activities, in this area particularly Rangecare. Jokes and ditties were faxed to relatives and neighbours, which offered a sense of everyday closeness and informal “conversation”. Sending of letters to relatives was also nominated as a use of facsimile, to family at work and at home (in one case a relative bought a fax so they could send and receive letters by fax). The post office’s Fax Post service was regarded as too expensive for relatives (who pay for the facsimile on collection from the post office). Some pastoralists also saw a down side to less social interaction using facsimile, as one pastoralist commented:

But when people send you things on the fax you don’t talk to them—you’ve got no communication with them. When I get on the phone I like to have a yarn to someone—find out what’s going on around the place.

Easy to use was nominated by many pastoralists as an important feature of facsimile machines in that they did not require an understanding of computers, they could simply draw or write what they wanted, dial the required number and send it through. Five pastoralists used personal computers for property record keeping, however, only in one case was the possibility of using computers to access potential information using a modem raised. Other pastoralists who did not use computers either hoped to learn about them in the future or saw computers as difficult to learn how to use and the “next generation” being computer literate.

Accessing potential information using facsimile had a dimension as to the “quality of potential information” pastoralists could enjoy. This was related to the time it took potential information to reach pastoralists by mail, reflected in such comments as:

You get your basic what’s been going on all the time but by the time it’s processed and sent out it’s obsolete.

Interpretations offered by those who had closer access to sources of
potential information were also seen by pastoralists to have shortcomings:

Most of the information we get access to is only through the media, and quite often that can be distorted.

Using facsimile, pastoralists reported they had access to the latest potential information, especially prices and market reports on the day when selling wool or stock. Weather map faxes were also nominated as more up to date than newspapers, television or radio. Pastoralists experienced facsimile as being a very useful way to get a lot of potential information together quickly from people long distances away who are directly involved in areas that they are interested in. Facsimile is then used by pastoralists to copy or re-fax to interested neighbours or relatives for study and later discussions in person and by telephone.

Spatial expression refers to the advantage of pastoralists being able to use facsimile to convey meaning in the form of diagrams and drawings, which is not possible over the telephone (but is by mail, but slower). Numerous examples of the relevance of this included being able to fax pages of a manual through with relevant machine parts for an order marked, using the fax to photocopy originals and sending a marked copy of diagrams and sending sketches and designs of equipment to neighbours or spare parts suppliers.

Written expression was nominated by pastoralists as an important advantage of using facsimile over telephone. This included the reduction in transcription errors when writing financial figures, wool statistics and part numbers over the telephone, which caused economic loss, loss of time and confusion. Business requiring paperwork was also nominated as a major use of facsimile in speeding up the process and covering legalities by having agreements in writing. Pastoralists also saw benefits in being able to study written documents sent and re-read them, taking time to write comments or letters and then sending them quickly rather than writing letters quickly and rushed, then sending them slowly by mail. Some pastoralists said they found it easier to think when writing something and then fax it rather than having to think on the spur of the moment or lose their temper on the telephone.

Using Communication Technologies Transforms Experiences –

Using communication technologies in mediated personal interaction has transformed pastoralists’ experiences in a mutually adaptive way, deriving meaning through its use.

The use of telephone and facsimile in this context transcends time and place, changing pastoralists’ experiences of the immediacy of personal interactions. Private and public protocols of conversation previously demarcated in the use of radio and party-line telephone systems changed with the introduction of private telephones to new meanings of utility and accessibility.

Use of facsimile amplifies written and spatial expression, and suppresses verbal expression (as telephone amplifies verbal expression and suppresses written and spatial expression) in communication. This has dramatically transformed pastoralists’ experiences of private and formal interactions beyond their local communication networks, particularly in business activities. Local networks of public and private, and formal or informal communication previously confined to face-to-face interactions, have changed with the use of facsimile. Facsimile technology has also taken on use-contexts in the form of its utility in the private domain (particularly business) requiring written or spatial expression and as a “photocopier” to offer neighbours and friends accessibility to data which is closer to the source than their “second-hand” interpretations. As one pastoralist explained:

We’ve made submissions to government about the Western Division. We get the media release from the minister’s office in Canberra half an hour after it’s put out—we can get it before the newspapers get it, we ask them to fax it through to us. It comes through to here, say, and I just fax it on to other neighbours around. So we all know right up to date what’s happening—so usually nobody knows any more than we do.

Of the 19 pastoralist families with facsimile, only one is connected to rural mains electrical power, which was available to them at the time this research took place. Rural mains power is to become available to pastoralists in the research area with first connections proposed in late 1994. Facsimile was powered by electricity generated from a diesel motor or solar/battery system on 18 properties.

The electricity generating system on properties did not operate 24 hours a day, and the use of facsimile had been adapted to fit this context. For example, facsimile on a property was operational between the hours of 8 and 10pm (more often in summertime with the air coolers which required electricity running during the day). If a fax was to be sent to the property outside this time, it required the sender to make a telephone call to the property first so the electricity system could be switched on or started up to receive the fax. Pastoralists reported they sent more faxes than they received, which to some extent reflected the current situation with receiving faxes, but this may change with connection to mains electricity. Five pastoralists who did not have facsimile attributed the currently limited operations of facsimile as a reason why they did not have fax and indicated that they would purchase one once the mains electricity was connected. Pastoralists experiences in the use of facsimile technology in the absence of mains electricity shows pastoralists’ ability to adapt technology and technology to adapt them. Changes to mains electricity and improvement in telephone communications will continue the process.
The performance of facsimile is also dependent on telephone lines in the area functioning properly, and many pastoralists experienced difficulties with connections. The analogue telephone system in the area was being updated to a digital system at the time of this research, which promised to provide more reliable telephone communications and therefore improvements to facsimile communications. Three pastoralists had separate telephone lines installed for their facsimile machines, the other sixteen operated facsimile machines on the same line as the telephone. This was due to the high cost of installing a second line on the analogue system (which was too weak to allow double adaptors) and pastoralists had to switch from telephone to facsimile machine by pushing a “send” button or unplugging the telephone and plugging in the fax machine.

Interdependence of technologies is highlighted in their built-in dependence on functioning within a network of support technologies and people to service. Facsimile machines need electrical power and telephone lines to operate, and these in turn are dependent on other technologies. Facsimile machines need to be serviced and supplied with paper and ink, electrical power even generated on the property needs to have parts, and telephone lines need repair and service. This draws pastoralists into new and more complex socio-technological networks of inter-dependencies.

Conclusions

Pastoralists in geographically remote areas are actively involved in the process of accessing sources of data in the form of both mass media (print, television and radio) and through personal interactions in their communication networks. Individual pastoralists are not divorced from the process of assimilating and making sense of data in their own right, utilising a diversity of sources in doing so. Subject to perceptual filters of relevance, data has potential to be experienced as meaningful information in a process of individual and social construction of knowledge. This challenges the Transfer of Technology paradigm conceptualisation of communicating information as a transmission activity, where centrally generated knowledge is transmitted as information to a passive receiver.

The nature of pastoralists’ accessing of data is diverse and complex, which reflects a dynamic process of individual and social construction of knowledge. Use of communication technologies such as mail, radio transceiver, telephone and facsimile has improved pastoralists’ ability to transcend social isolation within and beyond local communication networks, even though they remain geographically remote. They have greater accessibility to engage in formal and informal personal interaction to access potentially useful data, experiencing proximity and immediacy. Technologically mediated personal interaction differs in nature from meeting face-to-face, a dynamic of human-technology relations. Use of communication technologies offers alternative contexts for personal interaction which is seen by pastoralists as improving their accessibility to potentially useful information.

This analysis reveals some of the complexity and multiplicity of interactions through which pastoralists’ experience data, the nature of some of the factors which influence access-ability (accessibility), and some of the transformations in experiences over time using communication technologies in a context of geographical remoteness. This opposes the Transfer of Technology paradigm in that the nature of reality is based on individual construction of reality (Kelly, 1955), rather than resting on the positivist assumption that there is one reality which can be known objectively and is identical for all knowers (Dervin, 1989). Further, it supports a position that technology-in-use is non-neutral and transforms experiences (Idhe, 1990), rather than merely an object which is manipulated and controlled.

Communication of information in remote places need not be about how well information can flow from a knowledgable source to a geographically remote passive receiver, but about understanding how people in geographically remote contexts actively improve their accessibility to data. Pastoralists utilise communication technologies they see as useful in enhancing their experiences through mass media and social interaction (behavioural coordination) in networks of communication, contributing to the process of their individual and social construction of knowledge. This offers insight into the nature of opportunities for further improvement in accessibility to data, inviting new experiences which may be perceived by pastoralists as meaningful information for their agricultural production enterprises.

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Addressing Cultural and Language Barriers to Communication with Ethnic Farmers in Goulburn Valley

Bruce Cumming, Cengiz Erol, and Vicki Mitsos

ABSTRACT: Two major projects; the Ethnic Access Salinity Project and the Ethnic Farm Chemical Project were developed to deal with the complexities of farmers from a diverse and complex range of background in Northern Victoria. The projects use a “Philosophy of Inclusion” so that landholders are actively involved in policy development, decisions and activities using appropriate inclusive communication methods. The work is aimed at effectively using technology and management, to deal with land management issues. The aim of the project is for the communities of landholders to have true ownership of the decisions affecting them, and empowerment to take control. The projects use various communication methods to enhance the uptake of sustainable agriculture management techniques including awareness campaigns and a major survey into cultural barriers to communication. The survey also allowed a network of interpreters to be developed and local ownership of the projects. The project outcomes rely on the development of a shared approach between various government agencies, farmers, the Ethnic Council, farmer organisations, councils, corporations and community groups using a joint steering committee. Achievements include setting up of several small Neighbourhood Action Groups, resource development including simplification of English language material, translation of written materials into appropriate languages, using voluntary interpreters, and a multi-lingual video to help deal with low literacy and technical skills.

RESUMÉ: Deux projets importants ont été développés - le projet d’excès de salinité avec la participation des groupes ethniques, et le projet de produits agrochimiques avec la participation des groupes ethniques pour traiter les complexités des agriculteurs de la région nord de l’état de Victoria en Australie, qui ont un passé divers et complexe. Les projets appliquent une ’philosophie de participation’ afin que les propriétaires participent activement dans le développement politique, dans la prise de décisions, et dans les activités grâce aux méthodes de communication appropriées. Le travail vise à l’utilisation efficace des technologies et techniques générales pour la culture de la terre. Les projets ont découvert que les communautés de propriétaires participent réellement dans la prise de décisions.

RESUMEN: Se desarrollaron dos proyectos importantes el Proyecto de Exceso de Salinidad con la Participación de Grupos Etnicos y el Proyecto de Productos Agroquímicos con la Participación de Grupos Etnicos para tratar las complejidades de los agricultores de la región norte del estado de Victoria, Australia, que tienen un amplio y complejo rango de antecedentes. Los proyectos usan un “enfoque participativo” para que los terratenientes participen activamente en el desarrollo de políticas, en la toma de decisiones, y en actividades mediante apropiados métodos de comunicación. El trabajo se dirige hacia el uso eficaz de tecnologías y técnicas gerenciales para tratar los aspectos de manejo de la tierra. Los proyectos buscan que las comunidades de terratenientes tengan una verdadera participación en la toma de decisiones.

Background

Seventy nine percent of orchardists in the area are from a non-English speaking background (Cumming 1992,1). In 1992, a study was carried out to investigate cultural barriers to NESB farmers accessing...
extension services, particularly the Salinity Management Program. The study used interviewer/translator from each of the communities including Italian, English, Greek, Macedonian, Albanian, Serbian, Turkish, Punjabi and Filipino to assist in conducting a survey and to act as community contacts.

The survey and other work indicated that cultural and language background may have contributed substantially to the damage caused by salinity. This appears to be due to poor communication between government agencies and NESB people. Communication barriers relate to issues including cultural differences, spoken-language communication problems, lack of technical skills, lack of basic education and literacy, conservatism and the lack of specific government programs (Stoyles 1992, Cumming and Erol 1993). Subsequent demographic investigation shows that there has been a gradual shift in ethnic makeup, with only 29% of NESB landowners in 1939. Since that time there have been waves of migrants from different countries changing the ethnic mix with the largest changes occurring in the 1950’s and 1960’s resulting in 79% NESB landowners. The current wave is from the Punjab region in India.

Specific action which can be taken by orchardists to address the problems include: improved irrigation infrastructure and management; better surface drainage to lessen accessions to groundwater; and pumping of groundwater and development of holistic business plans.

**Percentage of Community/Language Groups in the Project Area**

<table>
<thead>
<tr>
<th>Community/Language Group</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serbian</td>
<td>0.3</td>
</tr>
<tr>
<td>Greek</td>
<td>20.0</td>
</tr>
<tr>
<td>Macedonian</td>
<td>15.5</td>
</tr>
<tr>
<td>Italian</td>
<td>28.0</td>
</tr>
<tr>
<td>Albanian</td>
<td>12.5</td>
</tr>
<tr>
<td>Punjabi</td>
<td>2.4</td>
</tr>
<tr>
<td>English</td>
<td>21.0</td>
</tr>
<tr>
<td>Mixed</td>
<td>0.3</td>
</tr>
</tbody>
</table>

**Project Methods and Results to Date**

While keeping in mind the “Philosophy of Inclusion,” the project team has gone through the phases of: needs recognition; awareness raising; information gathering; establishing general aims; establishing specific goals; developing methodology; establishing funding support; project conduct; assessment and refining the project; and documenting results.

The role of the various professionals involved in the project has been mainly one of group and individual facilitation. This role requires some discipline, and involves standing back a little and providing guidance, coordination, technical and scientific support and encouragement. This approach ensures ownership of ideas, plans and action by the community members and representatives. The role of the Ethnic Access Project steering committee is to make decisions about the direction of the project, while the detail is carried out by individual landlords and the professional staff.

**Awareness Raising and Information Gathering** – One of the first steps in this project was to carry out an awareness campaign to demonstrate that salinity is the cause of damage to orchards, and that programs are available or can be developed for farmers to manage salinity. The conduct of the survey to identify cultural barriers was a useful medium for awareness raising in addition to the primary aim of gaining new information. By using people from the ethnic communities to do the interviewing, we were also able to communicate information to landholders about salinity and project development. This enabled establishment of a network of farmers who felt ownership of the project.

**Communication and Facilitation Techniques** – In order to begin the project it was necessary to identify reasons for salinity mitigation works not going ahead, and methods of addressing these. While the more obvious reasons are language based, there are other less evident but important reasons. These include: low levels of literacy; cultural differences; tensions between ethnic groupings; perceived high cost; and the fact that the elder patriarch of the family often makes all investment decisions. There is also a general distrust of government services and personnel and of some industry structures. It was necessary to build community trust, to avoid a descending approach and demonstrate that NESB farmers are not excluded from programs and services as is commonly perceived. Recognised bodies like the local Ethnic Council, canneries and ethnic national television contributed to this change in perception.

An important step was to recognise that there was a need to empower NESB farmers to take action on land degradation, thereby overcoming the feeling of being excluded or of being powerless. It was decided to form neighbourhood action groups, made up of adjoining farmers with similar problems and of a non-English speaking background. This was done instead of using existing organisations which are not considered user-friendly by many NESB farmers.

The project is using various communication techniques to enhance the uptake of salinity mitigation works. These techniques rely on the development and facilitation of a shared approach between government agencies, growers, Landcare Groups, the Ethnic Council, grower organisations, municipal councils and community groups. A project steering committee made up of a cross section of these bodies and ethnic groupings ensures the shared approach takes place as specific project activities are carried out. The project uses a variety of facilitation techniques to help gain participation and cooperation of NESB farmers. For instance meetings are organised by the farming community rather
than by government agencies. Professional staff are trained facilitators and provide both a technical advice and a discussion facilitation role.

Other communication methods being used include: use of the ethnic mass media (TV and the press); involvement of primary schools as a link to farm families; holding of meetings in local informal venues; Adult Education courses; training schemes; training of community group leaders in goal setting and communication; and links with other community programs. Better linkages between horticultural researchers and the project are being developed.

Whole Farm Planning and Salinity Works – One of the key assistance methods now available to orchardists is Whole Farm Planning (WFP) (Cumming 1992). This is a holistic planning technique where the orchard family analyses the strengths and weaknesses of the orchard infrastructure and develops a mission statement, goals and a blueprint of actions for the future. The process is facilitated by the Department of Agriculture and is aided by private and government advisers, but the farmer controls the process and determines the final outcomes. This is to ensure ownership of the process and a commitment to future actions. Most of these actions relate to groundwater and surface water management.

The format of the documentation produced during the WFP process includes: accurate farm maps showing current infra-structure; a written report outlining problems and solutions; and a timetable for activities over the next 5 to 10 years. A financial assessment and business plan is usually also drawn up at this time.

The Whole Farm Planning process has been adopted well; rising from 2 in 1992 to over 50 per annum in 1994. The adoption of salinity works as a result of the planning process has been rapid with over 30% installing new surface drainage, over 50% installing micro-irrigation and over 25% installing groundwater pumps within one year.

Funding and Support – Funding was received by the Federal Government’s Rural Access Program to employ an ethnic access officer to deal specifically with NESB farmers and ethnic issues as part of the project. This has allowed the project to provide a contact for targeted person-to-person contact with ethnic farmers thereby helping to build trust and a willingness to participate in activities. Since that time the project has also successfully applied for funding from private and public bodies to support specific elements of the project. The local canny SPC, the National Landcare Program and the Department of Agriculture have jointly provided funds to continue employment of the access officer and provide project support over three years.

Formation of Neighbourhood Action Groups – A major project task is facilitating the setting up of small Salinity Neighbourhood Action Groups to allow true grassroots participation. The group’s activities are integrated by the input of the project steering committee. Two groups were formed by June 1993 and seven more by June 1994, representing the whole area. The groups are developing a sense of empowerment and have taken independent action. Australia’s first community groundwater pumping scheme was established by one group in 1993. Four other groups have carried out studies into drainage issues leading to action by the local water authority.

Special Communication Resources – Another project task is compiling of relevant resources. These resources include the simplification of English written material available from government agencies, and the translation of materials, including brochures, posters and newsletters, into appropriate languages using voluntary community translators where possible. Voluntary interpreters are used where appropriate for telephone and face-to-face communication. An educational salinity video kit has been produced with an English soundtrack, and several versions with relevant language soundtracks to suit non-technical audiences are being produced.

Conclusion

By identifying and taking account of the diversity of backgrounds of a general target audience of farmers, the Ethnic Access Landcare Project has developed appropriate communication methods for dealing with them. Using a philosophy of inclusion to ensure participation of farmers of these diverse backgrounds, the project has undertaken the process of empowering landholders to solve their land degradation problems. The project has been successful in bringing together ethnic groups, government agencies and industry bodies to jointly achieve shared objectives.

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Les réseaux TCP/IP en Afrique: Intérêts, enjeux et espoirs

Olivier Sagna

ABSTRACTS: The principal hindrances to the development of fundamental and applied research in the agricultural domain is the access to information for new knowledge and dissemination of the results of research from the scientific community to the agricultural operators. It is in this context that the TCP/IP information network, better known under the generic term Internet, has for some time been in subsaharian Africa. At the moment, some 30 countries are connected in one way or another to this highway of electronic information which is gradually establishing itself in the developing countries. Taking into account the possibilities offered by the network and the veritable revolution that it foreshadows in the domain of information circulation, it is essential that all of those who are involved in the production and the management of agricultural information become actively involved with this network.

RESUMÉ: Les principales entraves au développement de la recherche agricole sont liées à la difficulté d’accès à l’information pour l’élaboration de nouveaux savoirs, et la quasi impossibilité de diffuser et de valoriser les résultats de ces travaux scientifiques en direction des opérateurs agricoles. C’est dans ce contexte que sont apparus depuis peu en Afrique, les réseaux TCP/IP plus connus sous l’appellation générique d’Internet. A l’heure actuelle, une trentaine de pays africains sont connectés d’une manière ou d’une autre à ces autoroutes de l’information qui se mettent en place dans les pays développés. Compte tenu des possibilités offertes par ces réseaux et de la révolution qu’ils préfigurent dans la production, la circulation et la valorisation de l’information, il est indispensable que tous ceux qui sont impliqués dans la gestion et la production de l’information agricole en Afrique deviennent des acteurs engagés de ces réseaux.

RESUMEN: Los principales obstáculos al desarrollo de investigación básica y aplicada en el campo agrícola es el acceso a información para adquirir nuevos conocimientos y para difundir los resultados de investigación desde la comunidad científica hacia los operadores agrícolas. Es, en este contexto, que la red de información de TCP/IP, más conocida bajo el término genérico Internet, ha existido por algún tiempo en África sub-Saháríca. En el momento, 30 países están conectados de una manera u otra a esta autopista de información electrónica que se está estableciendo gradualmente en los países en desarrollo. Considerando las posibilidades que ofrece la red y la verdadera revolución que se augura en el campo de intercambio de información, es esencial que todos los que están involucrados con la producción y el manejo de la información agrícola en África participen activamente en esta red.

DANS LA PLUPART DES PAYS AFRICAINS, le secteur agricole, qui occupe plus de 70% de la population active, se caractérise principalement par sa sous-productivité et sa faible rentabilité. Cette situation résulte notamment de la lenteur des processus de modernisation des techniques culturales dont une des conséquences les plus préoccupantes est que le taux de croissance de la production agricole est en règle générale inférieur au taux de croissance démographique. Les études des différentes politiques agricoles menées depuis l’indépendance expliquent notamment cette situation par le fait que “le flux de transfert de connaissance et de technologies s’est avéré sur la période modeste, souvent inapproprié et sans rapport avec le niveau des revenus tirés de l’exploitation agricole”3. Pour remédier à cette situation, la solution préconisée, par exemple par les autorités sénégalaises, est d’améliorer l’efficacité du système de recherche agricole en l’intégrant dans un réseau. De manière plus précise, il s’agit de répondre à l’attente des utilisateurs finaux, de mieux valoriser les résultats de la recherche agricole et de développer la coopération sous-régionale en matière de recherche et de vulgarisation. Cela étant, force est de constater qu’aujourd’hui dans le secteur agricole, les institutions africaines d’enseignement supérieur et de recherche, ainsi que les structures spécialisées dans la gestion de l’information, sont confrontées à toute une série de problèmes qui ont pour conséquence de les marginaliser sur le plan scientifique et de saper les efforts consentis pour accomplir leurs missions. Les principales entraves au développement de cette recherche sont bien connues. Elles ont pour nom, difficultés d’accès à l’information pour l’élaboration de nouveaux savoirs et entraves à la diffusion des résultats des travaux scientifiques. Pour des raisons essentiellement financières, les chercheurs africains ne sont pas ou peu irrigués par les canaux d’information existants. Les périodiques scientifiques sont inaccessibles ou presque en raison du coût élevé des abonnements qu’il faut payer en devises étrangères et par ailleurs ils sont souvent reçus avec des retards incompatibles avec la conduite de programmes de recherche. De plus, compte tenu des budgets qu’elles nécessitent, les missions de recherche à l’extérieur de l’Afrique ont un caractère exceptionnel. A cette situation déjà difficile est venue s’ajouter depuis janvier 1994, la dévaluation de 50% du Franc CFA qui se traduit, entre autre, par la multiplication par deux de tous les prix des biens et services importés dans les quotas pays de la zone Franc2.
Malgré toutes ces difficultés, la recherche africaine produit tant bien que mal des résultats mais se pose alors le problème de leur diffusion en direction de la communauté scientifique internationale d’une part et en direction des utilisateurs finaux d’autre part, qu’il s’agisse par exemple de l’agro-industrie, des sociétés d’encadrement rural ou des communautés villageoises. C’est dans ce contexte que sont apparus depuis quelques temps en Afrique, les réseaux TCP/IP plus connus sous l’appellation générique d’Internet. A l’heure actuelle, une vingtaine de pays africains sont connectés d’une manière ou d’une autre à ces familiers autoroutes de l’information électronique qui se mettent peu à peu en place dans les pays développés. Compte tenu des possibilités offertes par ces réseaux et de la réalité révolution qu’ils préfigurent dans le domaine de la production et de la circulation de l’information, il est indispensable que tous ceux qui sont impliqués en Afrique dans la production et la gestion de l’information agricole deviennent des acteurs engagés de ces réseaux, s’ils veulent enrayer le processus de marginalisation dont ils sont aujourd’hui victimes.

Les réseaux TCP/IP en Afrique: Intérêts, enjeux et espoirs

**Et Internet fut…**

Clin d’œil de l’histoire où évolution normale des choses, ce que l’on appelle aujourd’hui le cyberespace⁴, ce monde dans lequel tout un chacun (du moins ceux qui sont connectés) peut communiquer avec n’importe qui, est à l’origine un pur produit de la guerre froide⁵, cette époque où les barrières entre les hommes semblaient infranchissables à l’image du Mur de Berlin. En effet, l’ancêtre d’Internet n’est autre qu’ARPANET, réseau mis au point pour les besoins du Department of Defense (DoD) des États-Unis et plus précisément de l’Advanced Research Project Agency. Il s’agit alors de relier les chercheurs avec des sites informatiques centraux de manière à mettre à leur disposition des ressources matérielles et logicielles. Dans un premier temps ARPANET est strictement réservé aux institutions travaillant sous contrat avec l’armée et aux universités faisant de la recherche en matière de défense. Par la suite des réseaux coopératifs et décentralisés du même type, tel UUCP⁶ pour le monde UNIX, se mettent en place pour désertiviser la communauté universitaire et même des firmes privées. Au début des années quatre-vingt c’est au tour de réseaux tels Computer Science Network (CSNET) et BITNET d’offrir aux universitaires et aux chercheurs un réseau d’envergure nationale. Les échanges entre ces réseaux sont alors certes possibles mais de manière à normaliser les procédures, le DoD élabore et teste des protocoles de communication internet (inter-réseaux) permettant de relier ces réseaux indépendants entre eux. Cette expérimentation débouche en 1982 sur l’adoption par le DoD du Transmission Control Protocol (TCP) et de l’Internet Protocol (IP). En 1983, ARPANET est scindé en deux branches distinctes avec d’une part MILNET, réseau à usage strictement militaire, et d’autre part ARPANET, réseau civil réservé aux organismes impliqués dans les programmes de recherche gouvernementaux.

En fait le véritable début d’Internet date de 1986 avec la création par la National Science Foundation (NSF) d’un réseau aujourd’hui connu sous le nom de NSFNET qui relie les chercheurs à travers les États-Unis en utilisant les normes TCP/IP. Dans ce cadre cinq centres informatiques équipés de supersordinateurs sont reliés à des réseaux régionaux auxquels sont connectés des réseaux locaux situés sur les campus universitaires ou dans les organismes de recherche. Peu à peu NSFNET remplace ARPANET comme réseau de la recherche et ce dernier est finalement démantelé en mars 1990. En 1991, Al GORE, l’actuel vice-président américain, lance le projet du National Research and Education Network (NREN) visant à la création d’un réseau d’ordinateurs à haut débit avec entre autre objectif de connecter d’ici l’an 2 000 “toutes les salles de classe, toutes les bibliothèques, tous les hôpitaux et cliniques”⁵⁶, projet qui est aujourd’hui connu sous l’appellation d’autoroute électronique ou d’autoroute de l’information. Dans cette dynamique, Internet s’étend peu à peu à travers le monde avec la connection de réseaux similaires en Australie, au Japon, en Europe, en Amérique du Sud et depuis peu en Afrique. Internet est aujourd’hui plus de 8 000 réseaux qui couvrent près de 125 pays rassemblant près 25 millions d’utilisateurs avec un accroissement du trafic de 10% par mois. Les points forts d’Internet sont d’une part sa rapidité qui en fait le réseau le plus rapide au monde avec des débits de 45 Mégabits par secondes (environ 5 000 pages dactylographiées) et d’autre part son ouverture qui lui permet de communiquer avec une grande diversité de systèmes. Ainsi que vous ayez un PC, un MacIntosh, un Super Cray, une simple ligne téléphonique ou un réseau à haut débit vous pouvez vous connecter à Internet⁷.

