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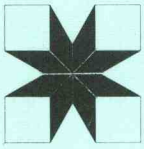
INFORMATION DEVELOPMENT

The International Journal for Librarians, Archivists and Information Specialists

EDITED BY
J. Stephen Parker

THIS ISSUE

IDRC



CANADA

IDRC

TWENTY YEARS IN INFORMATION DEVELOPMENT

VOLUME 6
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INFORMATION DEVELOPMENT

THE INTERNATIONAL JOURNAL FOR LIBRARIANS, ARCHIVISTS AND INFORMATION SPECIALISTS

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Contents

Unless otherwise stated, all photographs are supplied by the authors of the articles in which they appear.

IN MEMORIAM

We dedicate this special issue of *Information Development* to the memory of Pauline Ann Oswitch (née Thomas). Pauline passed away after a brief illness on Thursday, November 16, 1989.

She had devoted much of her life to the study of library and information sciences. Her assignments included Senior Research Officer at ASLIB, consultant to the British Library, Associate Research Fellow at University College, London, England, and Visiting Lecturer at the University of Western Ontario, London, Ontario. More recently, with IDRC, Pauline concentrated her energies. to the advancement of information sciences in the Third World as evidenced by her article contained in this issue on the role of the information professional in development. This was one of her last pieces of work and is a fitting testament to a person who had dedicated herself to this field. She will be deeply missed by all those who met her — both in the South and the North. Those of us at IDRC who had the benefit of her expertise and the pleasure of working with such a charming person over the past several years, will miss her dearly. Her memory will live on in her writings; she has left an indelible mark on each one of us.

Colleagues at the International Development Research Centre, Ottawa, Canada

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IDRC and information development: twenty years of achievement

This issue of *Information Development* is devoted exclusively to the information activities of the International Development Research Centre (IDRC), which marks its twentieth anniversary this year. IDRC is a public corporation created by the Parliament of Canada in 1970 to support research designed to adapt science and technology to the needs of the developing countries. Although IDRC is funded entirely by the Canadian Parliament, to which it reports annually, its operations are guided by an international Board of Governors with twenty-one members. The Centre's headquarters are in Ottawa; regional offices are located in Africa, Asia, Latin America and the Middle East.

A major criterion in IDRC's selection of projects is that proposed activities should fit within a priority expressed by a developing country government or research institution. Since 1970, IDRC has funded almost 4,000 research and research-related projects which have been identified, designed and managed by Third World researchers. Institutions in more than 100 countries have received IDRC grants.

During the last two decades, researchers and scientists, using IDRC funds, have demonstrated their ability to improve the life of people in Third World countries by developing increased supplies of food and potable water, improved education and health services, more reliable data for decision-makers, and better access to information.

IDRC is unique among development-aid agencies in that it has, from the start, maintained a major programme in the information sciences. This programme's mission is to provide access to information for researchers, policy-makers, information professionals, practitioners and the rural and urban poor in developing countries. Since its inception, the Information Sciences Division of IDRC has supported more than 500 projects in ninety-five countries with a total value of Can$90 million.

The seven articles presented in this issue provide an in-depth view of the activities of the Information Sciences Division. The first contribution is an introductory paper by Paul McConnell which sets the scene with a discussion of the history of IDRC and the evolution, mandate, past experiences and future directions of the Information Sciences Division. The Division's work takes on increasing significance as the 'information society' rapidly becomes a reality.

Continuous technological advances in the processing, storing, retrieving and disseminating of information are described in the second paper, by Peter Browne and Terry Gavin. Also discussed are the various technologies the Information Sciences Division has adopted as well as developed for its projects.

These new techniques have dramatically affected traditional information-handling methods; this unveils a challenging new frontier for information specialists,

who are now forced to change with the times and redefine their roles. Pauline Oswitch examines this issue in the third article, with particular emphasis on the implicit role of the information specialists in IDRC projects.

We then proceed to a topic in which technology and human expertise combine in the collection, dissemination and sharing of information across countries and continents. Shahid Akhtar presents the fourth paper on the Information Sciences Division's experiences with information networking, particularly in Latin America where much infrastructural support has been provided.

With all these information structures in place, who are the ultimate beneficiaries and how useful is certain information to those whom IDRC aims to help—the rural and urban poor of developing countries? An analysis of the users of information services constitutes the fifth paper, by Gisèle Morin-Labatut. The central argument here is that information should be packaged for potential users in a way that is culturally acceptable and relevant to local conditions.

Kerry Broadbent offers the sixth paper, which deals with information services aimed at the rural sector. Rural development practices have gained much support over the past ten years, and the Information Sciences Division is involved in developing and maintaining an active information policy in this sector.

The final article in this series discusses a regional information strategy developed by the Division. Alioune Camara presents a review of the Division's experiences in Africa, which recently became a top priority region for the provision of information services and systems.

The authors would like to take this opportunity to thank Ms. Tavinder Nijhawan for collecting and analysing background material and for helping in the overall coordination of the articles presented in this issue.

Shahid Akhtar, Guest Editor

Shahid Akhtar is an Associate Director, Information Sciences Division, International Development Research Centre, Ottawa, Canada

INFORMATION DEVELOPMENT NEWS

PACIFIC MARINE RESOURCES INFORMATION

Island states in the South Pacific are collaborating with the International Centre for Ocean Development (ICOD) in the creation of a Pacific Islands Marine Resources Information System (PIMRIS), which will involve the establishment of a network of information centres in the region. The project will enhance the library services of participating institutions, increase their holdings and establish a regional online database.

Further information from
International Centre for Ocean Development, 5670 Spring Garden Road, 9th Floor, Halifax, Nova Scotia, Canada B3J 1H6. Tel: (902) 426-1512; Tlx: 019-21670 ICODHFX; Fax: 902-426-4464.

Source: *ICOD Info, vol. 1, no. 2, 1988.*

NEWS FROM IFLA

Unless otherwise indicated, further information on IFLA activities is available from
IFLA Secretariat, POB 95312, 2509 CH The Hague,Netherlands.

UBCIM programme moves

Responsibility for the IFLA Universal Bibliographic Control and International MARC Programme (UBCIM) is to be transferred from the British Library in London to the Deutsche Bibliothek in Frankfurt from April 1990.

ISBD manual

IFLA has been awarded a Unesco contract to prepare a manual on the application of International Standard Bibliographic Descriptions (ISBDS). The manual is intended to serve as a reference and training aid and will include examples drawn from publications in various languages.

New Asia Regional Manager

Ms. Pongpan Rattanabusit, Librarian to the British Council Library in Bangkok, Thailand, had been appointed Manager of the IFLA Regional Office for Asia and Oceania.

PERSONAL NEWS

Stephen Parker, Editor of *Information Development*, undertook a three-month assignment at the International Water Supply and Sanitation Centre

(IRC) in the Netherlands from 1 October to 31 December 1989.

Joyce Butcher, former Head of Record Creation at the British Library, has been appointed to the new post of Director of Acquisitions Processing and Cataloguing, while **Stuart Ede**,former Head of the Library's Consultancy Service, has been made Director of the National Bibliographic Service. The posts have been created following the Library's decision to move some of its activities from London to Boston Spa in West Yorkshire.

David Spiller, until recently head of the British Council's libraries, books and information programme in India, has replaced **Gillian Roche** as Director of the Council's Libraries Department in London. Gillian Roche will take up the new post of British Council Representative in the Caribbean, based in Kingston, Jamaica.

CDS/ISIS INFORMATION

Alan Hopkinson

This is the third of a series which is to be a regular feature in which we hope to be able to exchange information about the CDS/ISIS software package. Readers who have any comments, queries, suggestions, hints or advice on the use of the package are invited to send them direct to

Alan Hopkinson
Information Systems Manager
Institute of Development Studies at the University of Sussex
Brighton BN1 9RE
United Kingdom

Please ensure that you state whether the comment or query refers to version 1 or version 2.3.

In this issue, we deal mainly with matters concerning version 2.3. We also have our first query which arrived just in time for inclusion in this issue.

RELEASE OF VERSION 2.3

Version 2.3 of CDS/ISIS was formally released in March 1989 with the completion of its manual which is a welcome improvement on the manual for version 1. (1) By now, many users will have received version 2.3, so this column will in future concentrate on the new version. Many features of version 1 have remained the same, but there are a large number of additional features in version 2.3. These are detailed below. Note that version 2.0 was never on general release.

INSTALLING VERSION 2.3

Version 2.3 has extra features which are optional. They have to be selected on installation, but are well-worth using. For instance, files required for the running of the program may be placed in a separate subdirectory from the databases. However, installation is now more difficult, and many users are having problems. Obviously, installation should not be attempted without a copy of the manual: the instructions are found on pp. 18-19. The easiest way of installing the files from the diskettes is to use INSTALL, but having copied INSTALL.BAT into the directory where you wish to install the ISIS software, you have to add the necessary parameters to the install command as at the top of p. 20. It is easiest to create the directories and subdirectories with the names suggested on p. 19. However, if you already have a directory called ISIS on your microcomputer containing version 1, then you have to call the new directory by another name, e.g. ISIS2. You will have to type at the DOS prompt:

```
MD \ISIS2
CD \ISIS2
MD SYS
MD MENU
MD MSG
MD DATA
MD PROG
```

When you run INSTALL, you must then type

```
INSTALL \ISIS2 \SYS \ISIS2 \MENU \ISIS2 \MSG
\ISIS2 \DATA \ISIS2 \PROG
```

[all on one line]

If, by mistake, you type ISIS and not ISIS2 in that line, the files will not be copied correctly, and data in the ISIS directory (which will most probably contain version 1) may be corrupted.

After installing the software on your computer, there will still be more to do before the program can be run. A file called SYSPAR.PAR has to be created as on p. 20 of the *Manual*. If you used the directory ISIS, create it as described in section (e) on p. 20. If you have created a directory ISIS2, then SYSPAR.PAR should be created as follows:

```
1=\ISIS2 \PROG\
2=\ISIS2 \MENU\
3=\ISIS2 \MSG\
4=\ISIS2 \
5=\ISIS2 \DATA\
```

If you do not know how to use EDLIN, this file can be created in any wordprocessor. Create the file as a non-document or unformatted file, if those options are available. You may have to call the file SYSPAR, if the wordprocessor will not accept SYSPAR.PAR, and you will probably end up with a file called SYSPAR.TXT or SYSPAR.DOC. Go to the MS/DOS prompt and type:

```
REN SYSPAR.DOC SYSPAR.PAR
```


or similar, to give the file the name it needs for CDS/ISIS.

You then have to copy the file to the directory in which you wish to run ISIS (e.g. ISIS or ISIS2). Also, in the file AUTOEXEC.BAT in the root directory, you have to include a line:

PATH=C:\ISIS\SYS or PATH=C:\ISIS2\SYS

If there is already a line beginning PATH..., you have to add at the end ;C:\ISIS\SYS or ;C:\ISIS2\SYS as instructed on p. 20.

You should then be in a position to run the program, by typing ISIS. If it still does not work, check that you have a CONFIG.SYS file containing lines:

FILES = 24
BUFFERS = 24

If the program still does not work, check that you have been consistent in the use of the directory names (ISIS or ISIS2) in the INSTALL statement, in the PATH and in the SYSPAR.PAR file.

CONVERTING DATABASES TO CDS/ISIS

Instructions for converting data from version 1 to version 2.3 are contained in the manual at pp. 26-27. This complex conversion process is necessitated by the new structure of the master file (the file that holds a database) which can now contain not 32,000 records as before but over 16 million.