**Les réseaux TCP/IP et leurs possibilités**

Assurant la transmission ou la diffusion d’informations confidentielles ou publiques entre individus ou institutions, les réseaux de type TCP/IP offrent une grande diversité de services. Parmi eux on peut citer le courrier électronique (E-mail), les listes de distribution de courrier (Listservs), les groupes de conférences (Newsgroup), (4) les connexions à distance (Telnet), le transfert de fichier (FTP) et les outils de navigation et de recherche d’information.

Le courrier électronique est à la fois le service le plus simple, car peu exigeant en termes d’infrastructures de communication et d’équipement de l’utilisateur, le plus populaire et le plus utilisé de tous les services disponibles sur Internet. Il
permis de communiquer presque instantanément avec n’importe quelle personne qui possède un compte dans un autre ordinateur accessible par Internet, quel que soit l’endroit du globe où il se situe. Il est ainsi possible d’envoyer et de recevoir des messages et même d’échanger des données à condition que les fichiers ne soient pas trop volumineux (moins de 300 000 caractères). Le courrier électronique offre plusieurs avantages dont la rapidité, le faible coût, la non nécessité d’une synchronisation entre émetteurs et récepteurs et la possibilité de joindre plusieurs personnes à la fois.

Les listes de distribution de courrier. Si l’on veut diffuser un message auprès d’un grand nombre de personnes alors il est possible d’utiliser les serveurs de listes de courrier (listservs). Il s’agit de systèmes qui gèrent des listes d’adresses sur lesquelles on peut s’inscrire librement par courrier électronique, et qui se chargent ensuite d’envoyer à toutes les personnes inscrites, des copies conformes des messages qui sont envoyés sur la liste. Ces listes peuvent compter plusieurs centaines de membres et le travail est coordonné par des volontaires. Cet outil utilise la technique dite store-and-forward qui permet le stockage et la diffusion en différent des messages. A l’heure actuelle, il existe plus de 3 500 listes de distribution de courrier dans l’Internet qui couvrent pratiquement tous les champs d’intérêt.

Les groupes de conférences de USENET. De manière à éviter l’engorgement des réseaux et des boîtes à lettres tout en facilitant la tâche de consultation des usagers, on a mis au point un système dans lequel les articles sont stockés dans des sites centraux où les personnes intéressées peuvent venir librement les consulter. Ces groupes de conférences appelés newsgroup forment un réseau appelé USENET qui s’apparente plus à un réseau de communication qu’à un simple réseau d’ordinateurs. A l’heure actuelle, il existe des centaines de newsgroup qui couvrent toutes sortes de thèmes.

Les connections à distance. Il existe également sur Internet un service appelé TELNET qui permet d’effectuer des connexions à l’Internet. De cette façon, on peut avoir accès à des catalogues de bibliothèques, des bases de données de campuses ou des bases de données sans avoir à passer par le réseau téléphonique ou par les réseaux de transmissions de données par puertos comme TRANSPAC ou DATAPAC.

Le transfert de fichier. Pour transférer des fichiers, il existe un outil spécial appelé FTP (File Transfert Protocol) qui permet d’exporter et d’importer des fichiers. Par ce biais, il est également possible d’accéder à certains logiciels du domaine public appelés freeware lorsqu’ils sont totalement gratuits et shareware lorsqu’ils impliquent une contribution, la plupart du temps modique, de l’usager.

Les outils de navigation et de recherche de l’information. Une des caractéristiques d’Internet est d’offrir un véritable magma d’informations qui est à la fois merveilleux et cauchemardesque puisque la surinformation est toute aussi paralyisante que la sous-information. Pour remédier à cela, des outils de navigation et de recherche d’information ont été mis au point qui offrent des interfaces plus conviviales à l’utilisateur que les services décrits précédemment.

• Gopher. Le logiciel Gopher a été développé par l’Université du Minnesota (USA) pour naviguer dans des répertoires de données hiérarchisées. L’intérêt d’un Gopher est de permettre à l’utilisateur de se connecter à des bases de données ou de faire du transfert de fichiers sans connaître les commandes, la syntaxe ou l’adresse Internet propre à chacun des systèmes. En parcourant les arborescences, on aboutit à des documents que l’on peut lire ou importer. De plus un Gopher permet de méémoriser des chemins d’accès à des informations de manière à pouvoir s’y rendre directement par la suite.

• Wide Area Information Service. Développé par Thinking Machine Corporation, Dow Jones et Apple Computers, le système WAIS (Wide Area Information Service) permet d’effectuer des recherches par mots-clés dans des banques d’informations qui contiennent un grand nombre de documents. Ces derniers sont d’abord indexés automatiquement sur tous les mots qu’ils contiennent, un peu à l’image de ce que fait le logiciel canadien Naturel, et par la suite on peut faire des recherches dans les banques de données ainsi créées. Lorsqu’une interrogation est faite, elle porte sur tous les sites où est installé un serveur WAIS et de chaque site interrogé, les documents répondant à la question sont envoyés à l’utilisateur.

• World Wide Web. Dernier né des outils de recherche d’information et de navigation, le système WWB (World Wide Web) développé par le Centre Européen de Recherche Nucléaire (CERN) permet aux chercheurs d’avoir accès rapidement aux publications et aux informations scientifiques en utilisant l’approche hypertexte pour présenter l’information. Dans ce système d’information client/serveur, les données sont présentées comme dans un document conventionnel, avec phrases, paragraphes, schémas et même photos, mais dans le texte on trouve des mots qui apparaissent en souligné, en couleur ou en surbrillance et qui contiennent des liens vers d’autres documents qui peuvent être sur un même ordinateur ou carrément sur un autre continent.

• Archie. Développé par un groupe de personnes travaillant à McGill University (Canada), Archie est un logiciel qui permet de rechercher tous les sites Internet qui offrent la possibilité de faire du transfert de fichiers.

• Veronica. Lancé en novembre 1992, le logiciel VERONICA a primitivement la même fonction qu’Archie.
puisqu’il permet de rechercher, à l’aide de mots-clés, les centaines de sites équipés de Gopher.

Les réseaux TCP/IP en Afrique

En Afrique, les seuls pays disposant d’une connectivité totale avec Internet sont l’Afrique du Sud, l’Algérie, l’Égypte et la Tunisie. Cela étant, un certain nombre de pays sont connectés à d’autres types de réseaux (BITNET, FIDONET et UUCP) ce qui leur permet un accès limité à Internet. On distingue actuellement quatre réseaux de communication électronique en Afrique à savoir EARN, RIO, AFRINET-ZA et GREENNET.

EARN: Reposant sur la technologie SNA, propre au monde IBM, le réseau EARN (European Advanced Research Network)13 implanté en Tunisie et en Égypte est connecté au réseau BITNET. Sur ce réseau, les principaux outils de communication sont le courrier électronique, la transmission de fichiers et les messages. Depuis peu, des liaisons TCP/IP sont également disponibles en Tunisie comme en Égypte.

RIO: Utilisant les réseaux TCP/IP pour certaines de ces liaisons en France et les réseaux X.25 et UUCP pour ses liaisons en Afrique, le Réseau Intertropical d’Ordinateurs (RIO) a été mis en place par l’ORSTOM. Pour ce qui est de l’Afrique, il est implanté, au Burkina Faso, au Cameroun, au Congo, en Côte d’Ivoire, à Madagascar, au Mali, au Niger, au Sénégal, aux Seychelles et au Togo. Le réseau UUCP, dont une version pour PC existe désormais avec le programme UUPC, offre l’avantage de pouvoir utiliser aussi bien le réseau téléphonique commun (RTC), les réseaux de transmission de données par paquets type X.25 que des lignes dédiées. Cela étant, ce réseau ne permet pas la communication en temps réel et est seulement utilisable pour la transmission de faibles volumes d’information.

AFRINET-ZA: Développé par Rhodes University, le réseau AFRINET-ZA s’étend dans les principaux pays d’Afrique australe à savoir, l’Afrique du Sud, le Botswana, le Lesotho, Maurice, le Mozambique, la Namibie et le Zimbabwe. En Afrique du Sud, il utilise le réseau Internet alors que dans les autres pays il s’appuie sur des liaisons UUCP.

GREENNET: Utilisant la technologie FIDONET, le réseau GREENNET mis en oeuvre par l’ONG du même nom couvre l’Afrique du Sud, le Botswana, l’Éthiopie, la Gambie, le Ghana, le Kenya, Maurice, le Mozambique, l’Ouganda, le Sénégal, la Tanzanie, la Zambie et le Zimbabwe. FIDONET est un réseau point à point qui utilise la technologie dite store-and-forward qui consiste à envoyer un message d’un ordinateur à un autre en passant par un nombre variable d’ordinateurs-relais via des modems et le réseau téléphonique commun (RTC). FIDONET permet l’échange de courrier entre utilisateurs, les conférences publiques et le transfert de fichiers, tout à faible coût grâce à l’utilisation du réseau téléphonique classique, le recours à des ressources matérielles et logicielles banales fonctionnant dans un environnement DOS et l’emploi de logiciels de communication bons marchés, voire gratuits, lorsqu’ils ne font pas l’objet d’une utilisation à des fins commerciales. Ceci dit FIDONET présente des limites comme l’impossibilité de procéder à des connections à distance (TELNET), un mode de communication en différencié non en temps réel, les difficultés rencontrées pour le transfert de gros fichiers ou encore la limitation du nombre d’utilisateurs à une dizaine par site14.

Pourquoi et comment intégrer le monde Internet

Face à la question de savoir s’il faut investir dans ce genre d’infrastructure, les pays africains sont, à première vue, placés devant un véritable dilemme. En effet, ces derniers sont pris en tenaille entre, d’une part la nécessité de résoudre rapidement et durablement les problèmes d’éducation, de santé ou d’autosuffisance alimentaire qui se posent à la grande masse de la population et d’autre part la volonté légitime de participer à la marche du monde en investissant pour ce faire dans des secteurs qui peuvent apparaître comme un lutte inutile voire indécis15. En fait, le dilemme n’est qu’apparemment démontré d’une étude de Meheroo JUSWAHALA sur les politiques menées dans les Nouveaux Pays Industrialisés d’Asie du Sud-Est, “aujourd’hui le développement est intrinsèquement lié aux investissements dans les technologies de l’information”16. Mieux, la croissance économique est désormais tirée, non plus par les services mais par l’industrie informatique et des télécommunications ce qui fait dire au Prix Nobel d’Économie Kenneth J. ARROW que “le rôle de l’information est en train de transformer la nature de l’économie”17. Mais, ce qui est observable dans les pays du Nord ou les NPI peut-il être valable pour les pays du Tiers-Monde et notamment pour l’Afrique ? Les travaux sur la question montrent que la réponse est oui car dans les endroits où les prémices du développement se font sentir, le principal goulet d’étranglement est toujours constitué par des systèmes de communication obsoètes ou sous-dimensionnés par rapport aux besoins. De cela, certain en concluent que la construction de réseaux de communication dans les pays du Tiers-Monde doit leur permettre de sauter les étapes du Quoï il en soit, il est indéniable que ce type de réseaux induit de profonds changements et pour s’en convaincre on peut citer les propos de John SCHONEBOOM, Coordinateur du Sub-Saharian Pro- gramm of the American Association for the Advancement of Science qui note que les réseaux de communication électronique sont en train de transformer la diffusion et la conduite de la recherche dans le monde.
y compris en Afrique, même si le phénomène s’y développe plus lentement.

Au-delà de ces arguments de portée générale, les possibilités concrètes offertes par Internet militent fortement en faveur d’une participation active des africains à ce réseau des réseaux. S’agissant de remédier aux difficultés constatées pour l’accès à l’information et aux entraves rencontrées dans la diffusion des résultats de la recherche, Internet apporte des solutions intéressantes. Tout d’abord grâce à la messagerie électronique Internet laisse entrevoir la possibilité de briser l’isolement dans lequel se trouve les chercheurs africains en transcendant la lenteur du courrier postal, en diminuant les frais de communication à longue distance (téléphone, télex ou télecopie), en libérant les utilisateurs de la synchronisation obligatoire entre émetteurs et récepteurs (qui caractérise notamment les liaisons téléphoniques) et en permettant de joindre simultanément plusieurs destinataires. Pour leur part, les serveurs de listes de courrier et les groupes de conférences autorisent désormais les universitaires, chercheurs et autres décideurs africains à rencontrer leurs pairs sans avoir à faire face aux coûts engendrés par le transport aérien et les frais de séjour, qui très souvent expliquent leur absence dans les réunions internationales. Mieux, la possibilité d’organiser des discussions sur des hypothèses de travail ou de diffuser des résultats de recherche offrent une tribune incomparable aux universitaires et chercheurs du Sud, d’autant plus que comme l’affirme Roberto BISSIO “sans l’attraction esthétique du papier glacé ou de l’impression en quadruchromie, seul le poids des arguments fera la différence pour les lecteurs”. En effet, les universitaires et chercheurs africains éprouvent d’énormes problèmes pour faire connaître leurs travaux compte tenu des obstacles rencontrés pour se faire publier dans les revues scientifiques internationales et souvent de l’absence de revues scientifiques locales. De son côté, un outil comme TELNET permet de palier l’absence de ressources informatiques locales en utilisant par exemple la puissance de calcul offerte par d’autres sites informatiques, sans parler de la consultation à moindre frais de certaines bases de données en lignes et de centaines de catalogues de bibliothèques. De plus le transfert de fichiers facilite l’échange de documents de travail ce qui ne peut que nourrir le travail en coopération des chercheurs individuels comme des structures de recherche. Par ailleurs, les programmes comme GOPHER, WAIS et WWB introduisent une nouvelle dimension dans les relations entre chercheurs du Nord et chercheurs du Sud. En mettant à la disposition de ces derniers le moyen de concevoir des systèmes d’information, ils leur permettent de manière influentun rôle de producteur d’information et non de simple consommateur comme c’est trop souvent le cas à l’heure actuelle. Enfin, l’utilisation intensive de cet outil de communication ne peut que donner une nouvelle dimension aux réseaux documentaires existant, notamment en Afrique où les difficultés de communications entravent souvent leur bon fonctionnement.

Internet présentant un grand nombre d’avantages, la question essentielle est de savoir comment le Sud, et plus particulièrement l’Afrique, peut et doit s’approprier ce formidable outil. Certes, l’Afrique est déjà affectée par ce mouvement mais ses effets sont cependant encore trop marginaux pour être perceptibles. Si Internet “reste un outil réservé à un nombre bien restreint de privilégiés”, nous n’en pensons pas moins que l’appropriation de cet instrument, par les africains notamment, est la meilleure façon de combler “le fossé béant entre ceux qui ont toute liberté de se procurer l’information qu’ils désirent et de communiquer, et ceux qui n’ont aucun moyen de trouver l’information qui leur serait nécessaire pour se former et agir”. Cela étant, on ne doit pas croire que le phénomène peut se développer comme dans les pays du Nord car les conditions d’un tel développement sont loin d’être réunies tant sur le plan des communications que sur celui de l’équipement informatique sans parler bien entendu des moyens. En Afrique, les infrastructures de télécommunication sont des plus faibles avec une densité de deux téléphones pour cent personnes, des réseaux téléphoniques souvent en piteux état et l’inexistence de réseaux X.25 dans de nombreux pays. Sur le plan de l’équipement informatique, la situation n’est guère meilleure quand on sait que le Centre de calcul de l’Université Cheikh Anta Diop de Dakar consiste en réalité en une vingtaine de micros-ordinateurs modèle 386 fonctionnant en monoposte et que le millier d’enseignants et les vingt cinq mille étudiants qui y travaillent doivent se partager environ trois cents micros-ordinateurs. Par ailleurs, sur un autre plan, l’achat d’un micro ordinateur constitue un investissement considérable pour les institutions comme pour les individus contrairement à la situation qui prévaut dans les pays du Nord. Ainsi, au Sénégal le prix d’une configuration comprenant un micro-ordinateur, une imprimante, un modem et un onduleur pour les inévitables coupures de courant équivaut à plus d’un an de salaire d’un professeur d’université. Le développement d’Internet en Afrique doit donc d’abord passer par l’utilisation optimale des ressources existantes et dans un second temps seulement par le développement d’infrastructures nouvelles. Dans ce sens, à court terme, il faut privilégier l’utilisation du réseau téléphonique existant dans les pays où il n’existe pas d’autres possibilités et le recours aux réseaux de transmission de données par paquets de type X.25 là où ils existent, même si ces solutions ne permettent pas toujours d’avoir accès à tous les services d’Internet. A moyen terme, il faut envisager le développement et l’interconnexion des réseaux de trans-
mission au niveau africain de manière à mettre en place "un réseau public virtuel de commutation par paquets d'envergure régionale". L'objectif de cette démarche est de faciliter les liaisons inter-états qui sont souvent difficiles voire impossibles à établir et qui font que la communication Nord-Sud l'emporte sur la communication Sud-Sud. Outre la création d'une infrastructure de télécommunication, il y va du développement de la coopération inter-africaine à l'intérieur comme à l'extérieur des différentes aires linguistiques. Dès lors, il devrait être possible de mettre fin à la situation actuelle qui fait que les chercheurs sénégalais ignorent tout ou presque de ce que font leurs voisins et homologues anglophones, lusophones ou même francophones de simple fait des barrières linguistiques, de l'inefficience des systèmes de communication et des habitudes prises ou imposées concernant l'orientation des courants d'échanges scientifiques, économiques et culturels.

Enfin, à plus long terme, on peut envisager la création de véritables liaisons Internet là où la nécessité s'en fera véritablement sentir à l'image de ce qui existe déjà en Afrique du Sud, en Algérie, en Égypte ou en Tunisie.

Tout cela est certes très séduisant mais qu'en est-il des coûts ? Pour ce qui est de la stratégie d'interconnexion des réseaux de télécommunication, les expériences menées ailleurs indiquent que les sommes nécessaires ne sont pas supérieures à ce qu'impliquent actuellement le fonctionnement séparé de chacun des réseaux existants. S'agissant du montant de l'investissement pour les universités, les organismes de recherche ou les ONG, si l'on en croit les propos de Pascal RENAUD, Chef de la mission informatique ORSTOM, qui a mis en œuvre le réseau RIO, les sommes exigées sont certes importantes mais n'ont "rien à voir avec le montant des subventions qui sont allouées à l'édition, aux équipements informatiques ou encore aux logiciels de traitement de texte". Enfin, l'expérience du CGNET qui regroupe la plupart des centres de recherche internationaux en agriculture, montre que les frais de communication sont nettement inférieurs à ceux engendrés par les moyens classiques.

En effet, le coût d'un message électronique est plutôt basé sur la quantité d'information transférée que sur le temps ou la distance qui sont par contre des déterminants majeurs du prix d'une communication par téléphone, télécopie ou télécopie. Ainsi, sur RIO le prix de l'abonnement annuel est de 10 000 Francs CFA (100 FF) pour les utilisateurs des pays du Sud et le prix d'un message envoyé par courrier électronique entre un pays du Nord et l'Afrique est d'environ 200 Francs CFA (2 FF) pour 1000 caractères soit moins de 500 Francs CFA (5 FF) pour l'équivalent d'une page dactylographiée standard (2 500 signes).

Conclusion

Les chercheurs et les professionnels de l'information évoluant dans le secteur agricole en Afrique, doivent avoir pour objectif de s'approprier cet outil de recherche et de communication dans l'adaptant si nécessaire à leurs besoins spécifiques. Comme ils l'ont fait jadis avec le micro-ordinateur, le télécopieur et tout dernièrement avec le CD-ROM, ils doivent apprivoiser cette nouvelle technologie plutôt que de l'ignorer ou de la rejeter en invoquant un niveau de sophistication jugé incompatible avec la somme de difficultés qui les assaillent. Au-delà de la crédibilité et de l'opérationalité des unités d'information dans lesquelles ils exercent, il y va, à plus long terme, de la survie de leur profession. En effet, compte tenu de la convivialité croissante des systèmes d'information et de leur rapprochement incessant des utilisateurs, ces derniers risquent de considérer les professionnels de l'information comme de simples éléments du paysage documentaire et non plus comme des partenaires obligés sils ratent l'entrée de l'autoroute de linformation.

NOTES ET RÉFÉRENCES


5. Unix to Unix Copy Protocol. Protocole de communication utilisé entre deux machines UNIX.


13. Équivalent de BITNET pour l'Europe.

14. Au sujet de FIDONET voir: Shem Ochuodho. "E-mail Demystified: Low-cost Networking with Fidonet" in Ameri-


21. Ainsi à l’Université Cheikh Anta Diop de Dakar, les annales de principales facultés ne paraissent plus depuis des années et le Bulletin de l’Institut Fondamental d’Afrique Noire qui faisait Jadijs référence, compte aujourd’hui plusieurs années de retard dans sa publication.


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The Australian Telecentres Program:

Providing Public Access to Information Networks for People in Rural and Remote Regions

Ian Crellin and Jim Graham

ABSTRACT: The Australian Government established the Telecentre Program in 1992. Telecentres are typically a broadly based community organisation, working cooperatively and drawing on the self-help ethic. Telecentres have the potential to contribute to a range of community objectives, related to the use of information resources and computers. A major focus is the improvement of farm and business management through access to information sources, management software and telemarketing opportunities. Increased local employment is another focus, including the development of telecommuting/teleworking opportunities for people in rural areas. Telecentres may also fill a role as delivery points for distance education and training, plus as a centre for information on community services and programs. The learning environment in telecentres appears to be particularly well received by people re-entering education with little prior educational experience. Linkages between these other information services and the telecentres are discussed. In addition, general issues associated with the collection, organisation and dissemination of information for rural and remote client groups are also addressed.

RESUMEN: El Gobierno Australiano estableció el Programa de Telecentros en 1992. Un telecentro es típicamente una organización comunitaria de base amplia, que trabaja en forma colaborativa y que se apoya en la ética del esfuerzo propio. El telecentro tiene potencial para contribuir a un rango de objetivos comunitarios relacionados con el uso de recursos de información y de computación. Uno de los principales énfasis es el mejor manejo de las fincas y de las empresas mediante el acceso a fuentes de información, a programas de computación sobre administración y a las oportunidades de telemercadeo. Otro punto importante es el incremento de empleo local, que incluye el desarrollo de oportunidades de teleconmutación y de teletrabajo para personas en zonas rurales. El telecentro puede desempeñar también un papel como punto de entrega para la educación y capacitación a distancia, o como centro de información sobre servicios y programas comunitarios. El ambiente de aprendizaje del telecentro es especialmente bien recibido por personas con poca experiencia educativa y que están ingresando nuevamente a esa campo. Se discuten los vínculos entre otros servicios de información y el telecentro. Se tratan, además, aspectos generales relacionados con la recolección, la organización y la difusión de la información para grupos de clientes en áreas rurales y remotas.

THE AVAILABILITY of inexpensive computing technologies and associated telecommunications facilities have opened up vast possibilities for the access to and distribution of a wide variety of information to an equally wide audience worldwide. It also opens the possibilities of easy interaction between people on a scale unimagined even a decade ago. These developments have changed the way in which many facets of life are conducted, including education and training, business and commerce, and the delivery of government services. These changes have been particularly important to people in rural and remote areas, bringing both benefits and disadvantages to them.

Responses to Change—The Telecottage or Telecentre

In the 1980s, in rural areas of Scandinavia, community computing and communications facilities were introduced to help rural people learn about these changes and to obtain access to the benefits which the new technologies bring. These were known as “telehaus”, or in English,
“telecottages”. A range of similar facilities have been developed in different countries and may be known as “community tele-service centres”, “telecentres” or “televillages”.

The Australian Government has seen the potential of these community based telecentres to tap the potential of the technology in rural communities and to address some of the problems which the changes bring. Funding was first provided in 1992 and some 60 sites are now in various stages of operations. The focus is in smaller communities of 500 to 5000 in population, often with connections to smaller outposted centres in smaller centres.

Management of centres is by a community committee and the services offered are designed to meet the particular needs of their community. Funding for the establishment of these centres is provided substantially from public funds with a local contribution. To obtain funding, groups must demonstrate that they have reasonable prospects of becoming self sufficient after a period of two years. It is anticipated that users will at least pay the marginal costs and that once a technique or business idea has been successfully trialed, many telecentre users will consider purchasing their own computing equipment. The Australian Telecentre Program is administered within the Rural Division of the Department of Primary Industries and Energy (DPIE), as part of the Rural Community Access Programs group.

### Objectives of the Telecentre Program

The rationale for public involvement in programs such as the Telecentre Program is broad and multidimensional, encompassing political, economic and social dimensions. It is useful to look at the goals of the Rural Division of the DPIE to see how the Telecentre Program contributes to this mission.

Three of these goals are particularly relevant. These are (inter alia):

- efficient, market oriented and internationally competitive rural and related industries, actively seeking value adding and export opportunities
- continuing improvements in the management of agricultural industries and their resource base consistent with the principle of ecologically sustainable development
- development of strong, viable and economically diverse and socially just rural communities

The underlying rationale for involvement in rural community matters is the proposition that a viable rural industry needs a viable rural community to support and sustain it. There is also recognition of community pressures for comparable levels of social justice across all parts of the community. The telecentre objectives of increasing local employment opportunities, of increasing access to management resources, of increasing access to information, education and training, and of delivering community services all contribute to the achievement of these goals at the community level.

### Utilisation of Telecentres

The oldest of the existing telecentres have now been operating for over two years. From their experience, it is evident that there is a considerable level of latent interest in computing and information technology within the broad rural community. It is also evident that there is a long learning curve for many people. A major evaluation of the program is scheduled for 1995. This is planned to include a detailed analysis of the utilisation of the centres and an estimate of their impacts on their communities. The following observations may be made on the basis of experience to date. Most telecentre users do not initially have a high degree of understanding of computing and information technology. Their first levels of utilisation usually focus on simple applications such as word processing and spreadsheeting. Most people can readily relate these applications to existing procedures within their lives and businesses. The step to using the computer as a gateway to the outside world is taken only after becoming comfortable with the simple applications. Often, people are aware that the computer offers these additional capabilities, but cannot readily see how it is relevant to them.

Individuals move at their own pace to these higher levels of utilisation, often after seeing other people with similar backgrounds, successfully using email, conferencing groups or information sources. However, I have observed that the level of utilisation of networked services is often surprisingly low and the degree of satisfaction with such services is correspondingly low. The telecentre situation is particularly well suited to first-step training to enable those people who have not had much contact with the formal education process, to learn in a simple and supportive environment. This may be as a short course or one-to-one tuition with the telecentre coordinator. In some cases, training has been conducted by a local entrepreneur using the telecentre. An additional feature of telecentres is that learners can come back to the telecentre and use the equipment to apply the skills which they have learned to their life interests or farm business. Most educational facilities in contrast, only permit their currently enrolled students to use their equipment and do not generally provide access for private use to former students.

At the community level, the existence of a telecentre leads to a secondary spin-off in that the telecentre management group becomes practiced in the business planning process and is motivated and empowered to plan and implement other ventures or services which meet needs in their community. This is an expansion of the entrepreneurial resource available within the community. Anecdotal evidence suggests
that many telecentre committees become the focus for a set of broader community development activities which may make a considerable contribution to both the level of economic activity and the social amenity within their communities.