Version 2.3 has a feature on most menu screens indicating the number of records in a database. If you discover that the number is impossibly high, it usually indicates that the software is reading a database created in version 1 or 2.0. To convert this database, the MST and XRF files at least, have to be copied to a directory containing the version of ISIS under which they were originally created. Databases from version 1 can be converted only if they have access to the programfiles ISIS.EXE and ISISXCH.EXE. To check that you have the right version of ISIS, try browsing: if the records browse correctly from record number 1 to the end, then you have the correct version of the software.

When running ISISXCH, call the file not ISO.MST, but MST.ISO as this is the new default name in version 2.3. Follow the instructions on pp. 26-27 of the manual.

If you had the database in different directories in version 1, you would have had a path pointing to the old ISIS program which may no longer exist after successfully installing version 2.3. You will then find that version 1 no longer runs. If that is the case, you can create a temporary path just by typing at the MS/DOS prompt in the directory where you have the data you wish to convert:

PATH=C:\ISIS

Alternatively, you can create the MST.ISO files for all databases you wish to convert before installing version 2.3, but you must give them different names in ISISXCH (e.g. BIBLIO.ISO, REF.ISO for databases BIBLIO and REF).

FURTHER PROBLEMS

The main problem after the databases have been converted, assuming the instructions in the manual have been followed correctly, will probably be in the print formats. Version 1 allows certain errors in print formats to pass undetected. Version 2.3 checks on the syntax of the formatting language in greater detail. Repeatable groups containing double quotation marks (") instead of logical not symbols (¦) may not pass undetected. A space will not be permitted in MFN (3) which should read MFN(3). These have to be corrected. However, print formats can now be changed while being tested from the ISISRET (Information retrieval services) menu. Press F to display the print format. Make the necessary changes. When you have the print format syntax correct, key function key 8, and the format will be saved. The old one will be overwritten, so it is now, under version 2.3, essential to have a copy of all print formats on a backup diskette.

A further problem may occur: under version 1, if the data definition file (.FDT) were lost, the program would still be able to access that database. This is no longer possible. A number of networks using CDS/ISIS have been distributing databases without the FDT files, to prevent the users from altering the field definitions or worksheets. Under version 2.3, the FDT file has to be present so it becomes necessary to create one. This can be done merely by copying an existing FDT file to an FDT file with the name of the database. So if your database is named LIB, then:

COPY CDS.FDT LIB.FDT

will give you a dummy FDT. Alternatively you can create a file LIB.FDT in EDLIN or a wordprocessor which consists of one line which can actually contain any text. However, it will still not be possible to alter the database structure or worksheets, and no attempt should be made to do so, as it will certainly fail and may cause file corruption.

If, when doing the conversion you run out of space on your computer's hard disc, it is worth reducing the size of the inverted files under version 1. Do this in ISISINV, option I, and make the range small (e.g. 1 2). Inverted files in version 2.3 require less space than in version 1. They will not be generated until all data have been converted, at which point the old ISIS directory can be removed from the computer to release more space. But do take a backup just in case!

ADDITIONAL USER FEATURES

The main feature of version 2.3 is that the separate programs of version 1 (see *Information Development*, vol. 5, no. 3, p. 136) are integrated into a single program accessible from the main menu. The two bottom lines of the screen in many functions give the name of the current database, display format, and current data entry worksheet as well as the number which will be allocated to the next record in the database.

New features are available in the print formatting language including a large number of ways of making conditionals; a format may now consist of up to 4000 characters.

The menus can now be tailored to better suit individual languages. In version 1 the keys to press for particular functions were based on the English language functions. Now they can be changed to suit the language in question.

These facilities are listed in the foreword to the manual (p. 3).

OTHER NEW FEATURES

The manual now includes (on p. 127) a description of the terms dictionary (T on the ISISRET menu) which was never documented in the version 1 manual. This facility allows the user to select terms from the dictionary.

The most interesting feature, however, is probably free-text searching, which is described on p. 105 of the manual. This facility is of supreme importance as hitherto searching was not possible in CDS/ISIS on data in fields that were not inverted. There was a tendency therefore to invert fields that would hardly ever be required as searchable fields, merely because they might occasionally be required. This could make the inverted file unwieldy; as there is only one inverted file, it would make searching more difficult for the end user if certain fields had been inverted purely for file maintenance purposes. Now fields need only be inverted if fast access is required and other fields can be searched by text searching. It is therefore worthwhile when converting to version 2.3 to reconsider the field select table (FST) which generates the inverted file.

Other features are available when searching: previous searches may be called up again by quoting the number of the search thus: #1. Key R from ISISRET to see previous searches.

PASCAL COMPILER

A major new feature, though one that many users will never need, is the CDS/ISIS Pascal compiler. Given the wide availability of the CDS/ISIS software, it is likely that many programs will be written which would be useful to other users. It will not normally be possible to publish listings of these programs in *Information Development*; but readers may like to send descriptions of interesting programs they have written. Please send to **Alan Hopkinson** (address above) any programs with their program name, a statement of function, the name and address of the person or organization from whom it is available, and any condition of availability (e.g. that it will be sent on receipt of a 5.25 inch diskette, or as a listing).

TUTORIAL

Mr Stanley Aung of the Asian Institute of Technology is developing a tutorial for CDS/ISIS for microcomputers. This takes the user through the ISIS functions and explains them in great detail. It is not yet completed, but promises to be a very useful training aid, and in its test version has been greeted very enthusiastically when demonstrated in Malaysia, the UK and Zimbabwe.

As noted above, installing version 2.3 can be quite difficult. Mr. Aung is also working on a program which will ask the user for various parameters and achieve trouble-free installation. More information can be obtained from:

Mr Stanley Aung
Asian Institute of Technology
Library and Documentation Regional Centre
Bangkok
Thailand

QUERY ON ISO 2709

Mrs Jaishree Kochhar of the Systems Unit, The University Libraries, The University of the West Indies, St Augustine, Trinidad writes:

'This library has been a member of OCLC since 1984 and we have also acquired their CATCD 450 CD-ROM product. I now work with data on both USMARC and ISO 2709 formats. However, when I try to import the MARC records into CDS/ISIS, I am not allowed to go beyond the parameters screen. I have changed the field and record separators to what I see in the MARC record. However, there appears to be a second field separator which I am unable to define. My MARC records are in 80 character lines as specified by the CDS/ISIS manual'. She asks if anyone has done successful data transfer from USMARC to ISO 2709, or vice versa, and if so how was it done. She also asks for more clarification on the inter-relationship of USMARC and ISO 2709.

Presumably, Mrs Kochhar would be quite happy if she could get USMARC data into CDS/ISIS, and the answer to that question would best be given by somebody who has been involved in transferring OCLC data to CDS/ISIS. If anyone can help her, would they get in touch with her.

USMARC is an implementation of ISO 2709, as are UK MARC, UNIMARC and the CCF. They follow the record structure laid down in ISO 2709. For more

information see *Information Development* (vol. 5, no.4, p. 202). The problem is that CDS/ISIS does not implement ISO 2709 completely. In the first place, it requires data to be in 80-character lines. It also requires the subfield delimiter (ASCII 31) to be a circumflex sign. (This may be the 'second field separator' encountered at the University of the West Indies.) In other respects it follows ISO 2709. Other formats which claim to be implementations of ISO 2709 also do not follow it completely, and it may be that the OCLC records are not pure ISO 2709. Some formats omit the field separator (ASCII 30) at the end of the last field in the record (the character before the record separator ASCII 29), though it appears that Mrs Kochhar has found this to be present. If there is no record separator, add one at the end of each record before processing by CDS/ISIS. Remember to change the defaults in ISIS from # to ASCII 30 and ASCII 31 on the importing worksheet, or to change those special characters in the original records. Other formats have a facility for block spanning which means an additional five characters at the start of each record which have to be removed before entry into CDS/ISIS.

Mrs Kochhar also sends a copy of the first issue of a newsletter of the Mini-Micro CDS/ISIS User Group of Trinidad and Tobago. (2) Other user groups are being set up in the Philippines and Zimbabwe, to name but two, and it is hoped to include news of these in future issues.

References

1. *Mini-micro CDS/ISIS reference manual (version 2.3).* Paris, Unesco, 1989.
2. *ISISTRIN: the Newsletter of the Mini-Micro CDS/ISIS User Group of Trinidad and Tobago.* Port of Spain, UN ECLAC, 1989-. no. 1 (June 1989) —

EDUCATION AND TRAINING OPPORTUNITIES

Robert Vosper IFLA Fellows Programme

The Robert Vosper IFLA Fellows Programme was initiated in 1989 to provide opportunities for outstanding librarians to work on activities linked to one of the Core Programmes of the International Federation of Library Associations and Institutions (IFLA). The programme is funded by the Council on Library Resources and administered by IFLA. It is named after the distinguished American librarian Robert Vosper, who was Vice-President of IFLA from 1971 to 1976 and is now one of its Honorary Fellows.

Four fellowships will be awarded each year in 1989, 1990 and 1991. Each Fellow will be awarded US$10,000 to work mainly in their own institutions, possibly part-time or on secondment, for a period of one year, with the possibility of extension.

Further information from
IFLA Headquarters, POB 95312, 2509 CH The Hague, Netherlands.

Information for development: experiences of the International Development Research Centre

Paul McConnell

INTRODUCTION

Since its creation in 1970, Canada's International Development Research Centre (IDRC) has allocated more than Can$140 million in support of strengthening information systems, services and tools for development. It has funded more than 500 information projects in ninety-five countries, it is actively involved in software development, and it maintains one of the most significant development research libraries in the world. As IDRC approaches its twentieth anniversary, this seems an appropriate time to take stock of its past activities in the information field, to comment on its current priorities and directions, and to speculate on what lies ahead.

THE ORIGINS OF IDRC

IDRC was conceived as a novel mechanism to encourage the application of science and technology to the problems of development. (1,2) The international climate during its formative years (the late 1960s) was one of increasing recognition that, despite two decades of international development effort, the gap between developed and developing countries was widening. A reappraisal of approaches to international cooperation was essential. In 1969, the World Bank Commission on International Development, led by former Canadian Prime Minister, Lester B. Pearson, reported eloquently on the problems and opportunities for 'Partners in development'. (3) Concerning the research sector, the Commission noted,

> As the ability to analyze scientific, technical and managerial problems and propose new solutions has grown in industrial countries, low-income countries have become increasingly dependent on a technology conceived and produced outside their borders and without reference to their special needs.

IDRC represented a unique response—a donor agency dedicated to stimulating and supporting research, especially research that would be designed and managed by the developing countries themselves in keeping with their own priorities and undertaken for their own benefit.

To accomplish this, and recognizing that research is a risky and somewhat unpredictable endeavour, IDRC was established as an autonomous public corporation that, although funded by an annual grant from the Parliament of Canada, would have its policies and programmes approved by an international Board of Governors with twenty-one members.

The IDRC Act specifies that the Centre's objects are:

> ...to initiate, encourage, support and conduct research into the problems of the developing regions of the world and into the means for applying and adapting scientific, technical and other knowledge to the economic and social advancement of those regions, and, in carrying out those objects
>
> (a) to enlist the talents of natural and social scientists and technologists of Canada and other countries;
> (b) to assist the developing regions to build up the research capabilities, the innovative skills and the institutions required to solve their problems;
> (c) to encourage generally the coordination of international development research; and
> (d) to foster cooperation in research on development problems between the developed and developing regions for their mutual benefit.