**Availability of Appropriate Information to Users**

As mentioned in the preceding section of this paper, we have been surprised by the low level of utilisation of networked services and the low level of user satisfaction with their content. From our experience, these have two principal causes: the lack of relevance of available information to user needs and an amalgam of concerns around the issues of ease of access and cost of access.

On the issue of the relevance of information to user needs, the content of publicly available information sources tends to reflect the interests and organisational constraints of the agency which generated the information rather than the needs of potential users. In addition, information often is not organised in ways which reflect the perspectives and modus operandi of target users. Also, in the case of EMail, many potential users are discouraged by a shortage of relevant people who are also EMail users. There seems to be a failure to achieve a “critical mass” of potential benefits.

With regard to access difficulties, I often hear users complain about the differences between various access procedures and coming to non-intuitive steps lacking suitable help screens. We also hear people complain of spending large amounts of money searching for information relevant to a particular problem, and at the end of the session, having found nothing useful. There appears to be a difference here between the satisfaction levels of those users whose bills are paid by their employers and those individuals who meet their own expenses.

The key to increasing the utilisation of networked information systems appears to be the easy availability of relevant information. Achieving this will require attention both to the information content and the systems themselves. The appropriate starting point for this is an investigation into the information needs and information utilisation processes of potential users. Most public access information has been mounted in the form generated by the originator. Thus, most networked information systems consist of many widely differing formats, assembled without the benefit of user needs investigations. It is an issue which requires our critical attention, if the potential of the technology is to be reached.

**PIENet—DPIE on the Internet**

Users of the Internet will be familiar with the great deal of effort which the US Federal Government puts into making their documents and databases readily available to the public through a range of electronic networks. The US Department of Agriculture (USDA) has made many of its information sets available in this manner. In Australia, the Federal Department of Primary Industries and Energy (DPIE) has sought to set up a similar system which will provide a range of government and agricultural information to potential users through the Internet through PIENet.

As with many similar systems, the principle governing the selection of information for inclusion on the system generally relates to its ready availability at low marginal cost, rather than to any specific analysis of potential user needs. After a slow start, new information items are being added to PIENet and its coverage and usefulness is increasing. Despite the inherent limitations of this approach, the availability of such information to interested members of the public is considered to be a worthy exercise in open government.

**Other Information Services Provided by DPIE to Rural People**

Studies in the 1980s showed that people in rural and remote areas of Australia had very low utilisation rates of many services and programs provided by Governments. Further investigations revealed that the availability of information on Government services and programs was a major factor in these low utilisation rates. As a response to this problem, information services for rural and remote areas were established within DPIE. After a trial was successfully conducted in the late 1980s, a permanent program under the name, Countrylink, was put in place.

The Countrylink Program provides a range of information sources on Government services and programs, including: a free directory of services, *The Rural Book*; newspaper advertising and letterbox drops; displays at country shows and field days; and a freecall 1800/008 telephone inquiry line. To support this service, a database of government services and programs is maintained. At various times, telephone modem access to this database has been provided. It was not widely used however, as high telephone costs associated with the slow speed of search and data transmission, were unpopular.

The problem of information availability was particularly acute in remote communities. Although Countrylink provided a telephone inquiry service, it is believed that face-to-face information services are more effective in these situations. Grants have been provided to community bodies in a number of remote communities to provide a local information service known as the Australian Country Information Service (ACIS).

Under ACIS, the local community provided a site and certain support facilities, and the DPIE provided funds for employing a local person as an information provider.
on a part-time basis. The Countrylink database was installed by disk on a PC and appropriate training was provided for the information provider. ACIS has generally proved popular in the communities where it operates.

Both ACIS and Countrylink focus on the provision of information on the services and programs provided by the Federal level of government. Many subject areas also have relevant services and programs which are provided by the State level of government. In some States, similar information services exist. To the citizens however, the distinction between Federal and State Government is not well understood and sometimes leads to frustration and misunderstanding. There is scope for minimising these difficulties through cooperation between the information services of both levels of government. To date this possibility has not progressed significantly despite wide recognition of its obvious advantages.

The local level of government has also funded information facilities based on the use of electronic networks. These range from simple local information systems, generally operated by touch-screens, such as the Gippsnet system operating in the Gippsland areas of Victoria and the Wellington Corporation system in New Zealand, to sophisticated facilities such as the Ipswich Global Info Links system in Queensland.

The Ipswich facility provides integrated delivery of government, commercial and public access information services as well as computer mediated communications (including video conferencing) and library services. The cost of establishing this large facility which has over 30 public access terminals plus 15 dial-in lines for telephone modem access, is in excess of $13 million, including the construction of a purpose built three story building. This project represents a quantum leap in the size and sophistication of such public access information facilities.

Current Situation of the Telecentre Program

As of January 1995, 40 telecentre projects have been approved and are in various stages of development. This is likely to represent the total number of grants which will be approved under the initial Telecentre Program. This will enable individual telecentres or outstations to be established in over 70 communities. In general, each project will be supported for two years, whilst moving towards self-sufficiency. Further new project starts are unlikely until additional funding is available.

The general assessment of the Australian experience is that it is of world standard. The Australian approach which combines teleworking and telelearning, in addition to public information access. This contrasts with many overseas telecentres, which usually focus only on one of these functions. This multiple approach reflects the Australian rural community needs profile. This particularly interested those considering the potential role of telecentres in LDCs, as it is arguably more relevant than the European experience.

While the original telecottage idea from Scandinavia had its origins in service delivery to remote rural communities, much of the later European, UK and US experience was with urban communities. Surprise is often expressed that the Australian program is managed by the Department of Primary Industries and Energy, rather than a Labour Ministry, although in the USA, closely related community programs providing Internet access to rural communities have been funded by the United States Department of Agriculture (USDA).

Future of the Telecentre Program

The future of telecentres in rural communities in Australia depends very much on the success or failure of the present group of existing tele-centres. This includes both their ability to reach self sufficiency and their broader impact on their communities. At this stage it is too early to judge these questions.

International experience has been that many telecentre-type operations tend to reach a stable sub-commercial level where the use of volunteers and some limited form of funding support from the community or government contributes to their survival. The current Swedish experience is being watched with interest. In Sweden, telecottages were initially generously funded by the government, but are now unsupported and operating on a commercial basis.

In general however, where telecentres have been supported by community members, it is generally believed by those communities that the telecentre has been a positive influence on economic development and employment generation in their community. Initial impressions from the Australian experience show that in some communities the telecentre has become a focus for community activity and business incubation. The bringing together of local people through the centre has led to starting other business or service activities. Some are government grant driven, while others are of a community based business nature. These are in addition to the benefits which individuals derive from access to modern computing and information technologies.

The availability in rural areas of a range exciting developments such as video conferencing and advanced Internet applications such as World Wide Web, also depends in part in the availability of suitable communications infrastructure with a broadband communications capability. Where such infrastructure is not available, the potential of the new technology to deliver information will be substantially limited.

Conclusion

In addition to providing a public access point to relevant information
sources, the telecentres program will hopefully be an important step in raising the levels of awareness of the opportunities provided by the new computing and information technologies in the economic and social life of rural communities.

It also is an institutional arrangement which places much of the responsibility for reacting to change in the hands of the community itself and gives some power to communities to influence employment, education and services delivery in their community. For some communities, it may provide the window to the future for their very survival.

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LandcareNet—
Australian Farmers’ Brush with Information Technology

Mandy Curnow

ABSTRACT: LandcareNet is a computer network that is a joint project of the University of Melbourne and Telecom that was developed after the need for shared information and learning between Landcare groups was identified. Landcare groups were surveyed for their experiences with the electronic network and why use had slowed. The impact of electronic communication on community networks and the hypothesis that no interface exists between LandcareNet and the information networks that operate within the group and the farming community is explored. Reliance on new technology to transfer information also assumes that the person who is best able to master the technology is the best person to communicate the information to the “village” network. The future of electronic communication relies on improved computer access, the willingness and skills of the group to communicate successfully and a wider range of “relevant information” available.

RESUMÉ: Le réseau d’ordinateurs appelé LandcareNet, est un projet conjoint de l’Université de Melbourne et des Télécoms, développé pour répondre au besoin de partager l’information et les expériences entre les groupes Landcare. Une enquête auprès des groupes Landcare a été menée sur leurs expériences avec les réseaux électroniques et la baisse de l’utilisation de ces réseaux. L’impact des communications électroniques sur les réseaux de communautés est exploré, ainsi que l’hypothèse qu’aucune interface existe entre LandcareNet et les réseaux d’information qui opèrent au sein du groupe et de la communauté agricole. Dépendant des nouvelles technologies pour transférer l’information suppose que la personne qui maîtrise le plus cette technologie est la personne la mieux placée pour communiquer l’information au réseau « village ». Le futur de la communication électronique dépend d’un meilleur accès aux ordinateurs, de la volonté et des connaissances du groupe afin de communiquer avec succès, et d’une plus grande offre d’informations pertinentes disponibles.

RESUMEN: La red de computadores LandcareNet es un proyecto conjunto de la Universidad de Melbourne y Telecom, que fue desarrollado después de que se identificó la necesidad de compartir información y conocimientos entre los grupos “Landcare” (amigos de la tierra). Los grupos Landcare se entrevistaron respecto a sus experiencias con la red electrónica y se determinó por qué su uso había disminuido. Se explora el impacto de la comunicación por medio electrónico en las redes comunitarias, y se presenta la hipótesis de que no existe una interfaz entre LandcareNet y las redes de información que operan dentro del grupo y la comunidad agrícola. La dependencia en tecnología nueva para transferir información asume también que la persona que mejor domine la tecnología es la más indicada para transmitir información a la red a nivel de “aldea”. El futuro de la comunicación por medio electrónico dependerá de un mayor acceso a los computadores, de la voluntad y las habilidades del grupo para comunicar exitosamente, y de un mayor rango de “información relevante” disponible.

Background

To discuss the apparent failure of LandcareNet in providing a valued service to Landcare groups a sketch of the communities involved and their communication network is needed. LandcareNet is a communication tool and, as such, an understanding of the social context in which it operates is important.

The typical farming and social system in South West Australia probably has some unique elements and also some similarities with all isolated rural communities. They typically have a close knit social fabric which includes sporting and cultural groups as well as farming and rural issue networks such as pasture improvement groups, farm consultancy groups and farmer advocacy groups. Communication tends to be verbal and it is well accepted by farmers (and seldom recognised by extension agents) that most information transfer happens at the tennis club, the pub or at lunch during field days.
Contrasting this, farmers are fiercely independent and reject intrusion by institutions into their farming enterprise and often change is viewed as a threat to their lifestyle. Outside their social groups and networks little sharing of knowledge happens and where it does it tends to be within the farming enterprise they are involved, for example, grain grower associations. The Landcare movement is changing the way farmers think. Farmers are learning that they need to share information and problems, work together on solutions in groups that aren’t necessarily the traditional ones.

Most rural based Landcare Groups in Western Australia (WA) are called Land Conservation District Committees (LCDCs) and are different to those in other states in that they are statutory bodies with land holder representatives. The district is bound by shire boundaries or catchment boundaries and all farmers within the boundary automatically are members. They are often large (80,000–500,000 acres) with committee members living distant from each other and often involved in different social networks. Often the most effective LCDCs are those on smaller catchments or who share the same social networks. Typically the members are male and middle aged although reports have shown that more effective groups have a mix of ages and sexes (Women in Landcare Seminar, 1994).

**Discussion**

Landcare has created a new set of circumstances and communication requirements between and within communities. The participatory process adopted by Landcare and the uncertainty of technological solutions generates much information that not only needs to be read and digested but discussed, tried and evaluated. LCDCs recognise the main value of their group is in the opportunity it provides to exchange information (Table 1.).

Information received by the LCDC is both formal and informal. Formal information is usually as correspondence and there is little time at the LCDC meeting to deal with it in other than traditional methods. The informal discussion that takes place often is not recorded and much is lost to other members of the group that weren’t at the meeting. From an individual’s perspective it is hard to get Landcare information unless contact is made with the LCDC. People operating outside the LCDC structure receive little specific information and advice as the LCDC is recognised as the official outlet by government and other agencies. In most communities LCDCs don’t have a base or a meeting place where information and displays are kept permanently. In more isolated districts the LCDC covers several small towns and has no recognisable boundary. For outsiders it is often difficult to contact the LCDC and the wealth of information they hold.

Most LCDCs recognise that they don’t deal with information well enough and have within their charter the aim of improving information flow within the district. The groups often struggle with finding the best system for disseminating the information further from the committee group. LandcareNet in its present usage and form doesn’t contribute to information distribution between the group and the community and for this reason is seen as a peripheral to the real business of information exchange for the group (Figure 1).

The level of social interaction around the use of LandcareNet was also discussed by some users as being critical. Most input/output was done in the Networker’s home (usually an LCD committee member with an interest in computers) rather than at the LCDC meetings

<table>
<thead>
<tr>
<th>Aspect of Landcare Groups</th>
<th>Valued Most Highly by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information exchange at meetings</td>
<td>33%</td>
</tr>
<tr>
<td>Information exchange at field days/demonstrations</td>
<td>3%</td>
</tr>
<tr>
<td>New farm management skills</td>
<td>4%</td>
</tr>
<tr>
<td>Catchment/regional planning</td>
<td>23%</td>
</tr>
<tr>
<td>Monitoring of land and water degradation</td>
<td>5%</td>
</tr>
<tr>
<td>Tree planting</td>
<td>7%</td>
</tr>
<tr>
<td>Community works</td>
<td>5%</td>
</tr>
<tr>
<td>Access to specialised machinery</td>
<td>1%</td>
</tr>
<tr>
<td>Peer support/co-ordination</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>16%</td>
</tr>
</tbody>
</table>

![Figure 1 – The Relationship Between the Community and LandcareNet in the Distribution of Information](image)
than at a group gathering, giving little opportunity for the whole group to interact with the network and even less opportunity for the networker to actively share the network. So that even if there was a willingness by a member of the group to be involved it was difficult to convince or encourage the rest of the group to value the system and spend time with it. Where the networker wasn’t directly involved with the group activity or outcome there was no channel for that information to get to the networker or if questions needed answers it was more comfortable to use methods that didn’t rely on written communication. Often requests for information on LandcareNet were asked in very specific detail and technical answers seemed necessary. Other groups were concerned that their responses weren’t technical enough and were cautious in responding. The formality of the network to a group unused to written communication could limit the interaction.

The cost in time and money to browse the network is huge. Very quickly people come to regard the Network as a difficulty. Usage must be accompanied by support and the assumption that LandcareNet users aren’t computer buffs. As a full time Government employee myself, LandcareNet was a big time user. It was frustrating and the hardware and software were difficult. Volunteer groups with finite time and energy to spend on information gathering and inter group communication and who are paying their own infrastructure costs won’t use the system.

The new and cooperative nature of solutions for Landcare requires the exchange of ideas from not just Government Agencies or other information brokers but other LCDC groups as well. Riches and Robertson (1989) explain that “groups of land holders with a common problem will develop and implement more effective projects/programs than individual land users or individual land users working with a Government Agency”. This involves the LCDCs being willing and able to impart their experiences to other groups. Many writers (Twigg, 1989, Howell, 1989) state that the hands on experience of how to make groups work better, how to maintain group enthusiasm and activity now lies with key group members. These individuals are usually very busy people and are even less likely to document and publish good ideas than extension agents in the past. These people are good oral communicators and work best face-to-face with people explaining their experiences. However, relaying these experiences was seen as the most exciting and valuable contribution LandcareNet could make. LandcareNet developers and LCDCs saw the potential for sharing experiences and successes but the general lack of training and information support from private industry and government undermined the effectiveness and credibility of the system to play a useful role.

Communication systems in farming communities are undergoing radical change. In the past, farmers have relied on the written word (although literacy isn’t always as high as assumed), visual demonstrations, social networks and field days. Government is pulling back from one to one extension, and information spread by individual workers wandering the countryside is seen as too expensive and ineffective. Communities are starting to run their own field days and extension programs but at present are still following the traditional style of disseminating information. It has been recognised that training programs for rural managers in communication has been minimal (Frank and Chamala, 1992) and that the LCDCs need skills in using the written word, finding and presenting information. Campbell (1989) notes that Landcare is a completely new way of doing things and that it’s not easy for many farmers to adjust to the notion that they are key agents in planning and developing new techniques. This also requires time and effort and new skills for the farmer as well as for the government extension agent that normally would do the job.

Typically the LCDC group has been supported by the Department of Agriculture and other Government Agencies such as Conservation and Land Management and Waterways Commission. More recently LCDCs and funding bodies are favouring community based coordinators who support one LCDC or run a Landcare Centre. The coordinator’s role is to synthesise and package information and co-ordinate activities from a central location within the district. The success of this type of centre with coordinators (volunteer or paid) in the mainstream conservation movement indicates great potential for Landcare and could provide opportunities to expand and redevelop LandcareNet.

Rural communities have other needs for electronic communication with groups and Agencies outside Landcare. Western Australia is developing a network of electronic communication centres for communities called WA Telecentres or WA-LINK (Anonymous, 1994). These are a WA initiative that provides electronic services to the isolated communities such as satellite schoolings, desktop publishing, INTERNET services and talkback TV. These centres are community run and are often community resourced and are becoming important for information and training. Making LandcareNet available in the WA-LINK centres would overcome the current limited access the network has to the general community.

**Conclusion**

At present, communication systems between farmers, LCDCs and farmer groups aren’t developed enough and don’t have the energy and resources to be able to effectively utilise the electronic system. If the existing LCDC group is to be the user of LandcareNet then the computer network has to be very
user friendly and full of local and national information, not just from other farmers but information bureaus on topics of wide scope. It will take time before there is a flow of information between LCDCs at a useful volume. Until then, it will be more questions asked and answers given or the access of prepared information. LCDCs and other information seeking groups need training and support to develop an empathy for the computer based written word system and while this is happening LandcareNet must be supported by an information organisation. This requires a state co-ordinator — someone who can respond quickly to queries, has time to update databases, to offer on line training and telephone support, in much the same role as the national co-ordinator.

Slowly it is being recognised that new skills are required by both agencies and the community and that the existing communication structure must change. Computerised networks have the potential to become an important source of information, communication and peer support to local co-ordinators who will be involved in activities in rural communities. A lot of local co-ordinators will be housed in community centres such as Landcare centres, Telecentres and shire offices where all sorts of computer and high technology services will be available to the whole community. LandcareNet will be changed in function from its beginning’s but there is great potential for it to become a valuable tool in the fight for sustainable rural communities.

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Scientists and Rural Communities Taking on Communications Technology: an Australian Case

Janice E. Oliver

ABSTRACT: This comparative case study involves staff from the CSIRO Multi-Divisional Program and rural dwellers with access to telecentres. There are over twenty six telecentres operating in all states of Australia. The electronic facilities available to both groups are quite similar, including email, listservers, fax, internet tools and conferencing capabilities. Some of the issues investigated include the efficiency, effectiveness, motivation and training requirements for sustained and ongoing electronic communications. Is there any gender differences in communication patterns? Are there social and economic benefits of electronic communications? Does this change the nature of work? Can bridges be forged between CSIRO and rural dwellers using electronic communications? Multimedia presentations mounted on CD-ROM or via World Wide Web servers may be a likely form of infotainment to extend the CSIRO research results to rural communities.


RESUMEN: Este estudio de caso comparativo involucra al personal del Programa Multidivisional de CSIRO y a los habitantes de zonas rurales que tienen acceso a los telecentros. Hay más de 26 telecentros en operación en los diferentes estados de Australia. Las instalaciones electrónicas disponibles para ambos grupos son muy similares; éstas incluyen correo electrónico, listas de discusión, fax, herramientas de internet y capacidad para realizar conferencias. Algunos de los aspectos estudiados fueron eficiencia, efectividad, motivación y requerimientos de capacitación para comunicación sostenida y permanente por medio electrónico. ¿Existen diferencias relacionadas con el género en los patrones de comunicación? ¿La comunicación electrónica genera beneficios sociales y económicos? ¿Cambia esto la naturaleza del trabajo? ¿Se pueden forjar vínculos entre CSIRO y los habitantes en zonas rurales utilizando comunicación vía electrónica? Las presentaciones en multimedia montadas en CD-ROM o vía servidores World Wide Web pueden ser una forma admisible de “entretenimiento informático” para difundir los resultados de la investigación del CSIRO hacia las comunidades rurales.

COMMUNICATIONS TECHNOLOGY, and particularly the introduction of the Internet has been deemed the saviour to overcome isolation—geographical, professional and social. The advent of these technologies was welcomed by agricultural scientists, as most extension staff work in isolated regions with few other colleagues to network with. Electronic network traffic increases by 300 percent per year in Australia.

Electronic networking affects all three phases of the scientific communication process of conceptualisation, documentation and popularisation. During the conceptualisation phase the research group is expanded, and becomes far more homogeneous and sustainable. Use of electronic networks ensures that there is more formal and informal documentation and influences the degree of access to the mass media (Johnston 1994).

The CSIRO Urban Water Systems Research Program (WWSRP) is a multi-divisional national program focussing on future methods for planning and design for water supply, wastewater and stormwater management. Staff are located throughout Australia in Perth, Adel-
strategy for the program which included the establishment of an in-house Listserv List—UWSRP. The initial phase was to market the concept to the 35 project staff involved in the program. Then information was sought on each person’s e-mail address; computer software and hardware (to facilitate document transfer); attitude and experience in the use of e-mail. The UWSRP list was implemented in May.

This paper identifies the outcomes of establishing an e-mail list that is how and why e-mail is used by UWSRP staff and what are the rewards and challenges of using electronic mail as a communications medium.

Electronic Mail Usage Within UWSRP

Several factors led to the establishment of the UWSRP Listserv List:

Geographical isolation of program staff who are located throughout Australia spanning three major time zones. During summer months there is a three hour time difference between east and west coast. This led to habitual telephone tag and much frustration on the part of staff. Many of the telephone discussions were over administrative functions, easily settled by bulk information transmission methods.

The need to develop multi-disciplinary research links between projects. Staff of the five Divisions were working independently on research projects. Since the advent of the Listserv staff have networked with other Divisions. Three of the ten projects now work as multi-disciplinary teams. During 1995 there will be the potential for further cross-disciplinary links to be developed.

Transfer of lengthy reports, agendas and minutes on a regular basis. Prior to the introduction of e-mail, this written material was faxed or airbagged at great cost which included courier fees, telecommunications charges and staff time. Multiple copies of the same document were often forwarded on different dates leading to administrative confusion.

Availability of the hardware, software and staff expertise. CSIRO staff in all Divisions have access to e-mail. The Division of Water Resources Adelaide Laboratory Systems Managers were willing to establish and maintain our Listserv.

Once the UWSRP list was established; inbound and outbound mail was monitored in two three month periods May to July and October to December 1994.

E-mail was used for similar purposes to those identified by Johnston (1994).

Information access
- The announcement of forthcoming conferences, seminars and internal program reviews.
- Dissemination of reports, literature searches, information on Listserv Lists and Internet Resources.
- Announcement of research articles and publications relating to urban water systems.

Communication
- Dissemination of reports, minutes and conference papers written or reviewed by staff.
- Development of professional networks by interaction within the program’s multi-disciplinary team.
- Announcements and feedback sought amongst program staff regarding research projects and communications strategies.
- Reviewing staff’s research and consultancies.
- Establish and maintain social networks and friendship amongst geographically isolated colleagues.

Collaboration
- Announcements and progress of research grants/consultancies.
- Listserv management and staff training.
- Organisation of meetings, conferences and events.
- Establishment and progress reporting of research contracts.
- Program administration regarding financing, program reviews content and direction of research.

During the study period a total of 548 messages were sent (Figure One) and 65% of the e-mail traffic was outbound. The results indicate that to maintain a communications program by e-mail the Listserv List owner (in this case the author)
must maintain contact with List members.

Messages relating to project management constituted over a third of all mailed items (35% of outward mail and 32% of inward mail). Minutes and reports constituted 25% of incoming mail, whilst 25% of outward mail constituted information dissemination. This result is indicative of how the list is used to field progress reports, conference papers and workshop notes from individual UWSRP staff, the content of which is later disseminated to the other groups. There has been a tendency amongst program staff not to post these reports directly to the list. Generally this has been due to staff’s reticence to use e-mail attachments due to the technical difficulties of using a variety of e-mail software. Eudora software is used by the author successfully. All e-mail attachments are successfully received fully formatted. There is some incompatibility between the UNIX PINE mailer and Eudora.

Following a generalised broadcast to staff members via the Listserv, many staff members continue or follow up specific points with the author individually, pertaining to their particular project. This is particularly the case relating to project management issues which often relate to confidential matters. These messages have been included in the survey. Future trends, indicated by e-mail traffic during January 1995, indicate that the percentage of information dissemination and project specific e-mail will increase in 1995. Ten projects have now been established since mid-1994 and researchers are beginning to publish, attend conferences and report on research results. Projects and consultancies originating from the co-ordinators office over the past few months has necessitated closer collaborative involvement with specific UWSRP Projects. Further examination of the e-mail traffic out (Figure Two) indicates that of the 358 messages sent in the period of the survey, 54% were sent during the May–July period. Slightly more messages were sent during this period due to the setting up and educating of staff in the use of the Listserv and the development of multi-disciplinary links and formulation of new projects. Setting up of the Listserv accounts for the high percentage (43%) of project management messages in the May to July period.

During the second period, October to December (Figure Two) the author was using the e-mail system for a far more diverse scope of activity as indicated by the slight difference in ranges between the minimum of 20% of messages relating to specific projects and the maximum of 29% of messages being used for information dissemination. Overall response time for messages sent by the author requiring a response, changed from within 24 hours to within one hour, as more and more staff are attracted to using e-mail. The number of long distance phone calls inbound and outbound has reduced significantly since the introduction of the e-mail system.

The e-mail received (Figure Three), somewhat mirrors the e-mail sent in the first period May–July due to the learning curve following the establishment of the Listserv. Fifty-six per cent of the inbound mail sent during the survey period was received between May and July. Project management (41%) and research project specific (23%) e-mail figured highly during the period due to the establishment of new projects. During October to December this trend was reversed with information dissemination (34%) and minutes and reports (30%) constituting most of the e-mail traffic. This change in e-mail activity was related to researchers presenting their first progress reports to the steering committee and participating in several workshops and conferences during this period.

**Rewards of Using E-mail**

Based on the author’s experience the benefits of using e-mail in an internal communications program far outweigh the costs. The benefits of using e-mail are—

E-mail effectively contributes to research as Johnston (1994) suggests by:
• Expanding a researchers sphere of influence. The author was new to the program and the research area and has now developed a professional and efficient profile.

• Provides greater access to potential collaborators and opportunities for diffusing ideas. UWSRP colleagues have been the source of many industry contacts, particularly in their local sphere of influence which is up to 3000km from the co-ordinators office. Joint meetings, projects and consultancies have been established via e-mail contact.

• Ensures that all project staff are informed simultaneously, as there is no delay due to fax transmission or mail delivery services. Easier to manage workflows as mail can be answered when convenient, unlike when fielding phone calls:

• Overcomes problems of contacting staff in geographically remote areas, particularly in summer where the time difference is up to three hours (Nicoll 1994, Dunstan 1994).

• Links small groups of researchers with a larger team which has multi-disciplinary expertise (Greengard 1994).

• Decreases operational costs due to the reduction in mail, telephone and fax usage.

• Enhanced opportunities for homeworking and flexible work hours (Joseph 1994).

• Allows for a written record of business communications to be kept, which is less formal than a memo but more binding than a telephone call (Joseph 1994).

Challenges of Using E-mail

Among the challenges of using e-mail are:

• Providing an alternate, traditional communications channel for one staff member on secondment to CSIRO who does not have e-mail access.

• Overcoming a culture of “technophobia”. One research group uses computers substantially as word processors and required extra encouragement to adopt e-mail.

• Use of e-mail requires more trust to belong to an electronic rather than a physical group, due to the permanency of the messages (Nicoll 1994).

• Computer hardware that precludes staff from using the most sophisticated e-mail functions such as attachments. Often the most remote rural based sites have the least computer resources.

• Contributing to the information explosion (Joseph 1994). E-mail can substitute, but may not replace other forms of communication (Joseph 1994). The author’s experience is that as time progresses, more and more researchers rely predominantly on e-mail for information transmission. However, a commonsense approach needs to be adopted as to what is the most effective form of communication at any one time.

• Maintaining a personable approach and depth of communication (Joseph 1994). Personal visits and occasional phone calls assist in this process.

• Provision of staff training in the use of e-mail from a remote location (Johnston 1994). This problem has been overcome by networking with systems managers and visiting sites in person when travelling on other project related business.

• Maintaining a personable approach and depth of communication (Joseph 1994). Personal visits and occasional phone calls assist in this process.

• Computer hardware that precludes staff from using the most sophisticated e-mail functions such as attachments. Often the most remote rural based sites have the least computer resources.

• Overcoming a culture of “technophobia”. One research group uses computers substantially as word processors and required extra encouragement to adopt e-mail.

• Use of e-mail requires more trust to belong to an electronic rather than a physical group, due to the permanency of the messages (Nicoll 1994).

• E-mail can substitute, but may not replace other forms of communication (Joseph 1994). The author’s experience is that as time progresses, more and more researchers rely predominantly on e-mail for information transmission. However, a commonsense approach needs to be adopted as to what is the most effective form of communication at any one time.

• Contributing to the information explosion (Joseph 1994). E-mail can be easily copied, forwarded and printed out. Workplace productivity is improved by the ease of filing, reply and copying of e-mail. Printing should be restricted to items that need to be maintained for official record keeping purposes, or where discussion amongst a group of colleagues is required.
Conclusion and Future Directions

E-mail has been successfully adopted by staff of the Urban Water Systems Research Program of CSIRO. The major challenge is to maintain momentum of the internal communications program. Due to the improved networking between colleagues, the use of e-mail for research as well as project management has increased during the period of the study.

The next phase of the project will be to ensure that all staff are connected to e-mail and to investigate the possibility of expanding our e-mail communications with external clients. This is a very large challenge since many remote rural clients, consultants and state government department employees in Australia do not have Internet access.

REFERENCES


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ABSTRACT: It is the mission of the Arid Lands Information Center (ALIC) to build mechanisms for the timely transfer of information among researchers, policy makers, and their constituencies. However, funding constraints in the past have set arbitrary limits on the levels and types of activities that can be initiated in this area. Now, through the use of new technologies such as the Internet, ALIC has the capability to provide fast, efficient, and inexpensive access to arid lands information worldwide. An Internet-based Arid Lands Information Network is in the design phase and will become fully operational by mid-1995. Initial financial support for the development of this network comes from three recently funded projects, each of which includes an information dissemination component. They are: a sustainable agriculture development project in Chile funded through the U.S. Agency for International Development (USAID) University Linkages Program; an outreach project for the International Arid Lands Consortium (IALC); and a combined National Institutes for Health, National Science Foundation, and USAID grant to identify bioactive agents from dryland plants in Latin America.

To accomplish its mission of disseminating information on the world’s arid regions to researchers, policy makers, and their constituencies, the Arid Lands Information Center (ALIC) has produced a variety of print products over the past 25 years, including abstract journals, newsletters, bibliographies, and technical reports. Funding constraints, however, have limited the level, type, and continuity of these publishing projects. Now, through the availability of new communications technologies, ALIC has the mechanism it needs to provide fast, efficient, and inexpensive access to arid lands information on a worldwide basis. Through the efforts of the ALIC staff and with financial support from three diverse projects, an Internet-based Arid Lands Information Network (ALIN) is being built and should become fully operational by mid-1995. The purpose of this paper is to outline the process we are using to build this network and to describe four of its preliminary modules.

Network Design

We selected the World Wide Web (WWW, W3, The Web) protocol to develop our Internet information server. Although WWW has been in existence for less than two years, it has quickly moved into the vanguard of Internet sources and ser-
services, owing largely to the opportunities it offers for interactive, graphics-based communication and multimedia (images, sound, and text) presentation of information. The Web, via the intermediary of a growing number of so-called browsers (many of them available for downloading without charge on the Internet; see Appendix for details), allows easy access to documents and provides active links within documents to other documents resident on computers literally anywhere on the face of the Earth.

Building a World Wide Web Site: The (Very) Basics

TOOLS—To build a WWW site, one needs more than a computer with an Internet connection. The precise mix of tools and resources needed is changing so fast that no one could guarantee the validity of any given list for more than fifteen minutes. Nonetheless, here is a list we find useful:

• a purpose—Who do you want to reach? And why?
• people, divided into sources (writers, researchers, bibliographers, subject experts, etc.) and producers (editors, graphic artists, site designers, and so on)
• a computer, with enough memory and disk space to act as a server (which actually contains and allows access to your Web site once it is built)
• an Internet connection—a modem coupled with a SLIP connection or SLIP emulation software will do the job for Internet browsers; but for site builders an Ethernet (hardwired) connection is much to be preferred
• server software capable of handling HTTP (Hyper Text Transfer Protocol), the enabling mechanism of the Web
• production software capable of turning plain text and images into HTML (Hyper Text Mark-up Language), the lingua franca of the Web; these tools currently are in their infancy, but new software is coming to market quickly and the pace of introductions will increase as the popularity of W3 continues to grow
• a Web browser, such as Netscape, NCSA Mosaic, MacWeb, Lynx, Cello, or a whole host of new browsers being released almost daily now; the browser is an individual’s gateway or user interface to the World Wide Web and an essential tool for the HTML editor
• cataloging/indexing and search/retrieval software

WEBSPEAK—A working grasp of a few key words and concepts is indispensable to a person new to the Internet. Without these basics (we have already touched on browser, HTML, and HTTP), deciphering the many and various guides to site building available on the Web itself will be more of a challenge than it needs to be:

• Home Page (usually capitalized) —the key concept of the Web; the Home Page is the introduction to all the other pages (or screens or files or chapters, etc.) that make up your site; the best short description of a Home Page we have heard is “a hyperinteractive (via hot links; see next entry), highly designed table of contents”
• hot links are words and/or images which usually appear in the browser window in blue and underlined or boxed, or simply underlined on a text-only browser; a link’s underlying code (see next entry) tells it where in cyberspace to take you, instantly, at the click of a mouse button or the stroke of a key
• URL Uniform Resource Locator; this string of characters is the cyberspace address to which a hot link takes you; for the site visitor, it need never be visible or thought about; for the site builder, knowledge of the way a URL works is essential; all Web site URLs, for example, begin with the prefix http://, which identifies the transfer protocol to be used to bring the desired page to your computer screen
• helpers these are software applications that allow your chosen browser to decode and decompress data files; some decompress and display still images, some enable movie or animation playback, some do the same for digitized sound, and a host of others do a myriad of other useful things; many helpers are built into the new generation of browsers

PRACTICE—With these basics in mind, it becomes relatively easy to decipher the URL for the Arid Lands Information Network Home Page:

http://ag.arizona.edu/OALS/alin.html

The first seven characters (http://) tell your browser which of the several Internet protocols to use; the next fourteen (ag.arizona.edu) identify the server on which our site resides; the four characters following the slash (OALS) identify the appropriate directory on that server, and the nine characters after the next slash (alin.html) identify the appropriate file (an html file) within that directory.

The Arid Lands Information Network

The skeleton of ALIN is in place and the work of fleshing it out has begun. As shown in Figure 1, the ALIN Home Page (i.e., its table of contents) offers an active menu of hot links that will connect site visitors to any other page within the site, including the Home Pages of the four modules to be presented here: the Arid Lands Information Center, the International Arid Lands Consortium, the Bioactive Agents from Dryland Plants of Latin America Project, and the Chile Linkages Project.

Module One: The Arid Lands Information Center

As with most of the resources available on the Internet, information about ALIC can be reached by a number of different routes. Obvi-
viously, ALIC is listed as an item on both the ALIN and OALS Home Pages, but it also can be reached by way of The University of Arizona’s Library information system (SABIO) and the UAInfo WWW Home Page. There often are multiple layers that may need to be sifted through when a user is browsing, or “surfing,” the Internet. Knowing the exact URL for a site can be a more direct, and therefore more efficient, means for locating relevant information.

Although the ALIC pages of the ALIN are only partially complete, they do offer two fully operational options: the OALS Publications Catalog and the Arid Lands Newsletter (ALN).

The Publications Catalog begins with a menu screen that lists the categories of publications available, such as periodicals, media, special collections, and general titles. When a category is selected, an annotated list of related materials appears and can be scrolled through to identify those of interest. Ordering information also is provided.

The Arid Lands Newsletter option offers the full but unillustrated text of the last two issues of ALN, the Office’s internationally circulated research magazine. The ALN Home Page contains introductory information and hyperlinks to each issue’s Table of Contents, which in turn provide links to the articles themselves. ALN issues 35 and 36 were converted to HTML text files after publication in print, but future issues will be published simultaneously in print and electronically, both versions complete with illustrations.

Other resources to be loaded on ALIN are an annotated directory of OALS faculty and staff members and a yearly compilation of their publications. In addition, ALIC is working with University computer specialists to create a framework for installing the ALIC Online Catalog.
that will offer the user sophisticated, but easy to use, searching techniques. This most likely will be accomplished with a database management program employed via a browser such as Netscape or Mosaic.

**Module Two: The International Arid Lands Consortium**

A one-year demonstration grant from the International Arid Lands Consortium, a nonprofit research consortium supporting ecological sustainability in arid and semi-arid regions worldwide, has provided ALIC with the opportunity to develop what we envision as the ALIN's first fully realized module. Work on the project began in October of last year, but the IALC module, like the other components of the ALIN, is still very much a work in progress.

The first order of business for the IALC site builders was to make the consortium’s overview brochure available online. The text of that brochure is now up-and-running and original digital graphics are being designed and mounted. Resources created specifically for this Web site also are under construction. They include *The IALC Online Newsletter: A World Wide Web Quarterly*, an IALC membership directory, a bibliography of IALC publications, and active (hyperlinked) compilations of selected Internet information sites and Web-searching tools.

An essential element in construction of this site has more to do with the other variety of networking the one that requires considerable telephone, fax, and e-mail time, as well as official letterhead. The project’s half-time Information Specialist has devoted a great deal of time thus far to persuading busy researchers at each of the consortium’s seven founding institutions to collaborate with us in this project. In return for a small honorarium, these collaborators promise to circulate among and retrieve from their colleagues a questionnaire of our devising, to supply us with all pertinent news from their home institutions. Without these stalwarts, our site might eventually be pretty, but it would not be as useful as it ought to be.

**Modules Three and Four**

Two other OALS projects are providing additional opportunities for further developing the ALIN. They are both complex five-year projects with multiple goals that involve many researchers from a variety of disciplines and organizations. Each one also contains components for organizing, managing, and disseminating information to facilitate interaction among project participants and others with similar interests.

The Bioactive Agents from Dry-land Plants of Latin America project is funded by the National Institutes for Health, the National Science Foundation, and USAID. It’s intent is to assess for medicinal value certain plant resources from specific arid areas in Chile, Argentina, and Mexico, and to ensure the conservation of these resources and the direct involvement of the areas’ indigenous people. Ultimately, a percentage of the profits will be returned to the local communities for their use, provided the development of marketable pharmaceutical products results from the project. Currently, the participating institutions are the Pontificia Universidad Catolica de Chile in Santiago, the Instituto de Rurcosos Biologicos in Buenos Aires, the Universidad Nacional de la Patagonia in Chubut, Argentina, the Universidad Nacional de Mexico, and, in the United States, The University of Arizona, Purdue University, and Louisiana State University. The pharmaceutical industry is represented by American Cyanamid.

The goals of the project’s information management and dissemination component are to build information handling capabilities at all project sites and to promote the exchange of resources, information, and ideas through formal linkages among the cooperating institutions. The primary tool for communication at this time is a newsletter, *BIO-D Prospects*, which is compiled by ALIC with input from Information Counterparts at each participating institution. Issues contain updates on all project components, as well as columns on related Internet information resources, publications, and news items. Although the newsletter has been available only in print format during its first year, it soon will be added to the ALIN under the heading for the project. All participating institutions are working to strengthen their communications systems so that they will have access to Internet resources such as the ALIN and electronic mail.

The second project is a U.S. Agency for International Development (USAID) University Linkages Development Project titled Development of Sustainable Agriculture in Arid Regions of Chile. Through it, the University of Arizona and Universidad de Chile (UCH) are establishing a collaborative program to strengthen research, education, and the dissemination of information in the field of sustainable arid lands agriculture. The primary vehicle for the information component is an information service center on arid lands issues to be organized at UCH. This center will organize and provide access to project-related information and will link to appropriate electronic resources and networks. As with the previous project, the primary means for disseminating information in the first year of activity was through a printed newsletter, *Tierras Aridas: Conexiones*. This newsletter, and *BIO-D Prospects*, are now available on the ALIN and opportunities for creating other electronic resources will be evaluated in the coming years.

**The Future**

On the technical side of the World Wide Web equation, change—constant, rapid, perhaps even paradigmatic—is the order of the day. All the hardware and software associated with the Web is on its way to
becoming so sophisticated that the primitive browsers, HTML editors, and search engines in use at this moment will tomorrow seem as antique as the Linotype machine once used to compose newspaper lineage in hot metal. Just around the corner are “intelligent agents”—a corps of automata encompassing all manner of programmable web crawlers, spiders, and knowbots—that will scour the wildly expanding Web at our bidding and return only with that information we really want or need; not only that, they’ll be able to organize that information into indexed outlines for our private perusal, or convert it to HTML and post it to our Home Pages, or sign us up for every newsgroup in the information universe that it has been programmed to believe we will find interesting.

As these changes come to pass, the speed with which we humans compose HTML, create digital art and graphics, and ferret out the most precious veins of electronic information doubtless will increase, allowing us to publish at warp speed.

The question, of course, is whether that new technological ease will translate into better Web sites, or just more of them.

For our purposes, we plan to use these new innovations to build a unique reference tool for the diverse group of people who study and manage the world’s arid regions. Looking beyond the loading of bibliographies, reports, and directories of resource people and institutions, we anticipate the development of ALIN modules that will address particular subject areas, such as desertification, water conservation, ethnobiology, and natural resources management. These modules will guide the user through a hierarchy of statements, providing answers to commonly asked questions and suggesting possible links to other resources at other sites. Thus, we expect the ALIN will not only save us time and money, but will help us offer better and more timely services to an expanded clientele.

Appendix

Where To Get What You Need

If you do not yet have a browser, you can acquire one by logging in to your current online account in the usual way and then using ftp (File Transfer Protocol) to access the Internet sites listed below; be sure to type in the ftp addresses exactly as they appear here, paying strict attention to capitalization and punctuation. When you arrive, download the software you need; note that it takes a bit more to set up a Windows machine to run Mosaic than it does to set up a Macintosh. Other browsers are out there, too, and you can easily explore for them once you have any of the following browsers in operation:

- **Netscape for Mac, UNIX or Windows:**
  ftp.mcom.com/netscape
- **NCSA Mosaic for Windows:**
  ftp.ncsa.uiuc.edu/PC/Windows/Mosaic
- **NCSA Mosaic for Mac:**
  ftp.ncsa.uiuc.edu/Mosaic/Mac
- **NCSA Mosaic for DOS:**
  ftp.ncsa.uiuc.edu/Telnet/DOS
- **MacWeb:**
  ftp.einet.net
- **Lynx for DOS (text-only browser):**
  ftp2.cc.ukans.edu/pub/WWW/Dos Lynx/DLXO 8A.EXE

**Where To Go When You Have What You Need**

You can travel the world via cyberspace once you are properly connected, but you will need some jumping-off points. Each of the browsers has in its default Home Page a built-in gateway to the Web that will get you started, but we would like to invite you to visit us early in your travels, too. Browsers come with a feature called Hotlist or Bookmarks, depending on the browser, which will allow you to add the URLs that follow and never think about them again:

- **Arid Lands Information Network (ALIN):**
  http://ag.arizona.edu/OALS/alin.html
- **The International Arid Lands Consortium Home Page:**
  http://ag.arizona.edu/OALS/IALC/Home.html
- **Arid Lands Newsletter Home Page:**
  http://ag.arizona.edu/OALS/ALN/ALNHome.html

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**ABSTRACT:** In general, in industrial countries, the major veterinary collections are located in veterinary college libraries which are not numerous (Canada, 4; France, 4) and at a considerable distance from each other. At the end of the 1980s, the Veterinary Libraries section of the Medical Library Association started a discussion list VETLIB on the Internet in order to improve communication on a daily basis between them. In 1994, the group electronically updated the 2nd edition of the *Union List of Veterinary Serials*; this will be searchable on the Internet. Also, the Veterinary Library (Université de Montreal) developed Veterinary Conference Proceedings Database, which allows the user to see the contents of the major veterinary conferences (national and international) and searches by author and/or keyword in titles of papers are possible. Since July 1994, a new group of European veterinary information specialists have formed and joined the discussion list, bringing additional resources to all. Other specialists from South Africa and Australia recently joined the group. In the USA, with the creation of the NOAH (National Veterinary Information System) on Compuserve, the veterinarians will be able to search the major commercial and non commercial databases available as well as the databases discussed above.

**RESUMÉ:** En général, dans les pays industrialisés, les fonds documentaires importants se retrouvent au sein des bibliothèques des collèges d’enseignement vétérinaire. Celles-ci ne sont pas très nombreuses (4 au Canada et le même nombre en France) et sont très dispersées. À la fin des 1980, la “Veterinary Library section” de la Medical Library Association a lancé une liste de discussion appelée VET-L sur le réseau Internet en vue d’améliorer la communication quotidienne entre ses membres. En 1994, ce groupement effectua une mise à jour, disponible en version électronique du catalogue collectif des publications en série en médecine vétérinaire; ce catalogue sera interrogable sur le réseau Internet. La bibliothèque de médecine vétérinaire de l’Université de Montréal a un service de base de données “Veterinary conference proceedings database”; ce service permet à l’usager de voir les tables des matières des conférences scientifiques importantes au niveau national et international. Cette base de données est interrogable sur les auteurs ou descripteurs des titres d’articles. Depuis le mois de juillet 1994, un nouveau groupement de spécialistes européens en information vétérinaire s’est formé. Ce groupe utilise et enrichit la communication produite dans le groupe de discussion déjà existant. D’autres spécialistes de cette discipline se joignent quotidiennement aux discussions électroniques, notamment des collègues d’Afrique du sud et d’Australie. Aux Etats-Unis, avec l’arrivée de NOAH (National Veterinary Information System) sur le réseau électronique commercial Compuserve, les praticiens vétérinaires peuvent effectuer eux-mêmes leur recherche bibliographique dans les bases de données commerciales ou non commerciales comme celle mentionnée plus tôt.

**RESUMEN:** En general, en países industrializados, las principales colecciones sobre veterinaria están ubicadas en las bibliotecas de las escuelas de veterinaria, las cuales son pocas (en Canadá hay 4 y en Francia, 4) y con una considerable distancia entre sí. Al finales de la década de los 80, la sección de bibliotecas veterinarias de la Asociación de Bibliotecas Médicas inició una lista de discusión, VETLIB, en Internet para mejorar la comunicación cotidiana entre las bibliotecas. En 1994, el grupo actualizó, por vía electrónica, la segunda edición de la Lista Unificada de Publicaciones seriadas en Veterinaria, que se podrá consultar en Internet. Igualmente, la Biblioteca Veterinaria de la Universidad de Montreal desarrolló una base de datos de las memorias de conferencias sobre veterinaria, que permite al usuario consultar el temario de las principales conferencias en el campo (a nivel nacional e internacional). También es posible realizar búsquedas por autor y/o por palabra clave en el campo del título de la publicación. En julio de 1994, se formó un nuevo grupo de especialistas en información veterinaria en Europa. Este grupo se unió a la lista de discusión, aumentando los recursos disponibles para todos. Recientemente otros especialistas de Sudáfrica y Australia se unieron al grupo. En los Estados Unidos, con la creación del Sistema Nacional de Información en Veterinaria (NOAH, su acrónimo en inglés en Compuserve, los veterinarios podrán buscar en las principales bases de datos comerciales y no comerciales existentes, así como en las bases de datos indicadas anteriormente.

**La première organisation de spécialistes en information vétérinaire,** la Veterinary Medical Library Section de la Medical Library Association, célébrait son 20e anniversaire en 1994. Celle-ci est composée essentiellement des représentants des 32 collèges de médecine vétérinaire nord-américains dispersés sur ce vaste continent, de même que des deux grandes bibliothèques nationales américaines, la National Agricultural Library et la National Library of Medicine.

Les activités des différents comités de ce groupe sont liées aux relations avec d’autres groupes et à la communication d’information vétérinaire: le comité du bulletin bi-annuel aux membres, le comité des relations publiques, le comité pour la publication d’une 3e édition du catalogue collectif des publications en série en médecine vétérinaire, le comité pour la préparation
d’une 2e conférence internationale des spécialistes en information vétérinaire pour l’année 1997 au Danemark.

Les communications courantes entre ces spécialistes se font par les moyens de communication courants tels le FAX, le téléphone et le courrier. Enfin, la réunion annuelle de la Medical Library Association prévoit une “Business Session” pour ses membres, à laquelle participent activement la majorité des membres et où sont invités des conférenciers locaux, de même que des représentants commerciaux qui nous font voir les dernières nouveautés en terme de livres, CD-ROM et autres produits électroniques. Les membres sont eux-mêmes priés de présenter des communications orales sur des sujets relatifs à l’information vétérinaire.

En 1994, un nouveau groupe de spécialistes en information vétérinaire s’est formé en Europe, l’European Veterinary Librarians Group, au sein de l’European Association of Health Information à l’occasion de la 4e Conférence européenne des bibliothèques médicales et des sciences de la santé en Norvège. Présentement ce groupe est composé d’une trentaine de membres représentant 15 pays européens.

Les objectifs de ce groupe sont:
• Regrouper tous les professionnels du domaine de l’information sur la santé animale.
• Développer et encourager la coopération entre les bibliothèques de cette spécialité.
• Établir un lien avec d’autres organismes internationaux dans le domaine, et notamment l’Association européenne des Etablissements d’Enseignement vétérinaire et l’Association mondiale vétérinaire.

Depuis 1991, grâce au support technique de la Virginia Polytechnic Institute and State University, un groupe de discussions sur Internet pour nos spécialistes a vu le jour: VETLIB-L; ce nouveau moyen de communication a transformé notre travail quotidien et nous a fait réaliser la pauvreté relative de nos communications antérieures.

Présentement, plus de 153 spécialistes en information vétérinaire sur tous les continents s’activent sur VETLIB-L, dont la majorité provient d’Amérique du Nord; mais un nombre grandissant de spécialistes de tous les pays, principalement du Royaume-Uni, de la Suède, de l’Irlande, de l’Australie et d’Afrique du Sud sont fort actifs dans nos échanges quotidiens. Ce réseau d’entraide internationale met à la disposition de chacun rapidement, efficacement et gratuitement les ressources disponibles auprès de chaque collègue dans chaque pays.

A l’heure où la littérature scientifique locale devient aussi internationale grâce aux bases de données multiples disponibles et aux réseaux d’information entre chercheurs du monde entier; et qu’en même temps les traités commerciaux internationaux favorisent le déplacement des animaux et des aliments accompagnés de nouvelles maladies ou fléaux, nos spécialistes jouissent grâce à ces nouveaux moyens électroniques d’atouts majeurs pour appuyer la recherche, l’enseignement et la prévention des maladies exotiques dans chaque pays.

Une enquête menée en septembre 1993 parmi les usagers de VETLIB-L pour connaître comment et pourquoi ils utilisaient ce groupe de discussions a révélé que l’apparition de cet outil de communication a transformé leur pratique quotidienne: discussion de problèmes liés à leur bibliothèque, obtention rapide d’aide sur des questions de référence, localisation de documents, photocopies d’urgence, offres de documents (revues, livres) en double, alerter les collègues de nouveaux services disponibles, information sur un éditeur d’un pays étranger; lieu de travail pour les différents comités du groupe dont la préparation actuelle de la 3e édition du catalogue collectif des publications en série dans le domaine vétérinaire, dont l’accès sera possible via Internet.

Revenons aux résultats de l’enquête: en septembre 1993, un questionnaire électronique fut envoyé à 98 membres inscrits au groupe de discussions, à ce moment-là, pour vérifier qu’est-ce que l’apparition de ce groupe de discussions avait changé pour ces utilisateurs et les usagers de leur bibliothèque: les 36 personnes qui ont répondu au questionnaire sont des usagers quotidiens de ce service, dont certains, plusieurs fois par jour (53%); 83% des répondants sont des spécialistes en information vétérinaire travaillant dans le milieu de l’éducation et 61% sont membres du groupe des spécialistes en information vétérinaire d’Amérique du Nord. VETLIB-L est considéré de grande importance par 81% des répondants, et utile par le reste.

Les sources d’information vétérinaire sur Internet

Nous nous limiterons ici à l’information strictement vétérinaire. La liste électronique du Dr Bolchert, “The Electronic Zoo”, est la plus complète même si elle déborde le domaine vétérinaire. Elle est disponible dans le gopher que celui-ci a créé pour réunir, dans une même source d’information, la plupart des ressources disponibles sur Internet (surtout américaines): il s’agit du Gopher NETVET VETERINARY RESOURCES (disponible aussi sur le WEB).

On y retrouve, outre la liste mentionnée auparavant, les rubriques suivantes:
• Des liens avec d’autres gophers, comme celui des collèges vétérinaires nord-américains, canadiens et anglais, des laboratoires de diagnostique, de la législation vétérinaire et de celle concernant la protection des animaux, des associations vétérinaires spécialisées, des organismes publics comme le Ministère de l’Agriculture et celui de la Santé des États-Unis.
• Des liens avec des ressources dont l’accès est payant: AVMA’S net-
work on animal health μ(NOAH), the Veterinary Information Network (VIN).

• Les archives des groupes de discussions d’intérêt vétérinaire.

• Des bases de données gratuites: USDA Current Research Database, FDA New Veterinary Drugs, Veterinary Journals: Table of Contents, Veterinary Conference Proceedings Database.

Évidemment les grandes bases de données bibliographiques d’intérêt vétérinaire (CAB, Agricola, Medline, Agris, etc.) sont disponibles par différents serveurs (non gratuitement). Ici on doit distinguer deux types d’usagers: ceux avec mot de passe et ceux sans mot de passe. En effet, l’apparition d’Internet a contribué à permettre l’accès à ces grandes bases de données gratuitement et à distance à la communauté universitaire nord-américaine grâce à un abonnement réseau. L’usager branché sur Internet peut consulter ces bases de données à tout moment en composant son numéro d’accès et son mot de passe; il peut même commander le document lui-même.