IDRC's grant in its first year of operation (1970-71) was Can$1.4 million; in 1989-90 the grant was Can$108.5 million, which represents about 4 percent of Canada's total allocation for overseas development assistance. Since 1970, IDRC has funded almost 4,000 research and research-related projects in more than 100 countries. The Centre now employs more than 600 staff located in its Ottawa headquarters and in six regional offices around the world (Montevideo, Cairo, Dakar, Nairobi, New Delhi and Singapore).

A unique feature of IDRC is that, from its inception, there has been a substantive programme devoted to tackling information problems. In fact, one preliminary concept for the new centre was that it might serve as a repository of vast amounts of information and function as an enormous databank that developing countries could draw on for research. (1) This was early recognition of the potentially powerful role of information in the development process. Eventually, a broader approach to

development was adopted, but first on the list of powers awarded to IDRC in the Act of Parliament was the power to

> establish, maintain and operate information and data centres and facilities for research and other activities relevant to its objects.

IDRC chose to pursue two broad routes to development: create new knowledge via its research-funding divisions, and promote access to existing knowledge via the Information Sciences Division.

EVOLUTION OF THE INFORMATION SCIENCES DIVISION

The manner in which IDRC has chosen to interpret its mandate for supporting information-related activities has evolved considerably during the last two decades. The first statement of priorities appeared in IDRC's annual report for 1970-71:

> The primary objective of the Division of Information Sciences is to support cooperative initiatives, particularly in the United Nations family, to develop information systems to which international, national and voluntary agencies can supply, and from which they can obtain, development information ... While the Division is concerned with the establishment of information and data banks at the international level, it will devote particular attention to ensuring that developing countries are able to exploit such banks to meet their local needs.

In the following year, 1971-72, the annual report described four responsibilities for the Information Sciences Division:

1. to provide library and information services to IDRC staff and to others with whom the Centre is cooperating;
2. to help to keep the scientific community informed about the problems of developing countries and encourage their involvement in the search for solutions;
3. to work with other development organizations to establish a cooperative information system on the science of development and on the many aid initiatives being undertaken;
4. to improve the flow of technical information to those who can apply it for development, particularly in the various disciplines represented by IDRC's research programmes.

Thus the Information Sciences Division at IDRC was founded on concepts of cooperative networks, active participation of the developing countries, and an inhouse responsibility for helping improve access to development information. These concepts have been retained and provide the foundation of the Division's present programme of work. But the way in which these concepts have been manifested in the Division's inhouse activities and in its programme of external grants has changed over the last two decades in response to the evolving information environment.

A number of significant influences can be identified. Most conspicuous has been the need to take advantage of the opportunities presented by modern information technologies that have emerged in recent years. Another important shift is the increased awareness of different types of application of information systems, including the use of non-bibliographic information.

As the developing countries gradually recognize the potential value of information systems and services, there are more information projects being designed at the national level to serve local needs. Also, although the research community in developing countries has remained a principal target group for many information systems, increased opportunities are being identified to serve additional audiences who can benefit from the knowledge generated by research, whether 'upstream' (policy-makers and planners) or 'downstream' (extension workers and community organizations).

The information infrastructure is clearly not uniform in all developing countries; the differing priorities can be reflected in the formulation of distinct regional strategies. The information profession as well is still relatively new in developing countries and its potential contribution is seldom recognized; however, education and training opportunities are increasing and a cadre of qualified professionals is beginning to make its presence felt. These issues of modern information technology, novel applications, the trend towards activities at the national level, clearer focus on different target groups, recognition of differing geographical priorities, and the emerging role of the information professional have been the major external influences shaping the operations of the Information Systems Division. The Division's involvement with several of these topics is described in more detail in a series of companion articles dealing respectively with information technologies (4), information networks (5), information for rural development (6), an information strategy for Africa (7), the role of the information professional (8) and the connection between information services and the user. (9)

The net result, in fiscal year 1989-90, is an information programme with eighty staff and an annual budget of Can$14 million. It continues to respond to opportunities for strengthening the management and use of information for development research and change. Administratively, the operations of the Division can be divided into two components: the programme of external grants for information projects, and the inhouse information activities. Its mission and objectives may be summarised as follows:

Mission

To promote the social and economic advancement of developing regions by providing researchers, policy-makers, and practitioners in developing countries access to the scientific, technical and other information they require for application to the problems of development.

Objectives

Through its inhouse activities and programme of external grants:

(a) to improve systems, services and tools for managing and using information relevant to development research and change;
(b) to build indigenous capacity within developing countries for the effective management and application of information for development;
(c) to foster cooperation and coordination in development research through information-sharing.

EXTERNAL GRANTS FOR INFORMATION ACTIVITIES

The project mechanism

In pursuit of the Centre's objectives to support development research and strengthen indigenous research capacity, the most frequent mechanism adopted by IDRC's programme divisions has been the provision of cash grants to institutions in developing countries. The Information Sciences Division has made extensive use of this approach: more than 500 projects with a total value of Can$90 million have been supported in ninety-five countries. The Division provides funding for applied, problem-oriented information activities that have clearly identified their objectives, users, beneficiaries, methodology, timetable, outputs and future sustainability (on conclusion of IDRC funding). The grants are provided in response to specific, detailed project proposals submitted by many different types of prospective recipient institutions.

IDRC does not contract out for research and information services; rather, it responds to requests for financial support from institutions that have identified a specific development problem and a methodology for addressing it and are anxious to carry out the work. This distinction is significant as the concept of 'ownership' by the developing-country institution is important for complying with local priorities, providing adequate local inputs, and helping to ensure that there will be local interest and follow-up. The alternative approach of contracting out research would risk creating a dependency on the donor, as well as compromising the search for local priorities. IDRC may be the catalyst, the facilitator and the co-financer—but it is not the executor or supervisor of the projects it supports.