Plusieurs éditeurs ont commencé à offrir leurs services (catalogue de livres et de périodiques) sur Internet. D’autres s’apprêtent à ajouter le sommaire des articles à venir dans leurs revues, cela gratuitement.

Aux États-Unis, l’American Veterinary Medical Association cherche à promouvoir ses services et la consultation de nouvelles sources d’information sur les réseaux électroniques, auprès des vétérinaires praticiens à un coût raisonnable. Elle a créé un réseau sur le réseau commercial CompuServe (the AVMA Network on Animal Health NOAH) dans le but d’amener ses membres sur l’autoroute électronique par l’offre de différents services. Ainsi un membre, pour une cotisation de 25.95$ par mois, pourra participer à des groupes de discussions avec ses collègues, assister à des conférences spécialisées, en plus d’avoir accès aux deux revues de l’AVMA: Journ-

nal of the American Veterinary Medical Association et American Journal of Veterinary Research (les sommaires seulement), et une base de données toxicologiques. D’autres services s’ajouteront pour répondre à la demande des usagers, en plus des ressources offertes par CompuServe et celles sur Internet.

Dans le même but de donner accès à l’information vétérinaire aux praticiens branchés sur Internet, la Faculté de Médecine vétérinaire de l’Université de Montréal a pris l’initiative de créer un Gopher local rassemblant trois bases de données bibliographiques originales:

Veterinary Conference Proceedings Database: il s’agit d’une base de données visant à rendre accessible la table des matières des comptes-rendus des réunions scientifiques vétérinaires au niveau national et international, grâce à la coopération des organisateurs de ces réunions qui nous expédient leur compte-rendu. Ce service a débuté en mars 1994. Présentement, la base de données est constituée de comptes-rendus de plus de 60 réunions scientifiques pour les années 1993 et 1994; de plus on peut l’interroger par auteur ou par les mots inclus dans le titre de chaque conférence.

Cette littérature, non conventionnelle, est d’intérêt car elle reflète les résultats les plus récents des chercheurs et leurs toutes dernières préoccupations. Cette information est rapidement mise à la disposition de la communauté scientifique souvent avant publication dans les grandes revues. De plus cette littérature n’est pas ou, sinon, tardivement couverte par les grandes bases de données.

Veterinary Journals: Table of Contents: il existe de plus en plus de service d’alerte de ce type. Aussi notre Faculté a décidé d’offrir à ses usagers le sommaire des publications en série en médecine vétérinaire reçues à notre bibliothèque, en expérimentant la nouvelle technologie du scanner et du logiciel de reconnaissance de caractère Omni-

Page. Ce service a débuté en octobre 1994 et s’avère très populaire. Il est offert aussi gratuitement à tous les usagers d’Internet. Présentement, des utilisateurs, surtout nord-américains, mais aussi d’une vingtaine de pays l’interrogent chaque jour. La parution de chaque sommaire est disponible la journée même de la réception du fascicule à la bibliothèque.

La Littérature vétérinaire francophone: Ce service est offert surtout aux pays de la francophonie et aux francophones de par le monde. Les sommaires des revues vétérinaires francophones, des comptes-rendus de réunions scientifiques vétérinaires francophones et, éventuellement, des thèses de doctorat vétérinaire sont présentés aux usagers aux mêmes conditions que la base de données précédente. On vise évidemment à rendre disponible pour les vétérinaires francophones la littérature de leur spécialité dans leur langue.

Ces exemples d’implication du spécialiste en information vétérinaire veulent illustrer la possibilité pour tout spécialiste en information d’organiser l’information pertinente sous forme de Gopher ou WEB sur Internet et même de créer des sources d’information originales sur Internet sans connaissance poussée en informatique, mais avec un peu de collaboration de spécialistes en informatique de votre institution.

Voici, en bref, un résumé de la situation en ce qui concerne l’utilisation de l’information vétérinaire par les spécialistes de cette discipline. Je vous remercie de votre attention.

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Using the Internet to Co-ordinate the Provision of Agricultural Information in the UK

David Stoker, Alison Cooke

ABSTRACT: A review of the current situation of agricultural information in the United Kingdom (UK) suggests that whilst computerisation has had an impact in many areas of agricultural information, relatively little progress has been made towards the achievement of an integrated and coherent information system available to agricultural practitioners and researchers. Comparison with other countries indicates the potential advantages which exist for such co-ordinated provision. This paper suggests that one way of achieving this aim in the UK could be through the use of the Internet, and in particular by the establishment of a World-Wide Web Home Page. This would provide links to relevant information on the network together with an associated Bulletin Board, Current Awareness Service and archive of electronic files. One model for such a service could be the UK Bulletin Board for Libraries which provides most of these facilities to a professional user group. The advantages of such a service would include the provision of an overview of information resources in this area and the simplification of their use. It could also act as a means by which overseas users could gain access to UK information resources. The problems and issues which would need to be considered before the establishment of such a resource for agricultural information are outlined and discussed.

RESUMEN: Una revisión de la situación actual de la información agrícola en el Reino Unido sugiere que en tanto la sistematización ha tenido un impacto en muchas áreas de la información agrícola, se ha avanzado relativamente poco hacia el logro de un sistema de información integrado y coherente, que sea disponible para los agricultores y investigadores agrícolas. En comparación con otros países, existen ventajas potenciales para un suministro coordinado. Este documento sugiere que una manera de lograr este objetivo en el Reino Unido sería mediante el uso de Internet y, especialmente, mediante el establecimiento de una página principal o "Home Page" en World Wide Web. Esto crearía enlaces con información relevante en la red, junto con una cartelería, un servicio de alerta y un registro de archivos electrónicos relacionados. Como modelo para este servicio se podría usar la Cartelería del Reino Unido para Bibliotecas que proporciona la mayor parte de estos servicios a un grupo de usuarios profesionales. Entre las ventajas de un servicio de este tipo están el suministro de una revisión de los recursos de información en este área y la simplificación de su uso. El servicio podría también actuar como un medio mediante el cual los usuarios en el extranjero tendrían acceso a los recursos de información del Reino Unido. Se indican y discuten los problemas y los aspectos que deben considerarse antes de establecer un recurso de información agrícola de este tipo.

Background

This paper originates from a brief survey and series of discussions undertaken during the Summer of 1994 with a view to submitting an application for research funding in the area of the co-ordination of agricultural information over the Internet.

In October 1976, the British Library Research and Development Department (BLR&DD) funded a two-year project at the Agricultural Extension and Rural Development Centre (Reading University) to review information provision in agriculture and to recommend topics for further research. This resulted in The UK Information System in Agriculture usually referred to as the Craig Report. The project concluded that previously there had been
“little useful data to clarify the nature and workings of the UK agricultural information system”.5

Among the many recommendations of the Craig report were the following:

- the process of distributing agricultural information should be examined systematically
- the sources of agricultural information should be examined to determine the most suitable means by which the data collected might be stored, kept up-to-date and made available to all potential users
- the accessibility of agricultural literature and data should be examined, and the BLR&DD should support studies of the effectiveness of setting up agricultural databanks
- the BLR&DD should actively investigate and continue to monitor the consequence of new technology for the way in which information is handled.

Furthermore, in the “summary and conclusions”, the report refers to the complexity of the agricultural information system and states, “the priority task appears to be to rationalise the information transfer system”.3

Immediately following publication of the report, a series of seminars was held to disseminate its findings attended by information professionals, agricultural advisors, research workers, agricultural managers and editors. The general reaction to the report was positive, and “a higher degree of co-ordination between elements of the [agricultural information] system was strongly felt to be necessary, given the scattered and fragmented nature of agricultural information”.4

A final meeting was held in 1980 attended by policy-makers and interested bodies in this area, to identify priority issues requiring further investigation. These included the control of grey literature and review literature, the compilation of a directory of information sources, training and education in information handling, user needs and co-ordination of information activities. The topic of co-ordination of provision, was also discussed but the recommendation for a national co-ordinating function of some kind was not supported. Participants at this meeting were not convinced that imposed co-ordination would be beneficial, preferring the encouragement of informal mechanisms for co-operation.

Since the Craig Report, there have been a number of follow-up reports and studies, dealing with some of the issues and also highlighting the potential impact of information technology in the area.5,6,7,8 Beyond examining decision-making by practitioners and addressing the problems associated with non-conventional and review literature, little appears to have happened in areas such as the co-ordination of information provision and the use of information technology. This article therefore seeks to review the current situation by briefly examining the range of information sources and users of agricultural information. It also compares the largely uncoordinated provision in the UK with the situation overseas, notably the USA. It then proceeds to suggest that one informal method of co-ordinating information provision in the UK could be through the use of the Internet.

The Automation of Agriculture Information Services

The ultimate consumer of agricultural information is the farmer or other agricultural practitioner. However, agricultural information is an umbrella term encompassing information generated from a large number of sources, which may be aimed at a range of user groups and required for different purposes. According to the Craig Report, users of the agricultural information system in the UK also comprise researchers, specialist advisors, general advisors, teachers of agriculture and related subjects, students, administrators, industrial scientists and technologists, merchants/salespeople and journalists. Each of these groups collects, exploits, and generates its own specific sources of information. Thus the term agricultural information could encompass research findings which have no immediate effect on agricultural practitioners, although in the long term may influence practice or the range of commercial products on the market. Equally it would also include legal and administrative information using specialist terminology inappropriate to practitioners, which would nevertheless form the basis of guidance notes issued by an Agricultural Advisory Service such as ADAS.

The scope for the automation of agricultural information is currently demonstrated in the work of the National Agricultural Library (NAL) in Washington, which is currently midway through its Electronic Information Initiative to “research plan and implement a systematic programme of managing data in an electronic form”.9 The NAL also co-ordinates access to automated information services in this field from a wide range of other sites within the USA. A similar example of co-ordination is the Agricultural Information Network (NAL) in the Netherlands, consisting of a number of libraries and information centres in Holland affiliated to either the Wageningen Agricultural University or the Agricultural Research Department of the Dutch Ministry of Agriculture.10

There are also a number of international collaborative initiatives such as the Current Agricultural Research Information System (CARIS), a decentralised network of national and regional centres in developing countries, each centre being responsible for the collection, processing and dissemination of information on current research in agriculture in its own country/region. National/regional directories are produced by the centres”.11 The CARIS Co-ordinating
Centre maintains an on-site global database which is produced by the consolidation of national/regional files. A further example is the Information System for the Agricultural Sciences and Technology (AGRIS), “a bibliographic system of global coverage in the fields of food, agriculture, forestry and fisheries...produced by the collaborative input of over 120 national centres”.

However, in Britain, there exists a large number of disparate producers, disseminators and consumers of agricultural information and an overall lack of co-ordination. There have been a number of interesting projects which have attempt to address the needs of certain agricultural information users, such as the use of teletext and viewdata services, Agri-FAX a document delivery service based on the use of facsimile, and the establishment of Agenet, an X.25-based network linking AFRC research institutions. Whilst much information is available in an automated form in the UK, there is also a need for some form of co-ordination to give guidance to its whereabouts and improve access. The opportunities afforded by the rapidly developing Internet may be an effective means of providing this.

The Internet

Brief Description of the Network

The Internet is frequently described as a network of computer networks, although strictly speaking it is rather a means by which innumerable existing networks are able to communicate with one another. In some respects it may be considered as a “virtual” network in so far as it is not separately administered and it has never been designed. Use of the Internet depends upon the acceptance of certain communication and data transfer protocols which enable remote computers operating in different environments to communicate successfully.

The main categories of task which may be undertaken using the Internet are as follows:

- Remote login using the Telnet protocol to interrogate external OPACs, and other public access enquiry systems such as bulletin boards or remote databases.
- Anonymous File Transfer for using the ftp protocol, to gain access to a designated publicly available file store.
- Electronic Mail: a simple and straightforward means of sending messages over linked computer networks. Groups of email users may circulate messages to one another by means of various list-servers which re-route individual communications to specified users.
- Usenet News: a facility which enables users to read and participate in wide ranging electronic mail discussions taking place within thousands of different news groups.

Until recently gaining access to resources over the Internet was relatively difficult, involving a knowledge of available resources, the means of gaining access, and the use of the command language or other user interface of the remote computer. The advent of distributed client server computing has given rise to the development of a number of access tools which have greatly simplified these tasks and have led to the increased exploitation of the Internet. These tools include:

- Gopher: a menu based interface to information resources over the Internet.
- Veronica: a search tool for accessing the contents of gopher servers and enables a user to identify a search term that might appear in a file name or directory name anywhere on the network.
- Archie: a tool for searching and retrieving files from FTP archives on the network.

More recently the establishment of the World-Wide Web (WWW) has enabled a more effective means of access storage and retrieval of networked information by means of hypertext links. These enable users to navigate through related documents and files. Access to the Web was originally only text based, but a new generation of retrieval tools allows for the integration of text with graphics and sound. The most effective means of accessing the World-Wide Web is through a graphical user interface such as the Netscape reader which operates under Microsoft Windows. In addition, there are already in existence, and under development, a number of useful tools for searching and creating guides to the resources of the World Wide Web. These range from subject indexes such as the Virtual Library maintained by CERN to various tools such as the World Wide Web Worm which are designed to roam the network looking for files and directories with names corresponding to the search terms and then producing a list with hypertext links.

Agricultural Information Currently Available on the Network –

There is quite a lot of agricultural information already available on the network and more is constantly being added. The information is of various types and with different degrees of formality, ranging from un-moderated discussions to data from the National Integrated Pest Management Information System or the US Department of Agriculture’s Agricultural Genome Project. Much of the information currently available derives from sources in the USA.

There are three main problems associated with disseminating or retrieving information over the network. Firstly a lot of important information is not yet available in this form and is unlikely to be so in the near future. Secondly, many of the existing information providers in this field lack the expertise and resources to mount and maintain information in this form. Thirdly, in common with most other subjects, there is the problem for the user to identify what is available and how best to gain access.

There are a number of guides to Agricultural resources which may
either be consulted online or else obtained as text files through the file transfer protocol. The most obvious example is Not Just Cows, produced by Wilfred Drew. However, using any form of secondary source as a means of locating and accessing information is inevitably a laborious and time-consuming process. Also, due to the nature of electronic information and the ease with which it may be updated or changed, there is always the problem that such sources rapidly date. A more dynamic means of identifying sources, over the Internet is through the creation of World Wide Web Home pages. These both provide hypertext links to documents and images that have been created in the WWW format and also give access to gopher servers and ftp archives. Most home pages have been created either by institutions or individuals as a means of identifying and providing access to their own material. Furthermore, they could be used as a central location for mounting information provided from a number of smaller sources. It is also feasible for a home page to be used as an indicator of other selected resources at other institutions on the network or as a means of linking to other home pages.

One strategy for locating information on the network on a given subject therefore might be to identify likely centres—perhaps by using one of the search tools available, or else a published guide. For example a new user of the Netscape Web browser might begin by accessing the NCSA Home Page which includes a link to another page entitled “Starting Points for Internet Exploration”. This provides access to a subject index with an entry for agriculture. Selecting this entry identifies seven potential headings some of which represent guides to further resources such as mailing lists, ftp archives etc. Others link to the home pages of institutions specialising in agriculture. Yet, these initial links are by no means comprehensive, and attempting to find a specific resource might well involve further searching.

Another possibility might be for an information provider to create an artificial home page, not directly associated with any single source, but rather with predetermined links to other resources worldwide. This could then serve both as a guide post to network resources and also as an umbrella under which smaller providers might make available their information. The user might then begin their search by consulting that single source. An example of such a facility is the Subject Tree associated with the UK Bulletin Board for Libraries (BUBL).

BUBL was established in 1991 as a bulletin board and current awareness service for library professionals, with links to other LIS resources, and also by providing its own current contents service and maintaining the full texts of files of interest to its user group. It has also subsequently extended its role beyond LIS by providing subject access to other networked resources, originally through the establishment of a menu based gopher. The current strategy is to develop hypertext links to major resources in each subject by means of a World Wide Web home page. The creation of these subject links is currently being undertaken on a voluntary basis and inevitably the depth of coverage between different subjects is variable. Also there is no specific selection criteria or qualitative judgement made about the value of sources indicated.

BUBL may be used both as an in-depth resource in Information and Library Studies and also as a starting point for Internet exploration in all subjects, and its development might therefore be seen as a model for other disciplines. If there were a sufficient number of these services, they could provide a network of subject based centres, which together could greatly simplify access to Internet resources. Thus, one means of achieving the recommendations of the Craig Report regarding the coordination of agricultural information and development of the use of Information Technology in this area could be through the establishment of such a service for agriculture.

Establishment of a Coordinating Body for UK Agricultural Information over the Network

Description – The proposed Networked Agricultural Information Service (NAIS) would be aimed at information users in the academic community in the first instance, but potentially could develop to serve all aspects of the agricultural community with access to computer networks. It would be primarily concerned with agricultural information generated from UK institutions, but would have links to other networked sources of potential interest throughout the world. Likewise it would be accessible to users throughout the world.

The NAIS would contain some or all of the following facilities:

• Bulletin board for agriculture which would act as an electronic current awareness service. It would provide such items as current contents, new and forthcoming publications, new legislation or regulations, research proposals, continuing research projects, conferences, vacancies, announcements, organisations and statistics.

• Mailbase discussion list — this might involve the establishment of an entirely new list or else the collaboration of one or more of the existing discussion lists. It would serve as a means of posting and answering notes and queries, carrying out brief surveys of users, and circulating additions to the bulletin board.

• File Transfer Protocol archive— containing both the archive of Mailbase discussions, and the texts of Internet Resource Guides and other relevant documents.

• Links—these would be the hyper-
text links to selected World Wide Web resources, together with a go-
pher server connecting to non
WWW resources. The section of
the home page providing these
links could perhaps give some in-
dication of the scope and authority
of the highlighted sources.

It could also act as a gateway ser-
vice to enable users to connect di-
rectly to commercial online services
and other relevant computer sys-
tems.

**How It Would Work** – The NAIS
would be maintained by a single
academic institution with the neces-
sary technical resources and exper-
tise. However, in order to succeed it
would need to have the support and
collaboration of the wider commu-
nity of agricultural information pro-
viders and users. Once again BUBL
provides a useful model in so far as
it was established using a British
Library Research Grant to examine
the feasibility and start up costs, and
has subsequently been maintained
by a mixture of voluntary effort,
commercial sponsorship and other
official sources of funding. Possible
sources for the establishment of an
agricultural service might include
the funding made available by the
Follett Implementation Group for
Information Technology, or the
AFRC. Likewise grants towards the
maintenance costs might be secured
from government funding or com-
mercial bodies within the field.

The above suggestions relate to a
service based in the UK which is
primarily concerned with those re-
sources of interest to British users.
However a network of similar ser-
vices worldwide could be linked to-
gether in much the same way, pro-
viding an international resource.

**Conclusion**

The Craig Report pointed to the
need for some coordination of UK
agricultural information and the
greater use of information technolo-
gy in this area. During the fifteen
years since, there has been disap-
pointingly little progress on both
fronts, particularly when compared
with developments overseas. The
Internet provides a vehicle for rapid
progress in this area, but there are
technical and organisation problems
in its use at present. Not all informa-
tion users have easy access or the
relevant hardware to take best ad-
advantage of its facilities. Those who
do have access frequently experi-
ence difficulties in identifying rel-
vant sources and assessing their
value. Some information providers
may not have the facility to mount
their products or to keep them up to
date.

The establishment of a Networked
Agricultural Information Service as
described above could address many
of these problems and make an im-
portant contribution to the provision
of agricultural information in the
United Kingdom and also perhaps
elsewhere. There appears to be a
good case for the establishment of
such a service if the necessary fi-
nances can be found.

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Harvest from the NET: Benefits of Email for Disseminating Agricultural Information in the African Continent

Chris Addison, Tim Cullen

ABSTRACT: The Natural Resources Institute (NRI) disseminates information on research and new techniques in natural resources management to developing countries. Communication has always been considered essential if NRI is to fulfill this brief. For four years, NRI has been involved in the use of email for the dissemination and communication of agricultural information, specifically in Africa. The aims of the operation in Africa are to communicate with NRI managed projects in the continent, but perhaps more importantly, to maintain links after the project funding period is over with the object of ensuring sustainability. The paper reviews existing services in Africa, discussing the networks available, the technologies used and the organisations involved. NRIs own use of the systems will be presented. The impacts, real and potential, of networks on the way people work, the human feedback factor perceivable at NRI and the implications for information management are examined.

RESUMEN: El Instituto de Recursos Naturales (NRI, su acrónimo en inglés) disemina información sobre investigación y nuevas técnicas de manejo de los recursos naturales en países en desarrollo. Siempre se ha considerado que la comunicación es esencial si el NRI ha de cumplir esa meta. Durante 4 años el NRI ha usado el correo electrónico para difundir y transmitir información agrícola, específicamente en África. El trabajo que se realiza en África pretende mejorar la comunicación con los proyectos del NRI en el continente pero es, quizás, más importante mantener esos enlaces después de que se haya terminado la fase de financiación de los proyectos para asegurar la sostenibilidad de los mismos. El documento revisa los servicios existentes en África, discute las redes disponibles, las tecnologías utilizadas y las organizaciones participantes. Se indica también el uso del sistema por el mismo NRI. Se examinan el impacto, real y potencial, de las redes en la forma de trabajo de las personas, el factor de retroinformación humana que se percibe en el NRI y las implicaciones en cuanto al manejo de la información.

THE NATURAL RESOURCES INSTITUTE, based at Chatham, Kent in the U.K. provides expertise on Natural Resources Management for Developing Countries. The information requirements of NRI staff and users from Developing Countries are met by the Library and Information Service Group and the Information Technology Services Groups. Each development project will have a different information requirement relying on access to reference materials in-house and increasingly on good communication channels. Over the last four years NRI has looked to the Internet and other computer networks to augment online and CD-ROM capability, and to encourage global communication to and from the Institute.

NRI first established an electronic mail connection to the Internet through the Joint Academic Network in the UK, (JANET). The principal aims were to improve communication with academic institutions, reduce communication costs and to allow NRI researchers to participate in the growing number of discussion groups and information services available globally across the Internet.

Having demonstrated the value of electronic mail, in particular for producing joint reports and papers, user demand led to our investigating the email services available in Developing Countries. There was particular interest in establishing a link with projects in Africa. We worked with GreenNet and Mangonet on establishing a connection in Zimbabwe and others soon followed. GreenNet has provided invaluable help in identifying methods for setting up email connections in Anglo-
Phone Africa and more recently we have been working with Orstom’s RIO network to communicate with Francophone Africa. Four years after our original connection a number of projects now rely on the email connections most notably in Zimbabwe, Uganda, Malawi, Kenya, Botswana and South Africa.

In providing this solution to the problems of communication it has become important to understand the limitations medium. The dissemination of information across the networks is not without problems and it is important to know the way in which the information is relayed, the services available and the costs involved.

The key points to note are the fact that the recipient may have to pay to receive messages and the reliability and speed of delivery is often relevant on the telephone system.

NRI Projects are increasingly involving the use of the Internet for providing information to the international community. The International and European Integrated Pest Management Working Group secretariats, based at NRI for example, are publishing information in the Internet and distributing electronically in addition to printed copies of a newsletter on IPM issues using email to the developed and developing world alike. Cost, speed, and ease of use are leading more Agricultural organisations to publish information in this way.

In establishing a discussion and information forum for the IPM working group it became apparent that the technology has a small part to play in the success of the networks. The technical solution to connect a community interested in, for example, agricultural information, encompassing donors, researchers and policy makers is only so many computers, wires, cables and satellite links. It is the users, not technicians who will determine the direction in which these networks will evolve.

Being connected in international networks need not change your life, but it will certainly change a working day. Email, once in regular use, impacts greatly on how staff behave in the office. How many of us look forward to receipt of email? Do we feel the same way about conventional mail, or fax messages? Email personalises communications, and seems to be a preferred method of receiving messages for many of us.

Email makes its users happier, but does it make them more useful to their employers? If someone spends between five and 10 per cent of their working day on the sending and receipt of email, are they more useful as a result (ignoring the fact that they might be happier)?

We want to first draw your attention to all the positive aspects of an interconnected world, before looking at the downside.

• Wherever users are, email makes them feel part of the wider world (when one of the authors of this paper stopped working in central London and started working in a provincial town, he felt quite cut off from the real world until he could use email to swap book reviews with people in Arizona).
• After an event such as this Congress, email will increase the chances of staying in close and regular contact with each other. The benefits of such personal networking are well documented and will not be repeated here. It is unfortunate that it seems from evidence gathered during the past days that the majority of attendees from Africa do not have access, and it is those people we at NRI would most like to email!
• It can enable us to talk to each other without a phone. At its best, it is close to enabling a live conversation.
• It has, because of some of the factors above, accelerated the invisible college to a point where these are still invisible but could probably run degree courses.
• Email undoubtedly grabs the immediate attention of recipients.
• Interconnectedness decreases dependence on local (and possibly, in developing countries, non-existent) archive information, be it on paper or CD-ROM.

• The lists and bulletin boards aspects (well documented by A. Kempf).

All these aspects are extremely important in agriculture, because it is a truly worldwide industry/activity. It is difficult to think of a profession that is more universal. For a dispersed community, it has never been easier to keep in touch than it is now, and indications are that it will get better.

Worries

A quote: “The main reason for all the fuss is that Internet is intriguing, fun, fascinating, interesting, addictive and challenging. Sometimes, it’s even useful”. New users often see it in that order of importance and get tied up in all the intriguing and addictive stuff. Some of us have probably worked with personalities who should never be let near it, because they will never do another day’s work.

• It will increase access to information, but there is no evidence that it will increase use of it.
• Are the most appropriate people in developing countries getting connected? Personal experience indicates not. There is a parallel with CD-ROM going into countries in Africa. New technologies follow the money (often from donors) and so the information-rich get richer even within developing countries.

• There is some evidence that women are some how excluded from Internet generally although they are productive users (Goodman et al). If this is true in the industrialised countries, it is possibly more likely to happen in Africa. There are conflicting views on this, with some believing that a more polite society in Africa will avoid the electronic harrassment that is claimed is occurring in the West.
Even the most appropriate technology for LDC's is spreading more extensively among the richer countries (Goodman et al). Inequalities, rather than equality is being encouraged.

There seems to be a myth arising that libraries can be replaced (but remember how microfiche/on-line/CD-ROM's were going to make libraries and books obsolete?). Libraries have to make increasingly difficult judgements on the mix of products they buy, but they are not about to disappear. They will increasingly allow access to services direct to end users, but librarians should not waste time feeling threatened. “The Internet is to the virtual library as a flea market is to the Library of Congress” (Caragata, W. 1994).

Although most human-computer interfaces are friendly(ish), they are only so to people who feel comfortable with the English language.

Cost of support is a particular problem in areas where connections would be most important. Ironically, the systems are perceived to be free in rich countries. Receiving a 1,000 word message might be more than the receiver’s monthly salary in a developing country.

Security and bureaucracy can over-burden access to networks (a problem until very recently for some UK Government offices).

There is fear that computer networks are creating a quick fix culture, particularly harmful to the teacher/learner interface in academic communities (Gray, S. 1995).

Where does the balance of advantage lie? Can 20 million users be wrong? A UK newspaper said in 1994 that if Internet were a country, it would already have a seat on the UN Security Council. The case rests. Email is a good thing—a positive contribution to information flow.

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Supporting the Information Needs of Agricultural Research Scientists Working in Remote Locations:

Implications of Recent Studies and Changes in Technology and Delivery Mechanisms

Peggy J. Beavers, Keith W. Russell, Ted S. Sibia

ABSTRACT: This paper provides a systematic review of recent studies related to the delivery of information services to agricultural scientists working at remote laboratories and in the field. Topics covered include: the nature of the information-related conditions under which such scientists work; current understanding of the information seeking behaviour employed in those situations; special aspects of their information needs; considerations concerning the identification, location and delivery of information; the real and potential effects of current trends related to technology and information delivery; and the impact of economic realities. The paper concludes with a discussion of strategies for improving access to information for scientists at remote locations, and with suggestions for future research on this topic.

RESUMÉ: Ce les laboratoires et stations localisés dans des zones isolées. Les sujets portent sur la nature de l’information, les conditions de travail des chercheurs, les comportements de recherche d’information de ces chercheurs dans ce contexte et leurs besoins d’information. Ils portent également sur l’identification, la localisation et la fourniture d’information, l’effet des tendances en matière de technologie de l’information ainsi que l’article passe en revue les études récentes concernant la fourniture de service d’informations aux chercheurs agricoles travaillant dans impact des réalités économiques. Cet article conclut sur une discussion des stratégies pour l’amélioration de l’accès de l’information au profit des chercheurs dans les localités isolées, et sur des suggestions pour des sujets de recherche sur le sujet.

RESUMEN: Este documento proporciona una revisión sistemática de estudios recientes relacionados con el suministro de servicios de información a los científicos agrícolas que trabajan en laboratorios aislados y en el campo. Los temas cubiertos incluyen: la naturaleza de las condiciones relacionadas con la información bajo las cuales estos científicos trabajan; la comprensión actual del comportamiento de búsqueda de información empleado en estas situaciones; aspectos especiales de sus necesidades de información; consideraciones respecto a la identificación, ubicación y suministro de la información; efectos reales y potenciales de las tendencias actuales relacionadas con la entrega de tecnología y de información; y el impacto de las realidades económicas. El trabajo concluye con una discusión de las estrategias para mejorar el acceso a la información de los científicos en lugares remotos; se hacen sugerencias para estudios posteriores sobre el tema.

The presentation I am about to make is a joint effort with Peggy Beavers, the coordinator of National Agricultural Library (NAL) services to researchers in the U. S. Department of Agriculture (USDA), and Ted Sibia, Head of the Bio-Ag Department at the University of California at Davis, Library. This paper has evolved since we wrote the abstract six months ago, so it is a bit different from what we envisioned at that time. (In fact, even more changes have been made in the paper since I left the office two weeks ago. That is why you have before you a handout of the bibliography but not the whole paper.) I hasten to add that we had a lot of fun and learned a lot in preparing this paper.

The primary reason for being for every one of us who works in agricultural information is to serve the user, to meet his or her information needs effectively. And to do so we must understand the user and his or her needs as well as his or her available and preferred means of receiving information. This is true whether we work directly with the user or in user support areas such as technical services, automation, or administration.

In planning this paper, we asked what we could contribute to the theme of this IAALD conference: Communicating Agricultural Information in Remote Places. Each of us had long been interested in the
users of agricultural information, and had been involved in recent studies pertaining to the use of information by USDA scientists. We are involved in the delivery of agricultural information, and work in libraries that are becoming more and more electronic. We concluded that our best contribution at this time to the community of agricultural information specialists would be to report on the literature of the past five years that most relates to our collective work.

A key question is this: If we, as librarians and documentalists, are not active spokespersons for individuals and organizations that need agricultural information, then who will be? In order to be effective spokespersons we have to know as much as possible about the user. That knowledge can come from several sources: from conducting carefully-designed studies of the users (and non-users) in the population we serve; from reviewing and analyzing other studies that are directly or tangentially pertinent to our population; or from reviewing and analyzing other literature and information that has, or potentially has, a bearing on our population and its current and future use of information.

This paper reports on information and implications of forty reports from these three categories, and highlights those we consider most relevant and worthy of note. It reviews publications since 1990 related either directly or indirectly to the issue of providing information services to agricultural scientists at remote locations. The publications cited in this paper include: a very few that are directly aimed at scientists working in agriculture; a larger number that address the information seeking behavior of scientists in other fields; and some papers related to the provision of information services by the library of the future...the electronic library or virtual library.

The authors of this paper have long been interested in what is known about the scientific community, user needs in the sciences, the information needs and the information-seeking behavior of scientists, and the implications of all of the above for libraries and information centers that provide information services to scientists. Literature from the history, philosophy, and sociology of science provides such insights, along with special studies conducted by librarians, documentalists, and information scientists.

The article by Beeverlee French in 1990 is a significant work that summarizes what was known at that time about the information needs and behavior of agriculturists, those individuals involved with agriculture or its products. Her review highlights the interdisciplinary nature and other distinct characteristics of the field of agriculture and how these factors complicate the provision of agricultural information to all types of users.

We consider her review article a benchmark, and have gone on from there to summarize briefly what we consider to be the most interesting publications since 1990 that are of interest to us and to others considering user needs in planning, improving, and delivering information services to one subcategory of agriculturists—the research scientists. We have organized our discussion according to statements that summarize what we found.

### Studies Directly Related to Agricultural Researchers

Of approximately 100 items examined, only a few were specifically concerned with the information-seeking behavior of, and information services to, agricultural scientists.

For several years the authors of this paper have been involved in a special project with the Agricultural Research Service (ARS), the primary research arm of the U.S. Department of Agriculture and the largest agricultural research organization in the world. ARS employs more than 8,000 people at nearly 120 locations. Approximately 2,400 of these employees are research scientists. Since 1986 the staff of the National Agricultural Library, with collaboration from librarians at land-grant universities and colleges, have been working closely with ARS research scientists and administrators to improve library services that they receive from NAL and 37 land-grant university libraries.

In 1990, NAL staff began working with Ted Sibia and Beeverlee French of the University of California at Davis to explore the special problems encountered by USDA scientists working at laboratories at remote locations—that is locations that were more than two hours away from a major library. That study indicates these scientists believe they are at a disadvantage compared to their counterparts at land-grant universities. They expressed concern about their ability to keep abreast of the latest research results due to scarcity of resources on-site or in the local area; limited funding for information resources; delay in receipt of materials once they identify items; isolation and distance from the nearest library.

Two information service areas of prime importance to place them on equal, or near equal footing with colleagues surrounded by a wealth of readily available resources are access to computerized library catalogs and user orientation and training on available library services, systems and other resources.

The report of that project (Sibia, Beavers and French, 1993) includes recommendations for addressing the concerns and needs the authors believe are critical to the success of the scientists’ research programs. A later report (Beavers and Sibia, 1995) presents specific actions for partnerships between USDA’s NAL, ARS, and cooperating land-grant university libraries to implement improved information services and delivery systems to researchers stationed at laboratories in remote locations.
Two other reports during this period describe the information needs of agriculturists. Adio (1993) reports on a survey of graduate students and faculty who use the International Institute of Tropical Agriculture (IITA) Library in Nigeria. Pozdnjakov (1991) describes an analysis of information requests by agricultural scientists in the USSR, and the use of resulting data to improve the collections of scientific agricultural libraries by changing acquisition and weeding policies.

Two reports in the medical library literature confirm the difficulties encountered by scientifically-trained workers in rural settings. Dee and Blazek (1993) document the difficulties encountered by rural physicians in accessing high quality and up-to-date information and make recommendations for helping (such as having the National Library of Medicine develop a computerized expert system to support the needs of all physicians).

Lundeen, Tenopir, and Wermager (1994) studied rural health care workers in Hawaii and identified several barriers they encounter in obtaining information. Among their recommendations is the “establishment of rural health care information agents (modeled on agriculture extension agents) on each major island.”

### Studies from Other Disciplines

Several papers and reports pertain to scientists working in other scientific disciplines, such as biology and engineering. Some authors, such as French (1990), have made a case for applying at least some of what has been learned in such studies to agriculturists. Other authors, such as Pinelli (1991), point out some of the drawbacks of doing so.

At any rate, many interesting and useful publications on information-seeking behavior and scientific communication in various sciences were published in the past five years. They include updates and reviews on classical topics or investigations with a new slant. We found the following items interesting.

The article by Metoyer-Duran (1993) is an extensive review of the literature on the concept of “information gatekeepers,” and how that term is defined in various disciplines. Her paper also explores how cultural differences affect an individual’s information-seeking behavior. Hurd (1992) discusses how the emergence of interdisciplinary fields affects information-seeking behavior, and the challenges faced by librarians who provide information to scientists engaged in interdisciplinary research. Poland (1991) focuses on the informal communication behavior of scientists and the impact of new communication technology on such behavior.

Hallmark (1994) asked scientists in biology, chemistry, mathematics, geology, and physics to discuss how they learned about, and obtained, specific publications they eventually cited in their own publications. She explores the expectations (and the misconceptions) the scientists have of the library, and the implications for librarians serving scientists.

Gee (1990) proposed a method for expanding what is known about how scientists and engineers actually use information, and how changes in technology are affecting that use. Her proposal includes the establishment of a broad base of data and information on the use of new information technology.

Van House (1990) reports on a pilot study that suggests a correlation between science and engineering library resources available at a university and the productivity of the scientific community at that university. The conclusion is that library resources do contribute to research productivity in science and engineering. This is a small study of member institutions of the Association of Research Libraries, but its implications are very interesting.

The King report (1994) is a monumental, annotated bibliography that covers much of the core literature on user studies (since 1970) of scientists and engineers. It includes some studies in the agricultural and life sciences. A special feature of the report is extensive indexes by type of study (such as studies on information-seeking behavior, studies that rank information sources, and studies that focus on the outcomes of information use).

Pinelli (1991) reviews literature related to differing uses of and approaches to information by scientists and by engineers, and cautions against making undeserved comparisons between the two groups. The article compares, for example, the differences between science students and engineering students, and what those differences may mean to librarians. “Evidence exists to support the hypothesis that differences between science and technology and scientists and engineers directly influence information-seeking habits, practices, needs and preferences.” We find this outlook particularly useful because a significant portion of the USDA scientists NAL serves focus on applied research and engineering, and many programs of USDA relate to technology transfer.

### Planning Studies

Some planning studies have appeared in the past five years that focus on improving library services to scientists. The Columbia University Study (1993), sponsored by the Council on Library Resources, focused on faculty, graduate students, and research staff in biology, physics and electrical engineering. Its authors suggest that the results of that study have implications for other institutions that provide scientific information. It contains, for example, a comparison of the users of electronic information with those who do not use electronic information. That comparison finds correlations with age (younger), use of document delivery (more), and use of a wide range of information sources (more).

The Triangle Research Libraries Network (TRLN) study (1994) was
also supported by the Council on Library Resources. TRLN is a cooperative that involves three major universities in North Carolina: the University of North Carolina at Chapel Hill, North Carolina State University, and Duke University. The project reviewed special aspects of the information needs and information-seeking patterns of science faculty and students at all three campuses. Recommendations for action included: more consultation with and education of users; more deliberations involving faculty, students, librarians and university administrators to “re-envision” a scholarly communication system; and closer collaboration between users and librarians.

The Massachusetts Institute of Technology study (Sherratt, 1992) investigates how faculty, researchers and students in three disciplines (brain and cognitive science, management science and materials science) gather information related to their work. Recommendations of the study included the expansion of efforts to make electronic resources available on the campus network and the expansion of the role for the librarian as a guide to the wide array of information sources.

The Gould and Pearce report (1991) is a background document produced to guide activities of the Research Libraries Group’s Program for Research Information Management. The mission of that program is “to identify the types of information researchers need better access to and to foster activities that encourage the development of new data resources.” The study utilizes interviews with faculty and researchers to identify dominant concerns and trends related to information in several disciplines, including biology, chemistry, geosciences, engineering and computer science.

The Electronic Library

Several publications discuss the nature of the electronic library and the importance of considering the user as library services are developed for electronic libraries.

One of the most useful publications concerning the electronic library is the encyclopedic report by Karen Drabenstott (1994) on the library of the future as viewed in the literature. This is a comprehensive work that describes and analyzes the vast (and rapidly growing) body of literature about the library of the future. The report concludes with a thinkpiece entitled “Whither libraries?” Several other articles have proposed what the electronic library will be, and how it will serve its users.

The Brudvig (1992) article is an interesting thinkpiece that considers the user and his/her needs or preferences as we enter the electronic age. Among other things he stresses the importance of being closer to the user.

Lockett (1992) reviews what we know about the user and his/her non-use of libraries. Topics covered include the implications of this information for the future of libraries and for changes needed in library leadership. Lucker (1992) reviews the recent history of academic library buildings and discusses how some of the issues that at one time affected the library design are less important now. The article includes predictions on the role of the research library in the next century, and highlights the importance of user needs and other factors in designing newer facilities.

On the practical side, related to the movement of scientific libraries into the electronic age, the National Agricultural Library has issued two reports on plans for its Electronic Information Initiative (EII). Phase I of this initiative was launched in December 1992, and consisted of an examination of the issues associated with NAL’s ability to manage electronically created and stored information. The report of Phase I is by Ditzler, Early, and Weston (1993) and it describes key components of the EII. One of the proposals concerns making AGRICOLA accessible via the Internet.

Phase II consisted of the creation of a project implementation plan and a list of prioritized tasks needed to accomplish Phase I recommendations. Mason (1995) is a report on Phase II, and it covers the status of EII activities and accomplishments as of December 1994. The third phase of the EII is in the planning stages. It focuses on such issues as connectivity, and places a high priority on identifying and analyzing user needs, and on creating a feedback system. In a related activity, Beth Sandore (1994) spent part of her sabbatical from the University of Illinois working at NAL to gather information on user needs that could and should be addressed by an Internet version of the AGRICOLA database.

The User of Electronic Information

Publications are beginning to appear that describe how scientists are using electronic information, the difficulties they are encountering, and the role of libraries. Richard Dougherty (1991) has reviewed the importance of what we know about our users and how it will affect the library of the future. He summarizes some of the earlier studies that indicate libraries are not high on the list of sources for information by researchers, and specifically warns against overestimating the library skills of researchers.

Allen (1991) focuses on change in the communication pattern of physicists and scientists in general due to the introduction of new technology, especially electronic communication. He cautions that “The enormous benefits of electronic media to scientists and publishers must not outweigh the concern for potential damage to the scholarly communication cycle.”

The Schmidt and Davis (1991) article reports on CD-ROM use at the University of Illinois (Urbana-Champaign) Biology Library, and explores the impact of CD-ROM use on collection development, staff-
ing, bibliographic instruction, and networking. Among other topics, it discusses the extensive use of CD-ROMs by graduate students.

Schmidt (1993) describes a credit course entitled “The Electronic Library” that was developed for students at the University of Illinois at Urbana-Champaign School of Life Sciences. The design and content of the course is explained, along with reaction to it and the positive impact the course has had on library public relations.

Holland and Powell (1995) tracked down University of Michigan graduates who took a course on information resources for engineers between 1978 and 1990. Via a questionnaire they studied the impact of the course on the development of the individual in his/her field. Responses from those who took the course are compared with responses from individuals who did not take the course.

Strachan (1993) reports on an information awareness training workshop presented to scientists from the Caribbean. The intent of the workshop was to increase the information capabilities of the participants, particularly to help them “develop individual strategies to improve the flow of information to their work.” A follow-up on the impact of this workshop on both the participants and the countries they represent is discussed.

The Stewart report (1994) is the result of a visiting librarian study at the National Agricultural Library. Susan Stewart, from the University of Nevada at Reno, spent part of a sabbatical at NAL working with staff to develop a plan for enhancing user education. That report is one of several developed during recent strategic planning efforts at NAL.

The Lewis article (1994) is frequently cited in the United States. While it focuses on reference services, it reviews much of the literature about services in the library of the future, and examines assumptions related to roles and organizational structure. It, too, highlights the importance of the user in preparing for the library of the future. It also discusses organizational change and current organizational theory as they relate to reference services.

### Current Limitations of Electronic Information

Some reports indicate that while the rush toward electronic information should improve access to information by people in rural areas, obstacles remain.

At this very conference, two nights ago, we heard Derek Tribe (1995) ask: “Are superhighways all they were cracked up to be?” He followed that with a quote that essentially says that inequality in the distribution of knowledge is even worse than inequality in the distribution of wealth, and that the electronic superhighway only exacerbates that inequality.

And on Monday afternoon, also at this conference, many of us heard Jan Bay-Petersen (1995) discuss access to information by farmers in rural areas of Taiwan. Recent developments in information delivery are assuring that those who already have access to such information will get more information, and that these new developments will not really help the information-poor farmer.

This problem is also reported in the literature. Senkevitch and Wolfram (1994) review relevant literature and “provides an overview of the current state of networking technology in rural libraries and describes a model for educating rural librarians in the new technologies that will enhance library service to rural communities.” The potentials of the newer technologies for improving access to information for rural communities are offset by such issues as economics that in many cases exacerbate rather than reduce the disparities in access to information.

A recent newspaper article by Rajiv Chandrasekaran (1994) makes a similar point: while there is great potential in online services to individuals, where they live can greatly influence the cost of getting information. As stated in the article, “the so-called information superhighway is accessible only by an often pricey toll road….Approximately 20 percent of the U.S. population does not have access to most commercial online services via a local phone number.”

### Future Studies

Some of the publications of the past five years provide insights on the types of studies needed in the future, and methodologies that may be employed.

A second paper by Pinelli (1992) is a good thought piece on the bigger picture involving scientific and technical literature. While he focuses on engineers and scientists in the aerospace industry, much of the background information he presents is broadly useful, and his recommendations very much involve a consideration of the user. The paper concludes with a recommended structure for arriving at a user-focused research agenda that would help overcome the current fragmented, often superficial nature of studies of users of scientific and technical information.

Three recent reports have discussed the use of focus groups as a methodology for exploring user needs. Mullaly-Quijas, Ward, and Woelf (1994) describe the use of this technique, identify the types of data best gathered in this way, and report the practical aspects of using it. The authors conclude by urging others to consider the use of focus groups.

A portion of the report by the Triangle Research Libraries Network (TRLN) (1994) describes the use of focus groups in eliciting ideas from library users that would be used in planning and policy issues for the three-university cooperative network. The benefits of using the technique, as well as the results of the process, are described. Part of the Massachusetts Institute of Tech-
nology study (Sherratt, 1992) also addresses the use of focus groups for gathering information on use and potential use.

**Conclusion**

In conclusion, during the past five years only a few publications have directly addressed the information needs and information-seeking behavior of research scientists in agriculture. However, a variety of relevant and potentially relevant publications on research in other scientific disciplines, and on electronic information and the library of the future, have appeared. These provide plenty of food for thought as we, the members of IAALD, seek practical and innovative ways to improve the provision of information services to agricultural researchers throughout the world.

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Information Highway or Dirt Track: Challenges in Delivery of Electronic Information Products to Isolated Clients

Des Stewart, Rosemary Blakeney

ABSTRACT: New South Wales (NSW) Agriculture has recently installed a wide area network (WAN) theoretically linking all locations across the state. In practice only the larger centres have been connected leaving many clients outside the network. This paper outlines the experiences and challenges when evaluating networking of electronic information products to geographically remote client groups. The challenges discussed are the structure of licensing agreements and how they disadvantage decentralised organisations such as NSW Agriculture, the technical problems of networking across large distances including communications infra-structure and provider software, development of a client education program, how the role of librarians will change from a provider to a trainer and/or facilitator, and the problems with aspiring to provide equal service to all clients wherever they are located.

RESUMEN: New South Wales (NSW) Agriculture ha instalado recientemente una red de amplio alcance (WAN, su acrónimo en inglés) vinculando teóricamente a todas las localidades del estado. En la práctica, sólo los centros más grandes han estado conectados, dejando muchos clientes por fuera de la red. Este documento esboza las experiencias y los retos que se presentan cuando se evalúa el desarrollo de redes de productos de información por medio electrónico para grupos de clientes geográficamente aislados. Entre los retos discutidos están la estructura de los convenios de licencia y la posición desventajosa en que estos convenios colocan a las organizaciones descentralizadas, como NSW Agriculture; los problemas técnicos de desarrollar redes a través de grandes distancias, incluyendo la infraestructura de comunicación y los programas de computador para proveedores; el desarrollo de programas de capacitación para clientes; el cambio del papel de los bibliotecarios de proveedor a capacitador y/o facilitador, y los problemas que surgen al querer proporcionar un servicio similar a todos los clientes, dondequiera estén ubicados.

Information Highway or Dirt Track: Challenges in Delivery of Electronic Information Products to Isolated Clients

The state of New South Wales (NSW) covers an area of some 800,000 square kilometres representing 10% of the Australian mainland. It has 20% of the cropland, 30% of the livestock and with a population of 6 million 35% of the total Australian populace.

NSW Agriculture (formerly the NSW Department of Agriculture) has 10 major centres spread across the state. Typically these are major research centres with extension personnel, administrative and computer support staff, and libraries with wider regional responsibilities. Where I come from, for example, Wollongbar is the major centre and regional headquarters for the north coast. Apart from the major centres there are some 80 minor locations ranging from 1 person offices to smaller research & extension centres dotted around the state.

NSW Agriculture Library Service reflects this decentralised service structure consisting of 10 main staffed libraries. The libraries are widely separated geographically and are situated in very different agricultural areas: from the near-tropical north coast with its fruit production and macadamia orchards; to the irrigated orchards in the south west; large acreage crops of the central region; to the rangelands in the west and north west. NSW Agriculture library network then extends its services thus far.

Each main regional library is staffed by a professional librarian with technical and clerical support. Most of the network’s resources are
located with these libraries. Each smaller location is often situated several hundreds of kilometers away. These remote locations hold smaller specialised collections of core material but clients at these sites are heavily reliant on the larger libraries for most of their information needs and services. So, not only are the libraries remote from each other and large population centres, but a large number of our clients are geographically remote from these regional libraries.

Each major library acts as an information hub receiving information requests, accessing resources worldwide, repackaging and forwarding this information back to clients. To make the most efficient use of resources it is vital that all the libraries are linked electronically and able to access outside information resources and services. It is also essential that the collections of each library be known and available to clients and the other libraries in the network.

Our aim is to enable all officers of the department, wherever located, access to the resources of the library network and other information services, via their desktop computer. While this is certainly technically feasible it is uncertain if it is a viable or practicable option in our organisation.

NSW Agriculture has recently put into place a wide area network (WAN), based on SUN hosts and Unix operating system. The WAN links all the major centres in New South Wales and the library service has piggybacked onto this. However the system does not extend to every location, mainly because of the cost of the infrastructure. While all the libraries and some remote locations are linked to the outside world and each other via the WAN, many locations are not. So, while we do have a network for information delivery it can only reach some of our clients. Because of this situation it was decided to investigate those information products which were capable of delivering services across the electronic network and devise other strategies for delivering the same services to those clients outside the network.

**Services Delivered via the WAN**

Library Services is a major user of information technology in NSW Agriculture. We utilise the WAN to do the following things:

**Primary Library WAN Uses**

- **E-mail**
  - Internal: CC-Mail
  - External: Internet via AARNet

- **Document Delivery**
  - Australian libraries via ILANET etc
  - BLDSC (in the UK)
  - UnCover (in the US)

**Information Resources**

- Online database providers eg Dialog, ABN
- Listserv groups
- UnCover Reveal (current awareness service)
- Resources via Internet

While most of these services are solely for library use, we would like to be able to provide some of these directly to isolated clients. For instance Internet capability to access various listserv groups, external library catalogues, Uncover Reveal service and so forth. We also have a number of electronic information products located in the various libraries that we would like clients across the state to be able to access directly from their desktop computers via the network.

The most important resources we would like to provide direct access to that are currently not networked are:

**Non-WAN based products**

**Commercial CD-ROM Databases**

- CAB Abstracts
- Agricola
- FSTA
- Toxline
- Ag.ROUND

**CLANN-CAT CD (books & journals catalogue)**

**Current Contents on Disk (CCOD)**

While networking such products across the wide area network appears to be technically feasible a number of factors had to be considered. In all such decisions it is important to ensure that the most efficient use is made of scarce resources. Our service faces diminishing funding and greater demands and while it would appear that networking resources such as CD-ROM’s would provide a better and more cost effective service this may not always be the case. Further, it is important not to be dazzled by the technology, or the “Information Hypeway”.

**Challenges Involved with Networking Electronic Information Resources to Geographically Remote Clients**

**Licensing Agreements**

Most vendors are set up to serve large centralised organisations based in one population centre who may wish to network to other sites in the same population centre or to other departments on the same site. Vendors have difficulty with geographically diverse organisations such as ours. This is shown very clearly by the definition of site decided upon by SilverPlatter Information Inc. SilverPlatter defines “site” as same bill-to address, same institution, same city. The metropolitan university, in any city, any country, has a single campus which houses three libraries: the Science Library, the Medical Library and the Psychology Library. This would be considered one site. On the other hand if the Metropolitan University has three campuses in three different cities Metropolitan University would NOT be considered one site. This means in our organisation each location no matter how small must be considered a separate site and purchase a separate license. To connect 10 regional libraries would require ten li-
It was originally conceived that we would use SilverPlatter’s ERL (electronic reference library) software, mount our SilverPlatter CD-ROM titles on a file server in the Head Office with the option of having some other titles mounted regionally. This was all technically feasible and would do what we wanted, that is, deliver services to our clients desktops. However with this kind of pricing structure it was economically not feasible.

So while the ERL is a technical breakthrough the pricing arrangements associated with its administration is strongly biased towards large centralised organisations. It has meant that our organisation will have to deal with each separate information provider and negotiate a separate agreement for each product where possible. CABI for instance, is willing to negotiate one to one agreements with their ‘consortium’ arrangements.

Technical Considerations

Before networking it is important to make sure that the system can support the maximum number of simultaneous users envisioned. This depends not just on your communications infrastructure but on how the product’s software performs. Our organisation recently conducted a number of tests on a range of CD-ROM and ISI products to see how they would perform across a network. It was found that the complexity of search statements, amount of information retrieved, and the number of simultaneous users affected the speed of retrieval; some to the extent that the product is not responsive enough to network effectively.

For networking to work effectively the computers attached to the system must be fast enough and have sufficient amounts of RAM. Again in our tests, we found significant differences in retrieval time for different models of PC’s and RAM capacity. The cost of upgrading computers to acceptable standards can be considerable and is often overlooked. Consideration must also be given to technical support for the implementation and ongoing maintenance of systems.

Client Education

If services are to be delivered to the desktop of clients it should not be assumed that clients will be able to efficiently use the systems and products. For such a network to operate effectively there must be promotion and a client education program in place before introducing the service. Because our service is decentralised it will require each librarian taking on the role of trainer. These services will change our roles—less as mediators where we have controlled the flow of information to facilitating a self-help mode of delivery to clients. As Paul Evans Peters, Director of the Coalition for Networked Information, pointed out in a recent Australian visit, “not sage on stage but guide on side”

Providing Services to Remote Clients Not On the Network

Even if these problems can be sorted out there will still be a significant number of isolated clients who cannot access these services. How do we deliver an equal quality service to these people? At this time we are investigating various possibilities. One is to set up 10 mini networks via Local Area Networks (LANS). However as previously mentioned the costs of licenses may prohibit this option.

For certain products such as CCOD we are considering purchasing a number of stand alone versions for all remote locations requiring access. This may mean buying many copies of the 2 or 3 Current Contents services we currently use. In the end it may mean offering a mix of delivery options of say, stand-alone systems, networked information (either WAN or LAN based), and more traditional delivery methods such as circulating printed abstracting journals, running searches on behalf of remote clients etc.