The programme staff of the Information Sciences Division are experienced professionals. The majority have lived or travelled extensively in developing countries and all are familiar with the types of information problems to be addressed. Some have in-depth knowledge of selected subject areas or information technologies; others have in-depth knowledge of the information issues prominent in different geographical regions. These IDRC programme staff provide peer review of project proposals during the development and approval phases and then serve as professional colleagues and occasional advisers to the project leaders during the lifetime of the projects, making regular follow-up visits to the recipient institutions.

Recipients, users and beneficiaries

The grant recipients tend to be institutions such as universities, government departments, international agencies, non-governmental organizations (NGOs), private non-profit organizations, and so on. Usually, the activities are carried out by specialist personnel in documentation and information centres, but this can vary according to the circumstances of the individual project. It is possible to identify five target groups of users—information personnel, researchers, policy-makers and planners, development practitioners (including community action groups, extension networks, local NGOs), and rural and urban populations. The latter, specifically the disadvantaged rural and urban poor, constitute the intended beneficiaries of IDRC's work, even though they may be at some distance from IDRC's point of intervention.

In its attempts to support activities aimed at tackling the problems of poverty, IDRC has placed emphasis on serving the needs of the research community and the policy-makers and planners in the expectation that application of its limited resources at these points might result eventually in a broader impact, albeit indirectly, upon the ultimate beneficiaries. IDRC is, however, giving increased attention to supporting novel information activities designed to serve more directly the needs of the development practitioners and the people themselves.

Programme organization

For organizational purposes,the funds available to the Division for project grants have been divided into four sectoral allocations. Two of these units are primarily subject-oriented, whereas the other two are more concerned with information technologies. In practice, the boundaries between units are kept flexible to encourage the merging of expertise where necessary.

The subject-oriented units respond to project proposals within the realms of **Socio-economic Information** or **Science and Technology Information**. These are the two largest units, each one accounting for about 40 percent (Can$3 million) of the total programme budget of Can$8 million for 1989-90. The third largest unit is concerned with projects designed to test and adapt newer **Information Tools and Methods** in the developing-country environment; it administers about 15 percent of the budget (about Can$1.2 million). The fourth unit has a very specific function—to help establish and strengthen **MINISIS Resource Centres** at selected institutions around the world as a means of disseminating and maintaining the MINISIS software (see below); about 3 percent of the programme budget (Can$0.25 million) is allocated to this task. An outline of the topics covered by these four groups is presented in Box 1; a fuller account of this functional structure has been published elsewhere. (10)

Geographical considerations

There is no formal geographical allocation of programme funds, either at the regional or the country level. IDRC reviews the project proposals on their individual merits rather than in accordance with a country quota. Bearing in mind the diversity among Third World nations with respect to levels of wealth and of indigenous research capacity, IDRC will provide different kinds of support to different countries. No developing country will be excluded from support, but as a general rule the widest range of assistance that can be provided will be confined to those countries with the most limited research resources and lowest levels of income. For those countries with the more sophisticated research systems and higher income levels, support will be targeted more to involvement in networks, international liaison, information sharing and fostering collaboration.

The overall pattern of geographical distribution of project funds in the information sector is illustrated in Figure 1. Further analysis of the data would reveal that the bulk of the Division's project expenditures in Africa took place in the last few years, whereas previously Latin America and Asia were the major recipients. This shift is not surprising given the relative strength of the information infrastructures in Latin America and Asia and their capacity to absorb the kind of support IDRC could offer.

Information projects

Although the basic administrative concept of the project mechanism has not changed radically since its introduction in the first year of IDRC's existence, there have been gradual changes taking place in the scope, content and priorities of the information projects selected for support.

Global versus national projects

Reflecting the priority perceived at that time, the initial project activities of IDRC's Information Sciences Division were directed toward supporting cooperative initiatives at the international level, often involving the United Nations family. The Division's very first project was a grant of Can$38,700 for the Development Centre of the Organization for Economic Cooperation and Development (OECD); it helped develop a common thesaurus of indexing terms—the *OECD Macrothesaurus*—to facilitate information exchange amongst institutions handling literature on social and economic development. Subsequent projects helped design and implement international information networks such as the International Information System for the Agricultural Sciences and Technology (AGRIS), the Latin American Population Documentation System (Sistema de Documentación sobre Población en América Latina: DOCPAL) and the Development Sciences Information System (DEVSIS).

Although it may be argued that the early stages of global activities such as these involved a 'top-down' approach, somewhat at odds with the underlying 'bottom-up' philosophy of the Centre, a substantial degree of coordination and standardization was required to ensure compatibility within the systems. However, the Division did not overlook the involvement of developing-country stakeholders; they were active partners in the policy decisions on form and content as well as in implementation. As the larger systems have matured, several components have been established at the regional and country levels. Nevertheless, one of the evolutionary trends visible in the Information Sciences Division over the last two decades has been a more deliberate involvement of the Division in local initiatives defined and implemented at the national and subnational levels. This mirrors a centrewide trend towards supporting research and research-related projects that strengthen local capacity and are likely to have a more direct impact on the intended beneficiaries.