There are implications here in such approaches that may take some time to surface. For example what are the true costs of offering such mixes of services?, and perhaps more importantly, will there be variation in the quality of different service delivery options?

Conclusion

Our organisation greeted the new information age with great celebration and anticipation. At last a way to deliver fast efficient service to all our clients, a way to overcome the problems of distance and isolation. However our experiences have shown that networking across large distances is full of challenges. It may not be the answer in all cases at least not until changes have been made in the licensing, the infrastructure is improved, and all our clients are part of the highway and not the dirt track.

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ABSTRACT: A pilot project to analyse the current level of coordination and to explore new ways of coordinating services between the State Library of Queensland, five public libraries and the Department of Primary Industries Library and Information Services, in servicing some information needs of public library clients, is being undertaken. Some of these opportunities or plans that have been identified so far include: a draft inter-library loan procedure using QUEST, the State Library of Queensland's automated inter-library loans module; presentations on Department of Primary Industries activities and library services to public library training workshops; and the establishment of an effective and efficient working relationship between an individual public library and the local Department of Primary Industries office. These plans and others are discussed with a view to enhancing the coordination of services to clients between the State Library of Queensland, the public libraries of Queensland and the Department of Primary Industries Library and Information Services.

RESUMÉ: Un projet pilote est en cours d’étude pour évaluer le niveau actuel de coordination—et explorer des formes nouvelles—entre la Bibliothèque d’État du Queensland, cinq bibliothèques publiques et la Bibliothèque du Département des Industries primaires, dans la fourniture d’information au public. Parmi les opportunités ou plans indentifictes figurent l’élaboration d’un projet de procédures de prêt inter-bibliothèque utilisant QUEST, l’utilisation du module automatisé de prêt inter-bibliothèque de la Bibliothèque de l’État du Queensland, les présentations du Département des Industries primaires et des services de bibliothèques aux autorités de formation des bibliothèques publiques ainsi que des relations effectives et efficientes entre les bibliothèques et le bureau local du Département des Industries primaires.

RESUMEN: Se ha iniciado un proyecto piloto para analizar el nivel actual de coordinación y para explorar formas nuevas entre la Biblioteca Estatal de Queensland, cinco bibliotecas públicas y los Servicios de Biblioteca y de Información del Departamento de Industrias Primarias para atender ciertas necesidades de información de los clientes de bibliotecas públicas. Algunas de las oportunidades o planes que se han identificado hasta el momento incluyen: un procedimiento de préstamo interbibliotecario preliminar utilizando QUEST, el modulo de préstamo interbibliotecario sistematizado de la Biblioteca Estatal de Queensland; presentaciones sobre las actividades y los servicios de biblioteca del Departamento de Industrias Primarias en talleres de capacitación para el personal de bibliotecas públicas; y establecimiento de una relación de trabajo efectiva y eficiente entre bibliotecas públicas específicas y la oficina del Departamento de Industrias Primarias en la localidad. Se discuten estos planes, entre otros, con miras a coordinar mejor los servicios que se prestan a los clientes por parte de la Biblioteca Estatal de Queensland, las bibliotecas públicas de Queensland y los Servicios de Biblioteca y de Información del Departamento de Industrias Primarias.

For three months in 1994, the Department of Primary Industries Library and Information Services on the one hand, and the State Library of Queensland and some public libraries in Queensland on the other, undertook a library coordination project. In an attempt to serve the rural communities better, the three parties investigated the level of coordination between them with the view to improve the existing procedures for information access and document delivery of primary industries information and also with the view to develop new services if appropriate.

Background

The idea for better coordination between the library systems arose in October 1993 at the first Queensland Rural Women’s Conference. The women needed information on many topics including rural business information. I was there to assess their needs for access to the library and information resources held by the Department of Primary Industries Library and Information Services.

In my opinion, one way to disseminate information to rural women and their families was through an already existing information delivery system—the public libraries. As there are over 300 situated around this state, in the rural communities, I think they are an obvious means to deliver information to country people. After discussions were held with the Library Board of Queensland’s Taskforce on Public Library Services in November 1993, it was agreed that the library coordination project should be undertaken.

With assistance from the State Librarian, five public libraries were
chosen to undertake the pilot study with the Department of Primary Industries Library and Information Services. They were the Mackay City Library, Maroochy Shire Library Service, Redland Shire Library, Goombungee Public Library and the Stanthorpe Shire Library. The first three libraries are independent, that is, the Local Authority provides a free independent library service and the remaining two are Country Lending Service (CLS) libraries, that is the Local Authority, with a population under 10,000, operates a country lending service under the State Library of Queensland Public Libraries Division.

Reasons for choosing these libraries were to:
- Assess the differences between the independent libraries and the CLS libraries when they coordinate with the Department of Primary Industries Library and Information Services.
- Assess the relationship between the public libraries and the Department of Primary Industries, when the public librarians refer their clients to the research stations or offices for information.
- Contain the project budget so four libraries were chosen for their proximity to Brisbane.

**Project Plan** – The current level of coordination of services to rural clients between the public libraries and the State Library on the one hand, and the Department of Primary Industries Library and Information Services on the other, was analysed.

**Aims of the Project**
- Improve rural client services by enhancing coordination among the three library systems.
- Explore the Department of Primary Industries level three information centre concept.

**Objectives of the Project**
- Identify clients and potential clients of primary industries information.
- Identify primary industries information needs of clients.
- Identify current coordinating activities and level of cooperation between the three library systems.
- Identify frequency of usage of Department of Primary Industries information resources.

**Project Proposal**
- Refine current coordinated activities and develop better services for rural clients of primary industries information.
- Develop clear and agreed procedures for quality client services.
- Develop a clear scale of fees for services provided by the Department of Primary Industries Library and Information Services.
- Assess the need for any additional requirements for successful coordination of activities to fulfil requests.
- Develop and implement appropriate systems for future coordination of activities and fulfilment of requests.

**Expected Outcomes from the Project**
- Public library clients get rapid access to primary industries information.
- A scale of fees for products and services acceptable to rural clients and public libraries.
- Fulfilment of requests will improve in depth and sophistication through marketing by allowing tailoring of services to suit client needs.
- Public libraries, the State Library and the Department of Primary Industries Library and Information Services have improved their coordination.
- An increase in usage of the Department of Primary Industries Library and Information Services.
- A successful model that may be applied to other public libraries in Queensland and possibly Australia.
- A successful model that may be applied by other Queensland Government libraries when coordinating their services with public libraries to meet rural clients information needs.
- An assessment of public libraries functioning as Department of Primary Industries level three information centres.
- Report on the Department of Primary Industries Library and Information Services’ management of requests.

**The Project to Date**
Approval to conduct the project with five public libraries was granted on 4 February 1994. A questionnaire was developed as the basis for discussions with the staff from each library. The findings will be discussed later in the paper. A draft interlibrary loan policy between the public libraries and the State Library of Queensland and the Department of Primary Industries Library and Information Services was drawn up. It includes a regular service (free) for all CLS and some independent libraries, and a direct service (charges for interlibrary loans are made) for the remaining independent libraries. Those choosing the direct service, send interlibrary loan vouchers to the Department of Primary Industries Library and Information Service. Presentations on Department of Primary Industries activities and resources have been made to three State Library of Queensland Public Libraries Division public library workshops to gauge the level and amount of Primary Industries information being sought by clients. Feedback collected from the workshop evaluation forms showed they were successful because the library staff were very keen to learn about the Department of Primary Industries activities and resources as there was a heavy demand for Primary Industries information from their clients and there was considerable interest in the concept of a public library becoming a Department of Primary Industries level three information centre.

The next stages of the project are to hold focus groups for some De-
partment of Primary Industries extension officers. This is planned to be a rehearsal for the public library focus groups. A focus group consists of a group of six to eight people who, with a facilitator asking a few well-constructed questions, discuss their beliefs and attitudes on a given subject. The discussion takes approximately one and a half hours. Because the Department of Primary Industries extension officers have an important role in the dissemination of information to the public, it is necessary to assess the extension officers’ attitudes to public libraries as resources for, and gateways to, primary industries information and to collect their ideas on their clients’ information seeking behaviours.

Plans are to hold two focus groups at each public library participating in the project. One focus group will be for clients already using the public library for primary industries information and the other for clients who do not use the public library for primary industries information. The information generated should assist the three library systems to develop appropriate marketing strategies. Endorsement for the draft interlibrary loans policy will be sought and a final report and recommendations will be written. Additional to the project will be to make presentations on the Department of Primary Industries and its information resources and services at four more State Library of Queensland Public Libraries Division public library workshops during 1994.

Findings to Date

Public library clients do not know what information is available, how much, from where, or from whom to request it. In 1994, the public libraries staff accessed the Department of Primary Industries library catalogue through ORAQLE, the online library management system developed by the Library Board of Queensland, and used QUEST, the ORAQLE interlibrary loans module. This strategy of using an online service that all parties can access easily and quickly to get a fast turnaround, contrasts with previous experiences which included a slow manual requesting procedure combined with the traditional interlibrary loan policy of special libraries not usually lending to external clients, and the reluctance of public libraries to charge for interlibrary loans.

Table one illustrates the effect of DPI Library and Information Services not being accessible to public libraries up to 1994.

Table two shows that many requests for primary industries information are being made by public library clients and the desire for the public library staff to offer alternative sources of information, such as visit, write or phone the local DPI office. These referrals are additional to the requests sent to the State Library of Queensland Public Libraries Division or to the Department of Primary Industries. There is no consistent referrals policy between the public libraries and the Department of Primary Industries at this stage.

Table three indicates that information on more than thirty-six primary industries topics was requested during 1993 from three public libraries.

Table four shows that the four most important categories of clients were, in priority order, hobby farmers (including home gardeners), ter-
tiary students, secondary students and primary producers. It was evident from the public library staff discussion groups and the State Library of Queensland Public Libraries Division workshops, that public library staff wish to know more about the Department of Primary Industries’ activities and resources so that they may judge when to refer clients to the Department. All the pilot public library staff would like to negotiate a referral policy with staff from the local Department of Primary Industries office because of the tradition of not usually accessing government department library resources, it was not surprising to find that the level of coordination for interlibrary loans was minimal.

Comments included: Satisfactory; usually timely; can’t really comment as we do not use the service; we do not use your library (Department of Primary Industries) because we are trying to keep down interlibrary loan costs. However, all the pilot libraries said they would use QUEST. The draft interlibrary loans policy enables them to choose to pay or not to pay for interlibrary loans. Regarding the current relationship between the public library and the local Department of Primary Industries office, comments consisted of: nebulous; there isn’t one!; do the clients go to the office, write or phone as suggested? Are their requests fulfilled? There is a significant demand for primary industries information and all the pilot libraries wished to encourage their clients to use their libraries to obtain this information. Their stated reasons were that public libraries are community libraries and these clients are a part of the community; and, as there is a real demand for this information, library staff wish to respond appropriately.

Barriers for clients in using the public library to get information were:

- Lack of appropriate holdings. There were problems with currency, specificity to locality or region, and funding. For example, the Stanthorpe Shire Library is situated in a district which has an affinity with the New England Tableland so the librarian would like to access information resources from the New South Wales Department of Agriculture library to fulfill some requests.

- Clients’ own perceptions included: not enough time; library staff appeared to be too busy; rather go to the Department of Primary Industries office; use personal networks; engage consultants; take out personal subscriptions; distance to library too great; do not know what information is available; unable to travel; lack of publicity on what is available.

In relation to the suggestion that clients may pay for interlibrary loans services, responses included: we do not get interlibrary loans; we have a limit on the number of interlibrary loans we can request; we do not charge as we absorb the cost in the library budget; we pass the cost on to the client.

**Preliminary Model**

As a result of the project so far, a preliminary model for enhanced coordination of services between the three library systems has been developed.

The elements include:

- Direct access by the public libraries to the Department of Primary Industries library catalogue via ORAQLE
- Inter-library loan request for specific titles found through ORAQLE are sent to the Department of Primary Industries Central Library via QUEST (the ORAQLE interlibrary loans module).
- An effective and efficient working relationship between the local Department of Primary Industries office and the nearest public library.
- Public libraries to operate as Department of Primary Industries level three information centres.
- Public libraries to operate as selling agents for Department of Primary Industries publications.
- The Department of Primary Industries extension officers to provide information on primary industries generally at public library workshops for the education of public librarians.
- The Department of Primary Industries to assist public libraries to access information more easily from departmental publications through training in the use of the publications.
- The Department of Primary Industries staff to provide information on appropriate reference tools and titles on primary industries for general collections in the public libraries.
- DPI Notes (the Department of Primary Industries’ new series of fact sheets) is published on CD-ROM so public libraries may subscribe to the CD-ROM.
- Regular courses on the Department of Primary Industries activities and

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**Table 4 – Categories of Clients in Priority Order.**

<table>
<thead>
<tr>
<th>STANTHORPE</th>
<th>MAROOCHY</th>
<th>REDLANDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hobby Farmers</td>
<td>Hobby Farmers</td>
<td>Hobby Farmers</td>
</tr>
<tr>
<td>Tertiary Students</td>
<td>Tertiary Students</td>
<td>Secondary Students</td>
</tr>
<tr>
<td>Primary Producers</td>
<td>Secondary Students</td>
<td>Primary Producers</td>
</tr>
<tr>
<td></td>
<td>Primary Producers</td>
<td>Tertiary Students</td>
</tr>
<tr>
<td></td>
<td>Consultants</td>
<td>Primary Students</td>
</tr>
<tr>
<td></td>
<td>Primary Students</td>
<td>Agric Science</td>
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<tr>
<td></td>
<td>Local Government</td>
<td>Teachers</td>
</tr>
<tr>
<td></td>
<td>Employees</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shire Councillors</td>
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</tbody>
</table>
information resources to be undertaken for public libraries through the State Library of Queensland Public Libraries Division workshops.

- Regular news items on the Department of Primary Industries information resources may be published in local newsletters to update the public librarians.

- Department of Primary Industries material may be displayed at local community shows and festivals in conjunction with the local public library display to raise awareness in the rural communities of the wealth of information that can be accessed from the local public library and the Department of Primary Industries.

**Further Comments**

The pilot libraries will assist the Department of Primary Industries to tailor its information services to suit client needs according to locality, region and level of sophistication of information required. The pilot libraries will monitor interlibrary loan traffic and costs. This information will be needed to evaluate the draft interlibrary loan policy that has been developed by the State Library and the Department of Primary Industries.

**Conclusion**

The project has provided an opportunity for public and special librarians to work together to provide a timely, relevant and quality information service to clients who live in rural Queensland.

**NOTE**

1. Information centres will be established in a number of towns within the state by the Department. They will provide a unified “shop front” where clients can obtain information from all sections of the Department, previously only available through direct contact with one or more officers. These centres will serve a dual function. Firstly, they will provide self help information facilities for clients. Secondly, they will provide a base for Information Extension Officers to integrate and disseminate information to target groups. The size and format of a centre, and the type of information held will depend on the needs of the area it serves. Level one information centres will be established at major locations, with lower level (two or three) centres at smaller locations.

   Level three information centres also may be located within a business or community service, for example a farm machinery business or a public library.

   —DPI Extension Strategy Statement. Queensland Department of Primary Industries, 1992, (pp. 5–6)

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Communicating Information to Remote Locations Takes Training

Jodee L. Kawasaki

ABSTRACT: Information technologies have the ability to overcome the remoteness which, in the past, has excluded rural people from important societal decisions and activities, including production of goods and services. People residing in developing countries or isolated populations within developed countries need training to use information technologies. In many aspects, the remote populations of developed countries are similar to populations in developing countries. In the United States, many rural areas now have the telecommunications infrastructure because of the Rural Telecommunication Improvements Act 1990 (104 Stat. 4038). Studies done in Mississippi, Louisiana, and Montana show that Cooperative Extension professionals do not have the skills to use the information technologies, much less the knowledge to teach others how to use them. Indicated throughout these studies is the need for training of Extension professionals or other agriculture information professionals so the communication of information can occur in remote areas. These studies also imply that Extension professionals are not always retrieving the most current information available. The 1993–94 Montana study reveals information technology competencies identified as important and needed by the Extension professionals.

RESUMÉ: Las tecnologías de información tienen la capacidad de superar el aislamiento, que, en el pasado, excluyó a los habitantes de zonas rurales de participar en decisiones y actividades sociales importantes, incluyendo la producción de bienes y servicios. Las personas que residen en países en desarrollo, o en poblaciones aisladas dentro de países desarrollados, requieren capacitación para usar las tecnologías de información. En muchos aspectos, las poblaciones aisladas de países desarrollados se asemejan a las poblaciones de países en desarrollo. En los Estados Unidos, muchas áreas rurales actualmente tienen una infraestructura de telecomunicaciones debida a la Ley 1990 de Mejoramiento de las Telecomunicaciones en Areas Rurales (104 Stat. 4038). Los estudios realizados en los estados de Mississippi, Louisiana y Montana muestran que los profesionales de extensión cooperativa no tienen las habilidades para usar las tecnologías de información y, mucho menos, el conocimiento para enseñar a otros cómo usarlas. Estos estudios indican la necesidad de capacitar a los profesionales de extensión y otros profesionales de información agrícola para que la diseminación de información pueda presentarse en áreas remotas. Estos estudios implican también que los profesionales de extensión agrícola no siempre recuperan la información más actualizada disponible. El estudio realizado en Montana en 1993–1994 indicó que los profesionales de extensión agrícola consideran que la capacitación en el uso de tecnología de información es importante y necesaria.

As the third millennium approaches and nations merge into a global economy, information has become increasingly important to businesses, governments, and individuals. Kong and Goodfellow (1988) wrote that:

Information is now viewed as a strategic resource, by both corporations and individuals. Participants in the global economy seek the most current and relevant information to make the most timely and cost-effective decisions. Increased access to information has paralleled an increase in demand for information. However, consumers must now learn to cope with two major obstacles of the information age: information overload and information complexity. The key problem that information consumers face is organizing and sifting through information to find what is usable and relevant. Uncontrolled and unorganized information is no longer a resource (p. 207).

A large-scale survey was conducted in 1988 by LaRose and Mettler to answer the question of who uses information technologies in
rural America. Their findings suggested that “with the exception of cable television, rural residents are just as likely as non-rural residents to have a wide variety of telecommunications technologies in their homes” (p. 56). Rural residents are as familiar with computer technologies as non-rural residents, yet fewer rural residents use telephone technologies such as answering machines. Rural residents’ information needs were discussed by Christenson, Maurer, and Strang (1994) as political issues that are being controlled by the political elite, which includes academe. In the United States, many rural areas now have the telecommunications infrastructure because of the Rural Telecommunication Improvements Act 1990 (104 Stat. 4038).

Information technologies have the ability to overcome the remoteness which, in the past, has excluded rural people from important societal decisions and activities, including production of goods and services. People residing in developing countries or isolated populations within developed countries need training to use information technologies. In many aspects, the remote populations of developed countries are similar to populations in developing countries.

Data and information have traditionally been applied to agriculture by the U.S. Extension Service (ES). In this role the ES acts as intermediary between government and the end user. Information is important in the U.S., yet drastic changes in how it is handled have occurred in this century. The ES needs to continually meet this challenge of change in order to fulfill this role as intermediary.

ES-USDA’s Future Application of Communication Technologies (FACT) committee (1992) found that there was a need to increase staff knowledge and skill in communication and information technologies. The committee members believed that all states should include education/training as a component of their strategic communication, information, and technology plan. Mims, Novak, Simpson, and Davis (1992) stated that:

training users on technology is a necessary component of technology adoption and should be included as part of the implementation process. To use new technology to its fullest, Extension professionals must understand why a particular technology is more useful than the more traditional information delivery methods (p. 626).

With the role as intermediary, ES must adopt an ever-changing role to meet these new challenges. There are databases and electronic networks throughout the United States that Extension professionals have access to via microcomputers. Harriman and Daugherty (1992) provide ideas for changing the staff profile of Extension, not necessarily personnel, but changing how the staff does business and clarifying the kind of expertise that staff should possess. These suggestions include information centers that provide immediate access via technologies to national databases to answer both common and uncommon questions. Harriman and Daugherty suggest many Extension professionals have yet to be effective in electronically acquiring and disseminating information. The question that needs to be asked is: Do Extension professionals receive sufficient training in information access, retrieval, and dissemination?

Studies done in Mississippi, Louisiana, and Montana show that Extension Service professionals do not receive the training needed to use the information technologies, much less the knowledge to teach others how to use them. Indicated throughout these studies is the need for training of Extension professionals or other agriculture information professionals so the communication of information can occur in remote areas. These studies also imply that Extension professionals are not always retrieving the most current information available.

Comparison Studies

Louisiana study done by Smith and Kotrlik (1990) in the Southern Region of the ES included eleven states: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Oklahoma, South Carolina, Tennessee, Texas, and Virginia. County agents were surveyed for their computer anxiety levels. This study showed that agents from these 11 states had computer anxiety levels similar to other professional workers. Computer anxiety levels are an important consideration in the process of incorporating computers into daily work routines suggest Smith and Kotrlik. “Further adoption of computer technology must be handled carefully if anticipated computer anxiety is to be reduced” (p. 12). Smith and Kotrlik recommend that agents be given more opportunities for training and more time to use computers.

The information about computer anxiety levels would be useful to improve the effectiveness of computer skills training. It is very likely that computer anxiety effects the learning process. Computer anxiety needs to be considered when developing training sessions about information technologies. Mims, Novak, Simpson, and Davis (1992) stated that “easing the pain of adopting new technology is not easy, but careful attention to the users’ needs will prevent adoption failure or sluggish adoption” (p. 627).

A study of the Mississippi Extension personnel by Goode and Elliott (1990) found that Extension personnel requested more time for practice and further training. Goode and Elliott recommended computer resources be made available for study and practice during working hours. The study indicates computer training needs of Extension personnel were not being met.

The two studies from Mississippi and Louisiana are slightly different than the Montana study. These studies are directed toward computer usage and skills, whereas the Mon-
Montana Study

The 1994 Montana study by Kawasaki reveals information technology competencies identified as important and needed by the Montana Extension Service (MES) professionals. The study surveyed Extension Service agents and specialists in Montana. Table 1 reveals the rank order of 35 competencies of information technologies. All the competencies were given priority for training by the MES professionals based on their responses. The lower ranked competencies, such as describe gopher or veronica, or identify at least four telecommunication software packages, are the ones to be taught and understood first, so that the higher ranked competencies can be understood and used properly. Even though prior training was available for the MES professionals, the study reveals future training and more time to practice were needed by them.

The Montana study (Kawasaki, 1994) ascertained the respondent’s instructional method and training preferences. Seventy-five percent of the respondents prefer to learn information technologies by working with something tangible, or with others. Learning new material by studying with others and sharing ideas, or performing specific tasks were preferred by 57.9 percent of the respondents. Over eighty percent of the respondents maximize learning through the instructional methods of practical, concrete examples, or clear and definite assignments. The most valuable methods of learning information technologies for more than three-fourths of the respondents were follow an outline or task sheet, or do an internship or practicum.

Time segments preferred for future training by 71.8 percent of the respondents were for half or full day training sessions. The frequency of update training sessions should be 2–4 times per year according to 72.6 percent of the respondents.

Conclusion

These studies suggest that training in computer and information technology competencies are not being met. Time and incentives to

Table 1 – Rank order of information technology competencies for priority training

<table>
<thead>
<tr>
<th>Competency</th>
<th>Rank</th>
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<tbody>
<tr>
<td>Finding electronic information resources relative to your field.</td>
<td>1</td>
</tr>
<tr>
<td>Search electronic resources to locate information.</td>
<td>2</td>
</tr>
<tr>
<td>Use information technologies in distance education.</td>
<td>3</td>
</tr>
<tr>
<td>Recognize legal aspects of storing extra copies of information.</td>
<td>4</td>
</tr>
<tr>
<td>Practice legal and ethical aspects of copyright law for electronic material.</td>
<td>5</td>
</tr>
<tr>
<td>Practice legal aspects of keeping the name of a person who requests information confidential.</td>
<td>6</td>
</tr>
<tr>
<td>Use a telecommunication software package.</td>
<td>7</td>
</tr>
<tr>
<td>Use satellite video.</td>
<td>8</td>
</tr>
<tr>
<td>Evaluate and interpret results of an information search.</td>
<td>9</td>
</tr>
<tr>
<td>Load and use a CD-ROM.</td>
<td>10</td>
</tr>
<tr>
<td>Follow instructions on the computer screen.</td>
<td>11</td>
</tr>
<tr>
<td>Use synonymous terms to expand an electronic search.</td>
<td>12</td>
</tr>
<tr>
<td>In preparing an electronic search, question a person in detail about the information desired.</td>
<td>13</td>
</tr>
<tr>
<td>Transfer a file from Internet to a floppy disk or hard drive.</td>
<td>14</td>
</tr>
<tr>
<td>Use email in distance education.</td>
<td>15</td>
</tr>
<tr>
<td>Email a message that was prepared by word processing.</td>
<td>16</td>
</tr>
<tr>
<td>Use an expert system.</td>
<td>17</td>
</tr>
<tr>
<td>Identify hardware needed for telecommunications networks.</td>
<td>18</td>
</tr>
<tr>
<td>Telnet to a remote computer.</td>
<td>19</td>
</tr>
<tr>
<td>Properly transfer a file using ftp on Internet.</td>
<td>20</td>
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<tr>
<td>Use the Internet almanac.</td>
<td>21</td>
</tr>
<tr>
<td>Recognize that the quality of information varies between different publications.</td>
<td>22</td>
</tr>
<tr>
<td>Exchange messages via email.</td>
<td>23</td>
</tr>
<tr>
<td>Use the Internet gopher.</td>
<td>24</td>
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<tr>
<td>Demonstrate different information technologies to a community group.</td>
<td>25</td>
</tr>
<tr>
<td>Unsubscribe electronically from a news group.</td>
<td>26</td>
</tr>
<tr>
<td>Describe Internet almanac.</td>
<td>27</td>
</tr>
<tr>
<td>Subscribe electronically to a list server.</td>
<td>28</td>
</tr>
<tr>
<td>Describe telnet.</td>
<td>29</td>
</tr>
<tr>
<td>Unsubscribe electronically from a list server.</td>
<td>30</td>
</tr>
<tr>
<td>Subscribe electronically to a news group.</td>
<td>31</td>
</tr>
<tr>
<td>Describe ftp.</td>
<td>32</td>
</tr>
<tr>
<td>Demonstrate different telecommunication software to a community group.</td>
<td>33</td>
</tr>
<tr>
<td>Identify at least four telecommunication software packages.</td>
<td>34</td>
</tr>
<tr>
<td>Describe gopher or veronica.</td>
<td>35</td>
</tr>
</tbody>
</table>
keep current with technology are two crucial points for any one to take note of when considering training sessions for their staff. To enhance training, taking heed of staff’s learning preferences would be useful. An organization will save time and money with successful training sessions the first time. An assessment of the current situation is crucial as revealed by the Louisiana, Mississippi, and Montana studies.

There are many things to consider when training professionals to use information technologies to access information. The U.S. Extension professionals have been studied often enough that one could conclude the training needs of this population were not being met. One must consider the program goals and needs of the individuals when adopting new information technologies, which needs assessment models can evaluate. The results of a needs assessment model allows the organization or program to develop and provide the necessary training for their professional to be successful at communicating information to remote places. In 1980, Borich developed a needs assessment model that could be used in the area of information technologies. The needs assessment determines “the congruence between what should be and what is...The evaluation is complete when the training program has objectively determined the discrepancy between these two poles” (p. 42). In this model, the Extension professional evaluates his/her own knowledge and skills related to information technologies. This is the “what is.” The training/program goals are the “what should be.” The rank ordered information technology competencies resulting from the Kawasaki study (1994), provides a starting point on which to base both the “what is” of individuals existing skills and “what should be” of the agencies’ needs. The needs assessment results will keep the professionals in the intermediary role and keep up with the changing role of information, as the 1994 Montana study has done for the MES professionals.

REFERENCES


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Anne Fox

ABSTRACT: An “International Projects Librarian” to act as a liaison to international development projects is one way to assure the communication of agricultural information. Oregon State University has such a position and was interested in identifying other universities with similar positions. A survey was conducted two years ago to ask about various international efforts of university libraries. One hundred and seventy-eight libraries in the USA and Canada responded to the survey. The results showed that few libraries had an actual position of liaison to international programs, but a high percentage of the respondents said their universities were placing an increasing emphasis on international efforts and their libraries generally supported these efforts. A follow-up study is being conducted by interviewing librarians who do hold designated professional positions to look for similarities, new ideas, and to formulate a model job description. The original survey and follow-up study results are reported in detail in this paper. Countries with rural, agricultural societies will best be served in their information needs if they have electronically up-to-date and access to important publications, researchers, and students are found that library facilities in the project country are insufficient for communication. Libraries have much to offer international development programs, especially ones that link universities, but may often be omitted from the planning stages or left out altogether. It has been my experience that as a project progresses it may be found that library facilities in the project country are insufficient for user needs and the in-country faculty, researchers, and students are without access to important published information in their respec-

RESONE: Una manera de garantizar la diseminación de la información agrícola es que haya bibliotecarios que actúen como personas de enlace en los proyectos de desarrollo internacionales. La Universidad del Estado de Oregón cuenta con esa posición y se interesó en identificar otras universidades con puestos similares. Hace 2 años la Universidad realizó una encuesta para identificar los diversos esfuerzos a nivel nacional de las bibliotecas universitarias. Un total de 178 bibliotecas en los Estados Unidos y Canadá respondió a la encuesta. Los resultados indicaron que pocas bibliotecas tenían una posición real de enlace con programas internacionales, pero un alto porcentaje de las universidades encuestadas dijo que estaban dando mayor importancia a los esfuerzos internacionales y que sus bibliotecas generalmente apoyaban esos esfuerzos. Se está haciendo un seguimiento, mediante encuestas, a los bibliotecarios que sí ocupan posiciones profesionales establecidas para encontrar similitudes y ideas nuevas para luego formular una descripción de un puesto modelo. En el documento se incluye la encuesta original y se detallan los resultados del estudio de seguimiento. Se atenderán mejor las necesidades de información de los países con poblaciones agrícolas rurales, si las bibliotecas y los centros de información de las universidades agrícolas locales tuvieron acceso a medios electrónicos actualizados y estuvieran orientados hacia el servicio. Los proyectos de desarrollo con componentes de biblioteca desarrollados pueden garantizar mejores posibilidades de comunicación.

UNO EXCELENTE WAY way to assure the communication of agricultural information in remote areas is for university libraries to become active in international development projects sponsored by their institutions. Universities in the more developed world have projects in place worldwide to assist lesser developed countries in building strong institutions of higher learning and often these institutions have an agricultural emphasis. University libraries can work closely with these international development efforts to assure libraries are given a strong emphasis in the original planning of projects.

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tive fields. A library component may hastily be added to the project after the fact. Librarians with international interests can be strong advocates for the inclusion of library components in the first place.

My philosophy concerning these international projects and generally concerning access to information for researchers in developing countries is as follows:

- **Access to information**: Students, educators, researchers, and documentalists in developing countries would benefit greatly from having access to current information in their fields: journal articles, conference proceedings, international research center reports, to name a few.

- **Skills to locate information**: Library research skills are needed to make good use of the literature and should be taught in conjunction with opening new avenues, the access itself.

- **Sustainability**: When provided with the proper skills and access, these researchers and documentalists will be empowered to work independently, exploring the literature on their own, and thus have greater control over the information they retrieve, the direction of their research and the development of their own country. This third point is the central theme of what I have to say today. Local researchers, agricultural agents, and librarians will best know the information needs of their rural communities, and given access to available information and tools to compile their own databases will be able to work toward fulfilling those needs.

One way for university libraries in the U.S. to make an important commitment to sharing information and expertise with libraries in developing countries is to support and take an active part in development projects. An important step toward getting involved in university development projects is to designate a professional position on the library staff, as an “International Programs Librarian.” That person will bring visibility for the library and act as a liaison to the offices at their universities planning these projects.

Oregon State University in the US has such a position, and we were interested in identifying other universities with similar positions. Thus, a survey was conducted to ask about various international efforts of university libraries. 178 libraries in the US and Canada responded to the survey, (mostly university libraries and mostly from the U.S.). The results showed that few libraries had an actual position of International Librarian who acted as a liaison to international research and development offices, even though such offices existed on many campuses. By comparison, a high percentage of the respondents said their universities were placing an increasing emphasis on international efforts, and their libraries generally supported these efforts.

Specific results of the survey showed that of the 178 respondents who were asked “Does your university have an office of international research and development, sometimes called international programs?” 120 or 67.4% answered “yes” and of the responding land-grant schools, a subgroup of schools with an agricultural emphasis, 91.1% said “yes”. But when asked if there was a specific librarian on their staff who acted as a liaison to that office 85% said “no” and even 80% of the land-grant schools said “no”. When asked if their library had a professional position designated to relate in some way to international services, not just international development, 89% said “no” and 91% of the land-grant schools said “no”. Assuming the results of the two questions can be combined with only two schools answering “yes” to both questions, that would show only 25% of the responding libraries with some formal position.

As I mentioned earlier, two general questions in the survey asked about the emphasis placed on internationalizing their universities and their libraries. Two thirds (65.7%) said there was either much more or somewhat more emphasis to internationalize their campus and half (48.6%) said the same for their libraries. Overall, the survey showed a growing awareness that we are part of a global community, but what university libraries see as their role in supporting international development is less clear. They may offer support, but often it is not in a formalized way.

Along with questions asking for “yes” and “no” answers, this survey asked for comments, descriptions, etc. Careful evaluation of these added notes, attached job descriptions and international program descriptions showed many similarities in the international efforts of the responding libraries. Providing special services for international students, building collections in area studies, supporting overseas study opportunities for U.S. students were all fairly common ways libraries obtained an international presence. That someone on their library staff had had some international experience was also often mentioned.

In looking closely at the professional titles of the respondents to my question #2, actual liaison positions, it was clear that many of these persons would spend much of their time on duties other than international research and development activities. They were often library directors, associate university librarians for administration and planning, for public services, or for collection development. In some cases their main international liaison contact may come from serving on a university council overseeing international programs. In other cases the liaisons were particular subject specialists in various areas, but were often people who had a personal interest in international librarianship. There are two hazards here, in the first case, the person may be too busy to give this international aspect of his/her job much attention, or, in the second case, those with a special interest in this area may move on to
other positions and the international participation is lost.

A recent follow-up questionnaire and informal telephone and email interviews with some representatives of the small group of libraries who actually had a liaison to international research and development on campus brought forth a variety of ideas and examples of excellent programs now in place. Outstanding examples of library dedication to international programs in U.S. university libraries include the Mortenson Center for International Librarianship at the University of Illinois at Urbana-Champaign and the Center for International Library Programs at Duke University in North Carolina.

The following description of international liaison activities was developed from ideas gathered from the survey, from personal contacts and my experience in working with the Office of International Research and Development at Oregon State University. First of all, university librarians who are international liaisons must become familiar with their university’s overseas development projects, faculty on assignment abroad, and the international research and development staff on their campuses.

Once the librarian is familiar with the institution’s international activities, they can begin by promoting existing library services such as general reference services, database searching, document delivery, special tours for international visitors. The librarian can also provide needed information, promptly upon request, to the office of international research and development staff. The OSU Libraries’ experience is that this staff is often working under great pressure and meeting many deadlines. The pace is faster than in most academic departments on campus, and thus service must be adjusted to their special needs. By working closely with this staff the librarian can identify what information will be most useful to them.

Maybe it’s sharing a new site on the World Wide Web, giving advice on CD-ROM hardware or database selection, locating a colleague’s email address, or gathering articles for a project director going overseas in a couple days. In general, libraries need to stress that they provide services to all members of the university community, including offices and programs which are not traditionally defined academic departments and especially to programs with an international emphasis.

Now there is the important issue of a library component being written into a development proposal or one growing out of a recognized need once a project is in progress. Much money is being spent on international development projects, and librarians should advocate to make sure some of it is directed toward information access and information exchange. Librarians can provide valuable assistance through collecting information for and participating in the proposal writing process. They may also directly participate as consultants going abroad, working closely with the project or country university library to select a core collection and needed bibliographic awareness tools, to connect to the Internet and to establish some type of document delivery which can be an ongoing service.

Finally, these library components should be designed to allow flexibility and to be a cooperative effort. Providing information and information access to those who in turn provide it to the rural areas of the developing world is important as is assisting those who come to teach and study on our campuses, but, in the end, endeavors which seek to open access to information directly to rural communities in the developing world should be our highest priority. We want to be careful not to tie up information access behind closed doors, as was mentioned in an earlier paper. The ideal would be to encourage libraries and information centers in developing countries to open their doors, to develop a strong public service attitude.

In conclusion the survey showed:

- A fairly strong international focus in U.S. universities and their libraries.
- U.S. university libraries can do a better job at selling their usefulness to international development.
- Greater access to information and technology is needed around the world, but...
  - Researchers in developing countries need more than just a CD index or abstract.
  - Researchers in developing countries should contribute to the body of available literature.
- Sustainability and funding are key issues which haunt us and they are closely linked.

Countries with rural, agricultural societies will best be served in their information needs if they have electronically up-to-date and service oriented libraries/information centers in their local agricultural universities. Development projects with strong library components and flexibility can be a step in the right direction. University librarians around the globe, communicating the information needs of their country’s rural population and their ideas for better access to the worldwide body of agricultural literature can make a positive difference for these rural populations.

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The Concept of the Literature and Factual Data Management System LIMAS

M. Plath, A. Mangstl, J.M. Pohlmann, H. Friedrich

ABSTRACT: In the intention to offer agricultural information which can meet user demand and economic requirements, the German Centre for Agricultural Information and Documentation (ZADI) is developing a new literature and factual data management system (LIMAS). Using LIMAS the EDP-aided processes of database production will be put on a new basis. The new implementations originate from the rightsizing of the software and hardware environment. A client-server based PC-network will be used instead of the mainframe environment. The cooperating documentation centres will develop from isolated input suppliers into a computing workgroup. The developing tools are characterized by modern techniques as CASE-tools, modern database architecture, and graphical user interface. In addition to more efficient production processes, LIMAS includes a variety of standardized database analyses. Scientometric and bibliographic analyses and graphics will be implemented. An overview of the database contents is available at any time. The user will control the system with standardized control elements. The knowledge of a retrieval language will not be required.

RESUMÉ: Dans l'intention d'offrir une information agricole qui puisse répondre à la demande des utilisateurs et aux exigences économiques, le Centre allemand d'information et de documentation agricole (ZADI) est en train de développer un nouveau système de gestion de la littérature récente et des données factuelles (LIMAS). L'utilisation de LIMAS donne une nouvelle base au processus de production de bases de données assistées par l'EDP. Les nouvelles réalisations ont leur origine dans l'adaptation adéquate des logiciels et de l'équipement informatique. Un réseau d'ordinateurs individuels basé sur le système client/serveur sera utilisé à la place d'un ordinateur central. Les centres de documentation membres du réseau cesseront d'être des fournisseurs de données isolées pour former un groupe de travail en réseau. Les instruments de développement seront des techniques modernes, comme les instruments CASE, les bases de données avec une architecture moderne et l'interface graphique pour les usagers. En plus des processus de production plus efficaces, LIMAS comprend une variété d'analyses standardisées. Des analyses scientométriques et bibliographiques peuvent être réalisées, ainsi que des graphiques. Le résumé du contenu de la base de données est disponible à tout moment. L'utilisateur contrôlera le système contenant des éléments standardisés de contrôle. Aucune connaissance du langage d'interrogation sera nécessaire.

RESUMEN: En un intento por ofrecer información agrícola que pueda responder a la demanda de los usuarios y a los requerimientos económicos, el Centro Alemán de Información y Documentación Agrícola (ZADI, su acrónimo en alemán) está desarrollando un nuevo sistema de manejo de literatura y datos objetivos (LIMAS). La utilización de LIMAS dará una nueva base a los procesos de producción de bases de datos ayudados por EDP. Las nuevas implementaciones se originan de la adaptación adecuada del ambiente de programas y equipo de computación. Se utilizará una red en PC basada en el sistema cliente/ servidor en vez de un computador central (mainframe). Los centros de documentación participantes pasarán a ser proveedores de insumo aislados a formar parte de un grupo que trabaja en forma sistematizada. Las herramientas que se están desarrollando se caracterizan por ser técnicas modernas, como las herramientas CASE, bases de datos con arquitectura moderna y una interfaz gráfica para el usuario. Además de procesos más eficientes de producción, LIMAS incluye una variedad de análisis standardizados de bases de datos. Se implementarán análisis científico-métrico y bibliográfica, además de gráficas. El resumen del contenido de la base de datos estará disponible próximamente. El usuario ma

articles, are indexed for the ELFIS database with FAO’s AGROVOC thesaurus. Together with the bibliographic data and the abstracts (if available) the descriptors are loaded into a text oriented input-program.

The input data is delivered separately to ZADI in Bonn every few months and ZADI puts together the single pieces from all over Germany. After being processed, the cumulated data is finally joined in the ELFIS database, which is stored on a mainframe host computer at the German Institute for Medical Documentation and Information (DIMDI) in Cologne. The ELFIS database is updated monthly. The input delivered to ELFIS is delivered to FAO’s database AGRIS, as well. The host can be accessed by telecommunications and special communication software, software for emulation and the knowledge of the CCL-based retrieval language for DIMDI’s own database management system GRIPS is required.

Although this kind of processing has been operating effectively for years, it is not easily accessible for users at governmental and scientific institutions and the ZADI staff itself. Some reasons for this include:

- Access to the databases is difficult even for the database producer ZADI, special technical equipment and special conditions are necessary for user “everyone” who wants to get access.
- The database management system GRIPS offers apart from ordinary searches very limited abilities referring to scientometrical and statistical problems.
- The ZADI has no influence on the developments at DIMDI referring to the GRIPS-system.
- The user interface of the mainframe computer does not meet user needs any more.
- Data retrieval is limited to information expert searchers who have the knowledge of the system and the retrieval language.

To meet user demands and economic requirements, ZADI is now developing LIMAS, a literature and factual data management system. LIMAS will not only change the existing way of database production, referring to data input and data processing; moreover, it will offer a new way of user access and various features for information retrieval. The philosophy is, to rightszie the system away from mainframe environment towards a client-server based PC-Network. The cooperating documentation centres will develop from isolated input suppliers into a computing workgroup. The platform for communication will be WIN, which is a German part of the Internet.

First, the ELFIS database has to be stored on the ZADI’s own server in Bonn and a communication server will be connected to the WIN/Internet under TCP/IP. The documentation centres have to connect their local networks to the WIN/Internet, as well. (Figure 2).

It needs powerful tools to handle the duties of a new information net-

Figure 1 – German Information System on Food, Agriculture and Forestry
work. ZADI has chosen Oracle to be the database management system for LIMAS. In this system bibliographic and factual data are stored in a variety of relational database tables. In addition to the modern database architecture, Oracle offers:

- **Case-Tools**, to design the database structures and relations.
- **Forms**, to generate own input forms in the graphical user interface.
- **Reports**, to develop standardized database searches and standardized output formats.
- **Graphics**, to generate standardized statistically reports into graphics.

Moreover, Oracle allows free-text searching and a graphical user interface as a Windows application. To use Oracle as a programming tool, special knowledge of programming languages is not required because of its graphical interface, but strongly recommended. SQL++ and SQL are integrated.

How will the workgroup computing between the documentation centres and the ZADI proceed in the near future? Each documentation centre will have the LIMAS-INPUT program running on its own local network. The newly created LIMAS-INPUT module allows data input not only by typing but input via scanner and OCR-Software or uploading will be possible as well because of data interfaces. The AGR-ROVOC-thesaurus, the subject categories, the specific catalogue of periodicals, tables of authors, institutes and more will be available directly out of the ELFIS database. Indexing can be done directly at the workstation with user friendly features like “thesaurus on screen” and “searching through free descriptors”. Bibliographic data like the exact journal titles can be chosen out of already prepared submenus by a mouse click thus avoiding errors in typing. Manual input will be checked before saving in the document file.

While being worked on by different staff members, input can be stored on the local server’s hard disk. This allows for possible time delays between indexing, input of bibliographic data and abstract typing. Inputting can also be shared among the workgroup for further processing.

If a documentation unit is declared to be completely processed, then its data will be delivered via the WIN/Internet to the central server at the ZADI in Bonn and put directly into the ELFIS database. At best case, an article could be in the database some hours after being published and ready to be retrieved. Even at not best case, input with LIMAS-INPUT is even faster and more comfortable then it was before. Delivering input to the AG-RIS-Processing-Unit (APU) in Vienna will be similar to the procedure described above.

LIMAS will also provide easy retrieval in the database. No knowledge of a retrieval language is required. Refering to ZADI’s databases, the documentation centres will have no more host fees and less costs for telecommunication. Connected to the ZADI server via the WIN/Internet, a graphical user interface, corresponding to LIMAS-INPUT, will allow for browsing through the database fields, to search for articles, or to run already preprocessed searches.

Additional to common retrieval functions, LIMAS will offer standardized control elements to overview the database contents at any time. Scientometric and bibliographic analyses will be available as well as graphical information. These forthcoming features will help each documentation centre to monitor and to control its own work.

**Conclusion**

GAIN is the contribution of ZADI to satisfy the demands of science, administration and industry for information. The concept of the literature and factual data management system LIMAS, the “workgroup computing” and the developing tools for the database correspond to modern strategies of information resource management. The acceptance of future users of the information system will prove, whether the concept of LIMAS has been the right alternative choice to a common mainframe computer host systems.

To think ahead, some of ZADI’s databases may be accessible through the Internet for the world public into the future. Therefore, LIMAS, as a part of the German Agricultural Information Network, will be the gateway to it.

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Poster Sessions
Poster Sessions were exhibits of information projects from around the world. For more information about the topic, contact the author directly at the address provided.

Exposition de posters
Exposition de posters sur des projets d’information dans le monde entier. Pour obtenir de plus amples informations sur un des projets, veuillez contacter directement l’auteur grâce à l’adresse indiquée pour chaque poster.

Sesiones de Carteleras
Las sesiones de carteleras constaban de presentaciones de los proyectos de información de todo el mundo. Para más información sobre el tema, contactar directamente al autor en la dirección suministrada.

Michal Demes, Jan Simko
The Institute of Scientific and Technical Information for Agriculture in Nitra and it’s Activities in Slovakia’s Agro-industrial Sector
Describes the activities of the Institute which include providing scientific, technical and economic information for the agricultural sector of the Slovak Republic from information sources.

L’Institut d’information scientifique et techniques en agriculture à Nitra et ses activités dans le secteur agricole de Slovaquie
Décrit les activités de cet Institut tout en fournissant de l’information scientifique, économique et technique sur le secteur agricole de la république de Slovaque.

El Instituto de Información Científica y Técnica para la Agricultura en Nitra y sus Actividades en el Sector Agroindustrial de Eslovaquia
Describe las actividades del Instituto, las cuales incluyen la provisión de información científica, técnica y económica para el sector agrícola de la República de Eslovaquia, extraídas de diversas fuentes de información.

Joachim Diederich, Gerard D. Finn, Raymond Lister, Liang Gang Zhang, Don Simonette, Robert Young
Batch Prediction System for the Dairy Sire Breeding Project
Describes B-CONNECTIBULL, a software program developed at Queensland University of Technology, to aid farmers in making informed decisions on the sires wanted for mating in their diary herd.

Système de sélection de reproducteurs pour le projet d’amélioration de la production d’élevage laitière
Décrit le logiciel B-CONNECTIBULL développé par l’Université de Technologie du Queensland, pour aider les agriculteurs à prendre des décisions avisées sur les meilleurs reproducteurs pour leur cheptel laitier.

Sistema de Predicción por Tandas para el Proyecto de Mejoramiento de Sementales en Ganado Lechero
Describe un programa de computador—B-CONNECTIBULL—desarrollado en la Universidad Tecnológica de Queensland, para apoyar a los agricultores en la toma de decisiones sobre los sementales deseados para el apareamiento en su hato lechero.
Arun Kashyap

TREECD Workstations in Asia and the Pacific—
Experiences of Selected Forestry Research Institutions

Presents the results of an initial user survey that has been conducted for the sites that received TREECD workstations under the ADB-UNDP funded Forestry Research Support Program for the Asia Pacific (FORSPA) and the AIDAB sponsored program in support of forestry research and development in the Southeast Asia.

Les sites TREECD en Asie et dans le Pacifique:
expériences de certaines institutions de recherche en foresterie

Présente les résultats de l’enquête initiale sur les utilisateurs, faite auprès des sites TREECD installés grâce au projet de soutien pour la recherche en foresterie dans le Pacifique asiatique (FORSPA) sponsorisé par l’ADB-UNDP, et au projet de soutien pour la recherche et le développement en foresterie dans le Sud-ouest de l’Asie, sponsorisé par l’AIDAB.

Terminales de TREECD en Asia y el Pacífico:
Experiencias de Instituciones de Investigación en Ciencias Forestales Seleccionadas

Presenta los resultados de una encuesta inicial de usuarios que se realizó para los sitios que recibieron terminales de TREECD con el auspicio del Programa de Apoyo de Investigación en Ciencias Forestales para el Pacífico Asiático (FORSPA, por su acrónimo en inglés), financiado por ADB-PNUD, y el programa patrocinado por AIDAB para apoyar la investigación y el desarrollo en ciencias forestales en el Sudeste Asiático.

Glyn Rimmington, Janet Hoare, H. Stuart Hawkins

LandcareNet—an Electronic Network of Agriculture and Nature Conservation

Describes LandcareNET, a telecommunications network that provides a wide range of communication services such as electronic mail at an affordable cost.

LandcareNet : un réseau électronique
sur l’agriculture et la conservation de la nature

Décrit LandcareNet, un réseau de télécommunication qui fournit une grande variété de services de communication tels que le courrier électronique à bon marché.

LandcareNet, una Red Electrónica de Agricultura y Conservación de la Naturaleza

Describe una red de telecomunicaciones LandcareNET que suministra una amplia gama de servicios de comunicación, como el correo electrónico, a un costo accesible.

A. Mangstl, K. Grossman, J.M. Pohlman

Availability of Factual Data in an Information Network

Describes decentralized availability of information and central information guides (metadatabank) of the information network that will be coordinated by the German Centre for Agricultural Documentation and Information (ZADI) for factual data.

Disponibilité de données factuelles sur un réseau d’information
Décrit la disponibilité décentralisée d’information factuelle et de guides d’information sur le réseau d’information factuelle qui sera coordonné par le Centre allemand de documentation et d’information agricole (ZADI).

Disponibilidad de Datos Objetivos en una Red de Información

Describe la disponibilidad descentralizada de información y las guías principales de información (banco de metadatos) de la red de información. Esta red de datos objetivos será coordinada por el Centro Alemán para la Documentación y la Información Agrícola (ZADI, por su acrónimo en alemán).
Jill Maughan

Defeating Distance in Western Australia:
Networking in the Department of Agriculture

Describes the use of information technology to deliver information to the decentralized staff of the Department of Agriculture in Western Australia.

Vaincre la distance en Australie de l’Ouest :
travailler en réseau au sein du Département sur l’agriculture

Décrit l’utilisation de la technologie d’information pour fournir l’information au personnel du Département sur l’agriculture, décentralisé en Australie de l’Ouest.

Derrotando la Distancia en Australia Occidental:
Uso de Redes en el Departamento de Agricultura

Describe el uso de la tecnología de la información para entregar información al personal del Departamento de Agricultura de Australia Occidental que no trabaja en la sede principal.

Nikola Kezic

Agricultural Libraries in the Republic of Croatia

Describes the agricultural libraries that are part of the Croatian Academic and Research Network (CARNET) in the Republic of Croatia.

Bibliothèques agricoles en République de Croatie

Décrit les bibliothèques agricoles membres du réseau académique et de la recherche CARNET en République de Croatie.

Bibliotecas Agrícolas en la República de Croacia

Describe las bibliotecas agrícolas que forman parte de la Red Croata de Académicos y de Investigación (CARNET, por su acrónimo en inglés) en la República de Croacia.

Jan Scott, John Weckert, Geoff Fellows

Remote Explanation

Describes networking of expert systems to provide information to remote locations.

Explications à distance

Décrir un réseau de systèmes experts fournissant l’information à des lieux éloignés.

Explicación Remota

Describe el uso de redes de sistemas expertos para suministrar información a localidades remotas.

Marcelino Jojo Luis Tabago, Jr.

Content Analysis of the Programs “Lingkod Bayan”
and “Tarlac Ngayon” over DZTC

Explores the possibility that values can be communicated through music.

Analyse du contenu des programmes ‘Lingkod Bayan’
et ‘Tarlac Ngayon’ via DZTC

Explore la possibilité de communiquer des valeurs par la musique.

Análisis de Contenidos de los Programas “Lingkod Bayan”
y “Tarlac Ngayon” en DZTC

Explora la posibilidad de que los valores puedan comunicarse a través de la música.

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Bridging the Gap with Appropriate Agriculture Information Systems

Discusses use of technology such as radio or film in the transfer of information. The links with organizations such as the South Pacific Commission and the University of the South Pacific are described.

Systeme d’experts pour communiquer l’information sur les cultures sequentielles

Decrit un systeme pilote de decision pour les cultures sequentielles, developpe pour l’agriculture en zone aride du nord-ouest de la province Victora d’Australie.

An Expert System to Communicate Information About Crop Rotations

Describes a prototype of a knowledge-based decision support system for crop rotation that has been developed for dryland agriculture in north western Victoria Australia.

Un Sistema Experto para Comunicar Información acerca de la Rotación de Cultivos

Describe un prototipo de un sistema para apoyar la toma de decisiones respecto a la rotación de cultivos, que se basa en los conocimientos existentes. Este sistema fue desarrollado para la agricultura de secano del noroccidente de Victoria, Australia.
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Agricultural Information Resource Centers
A WORLD DIRECTORY 1995

Jane S. Johnson, Rita C. Fisher, Carol Boast,

The International Association of Agricultural Information Specialists (IAALD), in cooperation with the Technical Centre for Agricultural and Rural Cooperation (CTA), is pleased to present an updated and enlarged directory of agricultural libraries and documentation centers. The Directory includes complete addresses and phone numbers for over 3,500 libraries and documentation centers from 250 countries. Most entries also include size, subjects, and language of collections; type of institution; type of materials collected; services provided; name and phone number of the director; and information on databases maintained and/or searched. Available telex and telefacsimile numbers, and e-mail addresses are also given. The primary language of the directory is English, but names of institutions in other romanized languages have been included if provided.

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Boletín Informativo de AIBDA. Secretaría Ejecutivo de AIBDA, c/o Centro Interamericano de Documentación e Información Agrícola (IICA/CIDIA), Turrialba, Costa Rica.

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