Special information centres

Despite this increasing effort to develop national information infrastructures so countries can organize their own information more effectively, there is a limit to the extent that specialized collections can be built up in every country. Consequently, in selected fields of research, IDRC has supported an alternative approach—the Specialized Information Analysis Centre (SIAC). Each of these centres focuses on a very specific topic (such as an individual crop, product or process) and is located at a recognized centre of excellence for research in that field. This permits information personnel and research scientists to work together in providing a comprehensive service to clients. Typically, these centres will collect specialized literature and prepare abstracts, indexes

Box 1

IDRC Information Sciences Division
Programme organization

A. Science and Technology Information

Agricultural information

Food and nutrition
Crop production
Animal production
Post-harvest problems
Agricultural marketing and trade
Agricultural economics

Industry, technology and shelter

Small and medium industry
Technology
Shelter
Energy
Transportation
Patents and standards

Natural resources and environment

Stability and sustainability of resource base e.g. Agroecology, Fisheries, Forestry, Land use, Soil and water resources
Environmental protection and preservation e.g. Toxic materials/wastes, Coastal erosion, Desertification, Natural disasters

Multisectoral science and technology information systems

B. Socio-economic Information

Development economics
Debt and public finance
Trade
Labour and employment
Health and social issues
Public and community health
Education, language and communication
Social justice for special groups
Women in development
Information infrastructure development
Information science education
Regional, national and subnational information systems and networks

C. Information Tools and Methods

Telematics
Informatics
Statistical systems and methods
Cartography and remote sensing
Micrographics and other mass storage technologies
Documentation methods and tools

D. MINISIS Resource Centres

and bibliographies, and provide documents; but they will also analyse and evaluate data, publish newsletters, commission state-of-the-art reviews, prepare texts for particular audiences (students, extension workers, administrators) and provide answers to technical questions.

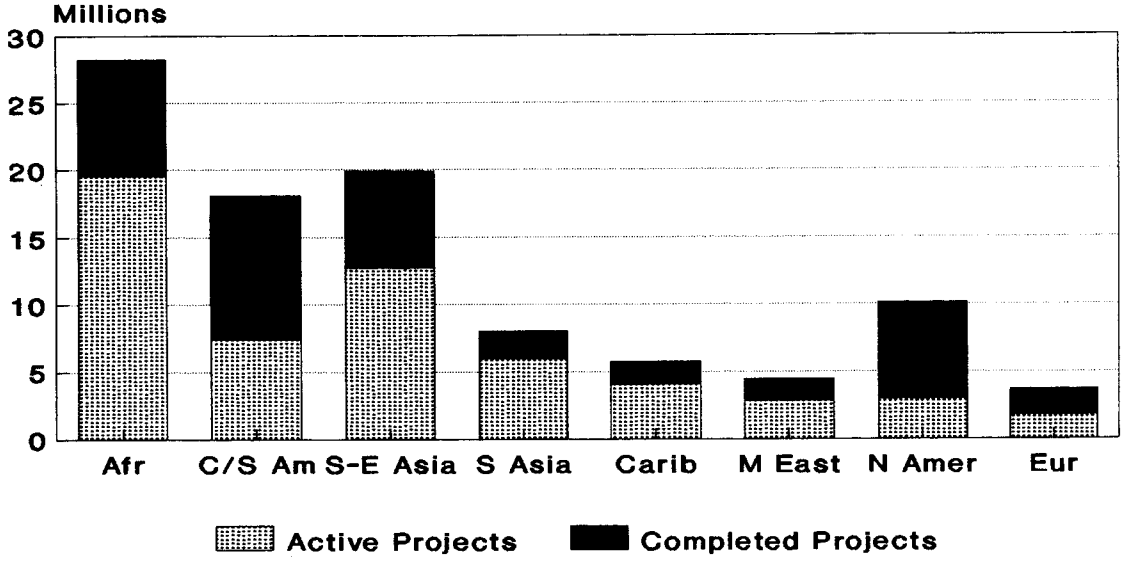
IDRC funded its first SIAC in 1972-73, and still supports this approach on selected topics when the demand has been clearly established. For example, major investments have been made in SIACs throughout the network of research centres of the Consultative Group on International Agricultural Research (CGIAR), including cassava at the International Centre for Tropical Agriculture (CIAT) in Cali, Colombia; grain legumes at the International Institute of Tropical Agriculture (IITA) in Ibadan, Nigeria; sorghum and millets at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Hyderabad, India; and several other centres in the CGIAR system.

Substantial support has also been provided to a series of SIACs at the Library and Regional Documentation Centre of the Asian Institute of Technology (AIT) in Bangkok, Thailand. These include information centres on geotechnical engineering, ferrocement and environmental sanitation. AIT has published an interesting description of its experience with the SIAC concept. (11) Elsewhere, IDRC is supporting similar approaches on a variety of specific topics, such as soil management, diarrhoeal diseases, schistosomiasis, mosquito-borne diseases, rattan, buffalo, and tea.

Non-bibliographic systems

Some of the Specialized Information Analysis Centres illustrate another trend in IDRC's support—an increasing interest in factual, statistical and other non-bibliographic information systems. The

Fig. 1 Geographical Distribution of Project Funds (31 March 1989)



Southeast Asian Weed Information Centre (SEAWIC), for example, was created in 1986 to screen, analyse, process and disseminate all forms of information on undesirable plants in the region. Based in Bogor, Indonesia, it not only serves the regional research community with a database of documents but also with a herbarium of weed specimens and an associated databank of factual information on identifying characteristics, biology and management.

Another example of a non-bibliographic information project, this time at the national level, is a cattle information system being created in Egypt. This will permit analysis of statistical data from a representative sample of animals for application in cattle-breeding research. In a different subject area and using a different type of non-bibliographic data is the National Poisons Information Centre that IDRC helped establish in Sri Lanka. The Centre now provides a rapid information service for physicians and paramedics on signs, symptoms and treatment of poisonings caused by agricultural chemicals, household products, drugs, snakes and toxic plants. The concept of Poisons Information Centres is familiar in the developed countries, but is still at the experimental stage in the developing world—hence IDRC's interest in testing and improving this type of applied information service.

Networks

IDRC's experience with support for Poisons Information Centres illustrates another facet of its programme objectives—encouraging organizations to cooperate on information issues. In addition to supporting individual activities on poisons at the national level in a small number of countries, IDRC helps forge links between them.

It is also working with other bodies (the World Health Organization, the Canadian Centre for Occupational Health and Safety and the Toxicology Centre of Quebec) to develop a comprehensive package of information on common poisons, treatments and guidelines for recording case data; both computerized and hard copy versions will be produced. Eventually, a network of Poisons Information Centres could be established around the world, sharing their experiences and updating their data and techniques.

Meanwhile, IDRC has already gained considerable experience in supporting different types of information networks at the global, regional and national levels in various subject areas. This can be a valuable approach to sharing information in a climate of limited financial and human resources. One such network is the Latin American and Caribbean Program for Trade Information and Support of Foreign Trade (Programa Latinoamericano y del Caribe de Información Comercial y de Apoyo al

Comercio Exterior: PLACIEX), originally established as the Latin American Trade Information Network (RELIC), which now has a coordinating centre in Lima, Peru. Member countries assist each other in feasibility studies, systems designs, software development, training, and so on in the area of trade information. IDRC's grant helped strengthen the network by expanding central services and by enabling the three least-developed national centres of the network (Bolivia, Honduras and Nicaragua) to participate more fully. The information network is an important concept; IDRC has been involved in several projects aimed at strengthening network initiatives. (5)

Information technologies

Another of the networks established with IDRC's support is the CGIAR Data Transfer Network (CGNET), a computer-based message system linking organizations within the CGIAR. This project also illustrates IDRC's interest in encouraging the testing, adaptation and adoption of modern information technologies in developing-country environments.

IDRC was established before microcomputers appeared on the scene to open up new horizons for information sharing and management. From its inception, however, the Centre has supported efforts to apply the latest available information technologies. Many of the earlier projects that used manual techniques subsequently received further grants enabling them to acquire the skills and equipment for automating their systems and improving services.

Gradually, IDRC's programme has broadened to encompass support for the development or testing of several new tools. These tools are not panaceas. They may not always be appropriate; they are often associated with problems of cost (of acquisition or use), limited availability of equipment, poor servicing and inadequate training opportunities. Nevertheless, given their immense potential contribution to development, IDRC has been involved in several experiments designed to apply these technologies to information management for researchers, planners and other target groups. Projects have involved Compact Disc—Read Only Memory (CD-ROM), software development in various sectors (such as debt management, cropping systems, small-area census data), packet radio, expert systems, teleconferencing, geographical information systems, computer-assisted mapping and several other applications in developing countries. (4)

Reaching the people

Although effective application of newer technologies is essential, these are only tools. It is important for IDRC not to lose sight of its basic purpose—to contribute to the economic and social advancement of developing countries, with particular focus on the problems of poverty. As described earlier, the grant recipients and information users are often some distance from the intended beneficiaries of the Centre's work, namely, the rural and urban poor. Although the researchers, planners and policy-makers are significant target groups through which IDRC's support aims to reach the beneficiaries, albeit indirectly, there is a growing concern within IDRC (and perhaps also in the donor community at large) to demonstrate more conspicuously what is being accomplished, who is benefiting from the grants, and what the development impact has been. Related to this is a concern to enhance the participation of the people in the development decisions and services that impact upon them.

Consequently, in recent years, IDRC has started to expand its support for activities designed to have a more direct link to the beneficiaries. For example, a project being undertaken by the University of Botswana is researching the factors that will influence the design of improved information services for rural communities. Factors being studied include the information needs of different groups, their information-seeking behaviour, the demand for and supply of information from external services, and access to indigenous knowledge.

A different type of project, involving different levels of government in Thailand, is trying to develop a more decentralized system for gathering and using information for rural planning; the objective is to introduce a system that is more 'bottom-up' and hence likely to be more relevant and responsive to local needs. This is a complex field but one of increasing importance to IDRC and one that will receive additional support in the years to come. (6,9)

Human resources development

Building local capacity within developing countries to improve the management and use of information is one of the prinicpal objectives of IDRC's Information Sciences Division. The project mechanism provides an effective means of accomplishing this. Some of the activities funded by IDRC are short-term courses designed to meet the immediate requirement for upgrading practical skills in specific fields; these include training courses in indexing and abstracting, library automation and information repackaging. Other projects are designed to address the longer term needs of developing countries by improving the opportunities for postgraduate education in information sciences.

At Addis Ababa University in Ethiopia, for example, IDRC is helping to establish a Regional School of Information Studies for Africa. Serving Eastern and Southern Africa, the school will offer a postgraduate programme leading to a Master of Science degree in Information Science. Potentially, the information

professional holds the key for unlocking the storehouses of knowledge that can be applied to the problems of development. This topic is explored further in a companion article. (8)

INHOUSE INFORMATION ACTIVITIES

Of the eighty personnel currently in the Information Sciences Division, almost half are involved with information-related activities undertaken directly by the Division. The first such activity to be introduced, in 1971, was the Centre Library. The second, introduced the same year, was the Centre publications programme. By 1973, however, this had become large enough to function as a separate unit outside the Division. The third substantive inhouse activity was introduced in 1973 to adapt computer applications for library management; this led to IDRC's involvement in software development, which is undertaken by the Computer Systems Group. Several other specific information assignments have been undertaken within IDRC over the years, but the Library and the Computer Systems Group remain the most significant and merit further description.

Library and bibliographic services

The goal of IDRC's Library is to stimulate and facilitate access to information about Third World development, particularly on research designed to adapt scientific and technical knowledge for economic and social advancement.

The Library provides information and library services as well as training and advice to IDRC staff, recipients of IDRC support, and Canadians involved in governmental, academic and voluntary institutions concerned with Third World development. Training is also offered to the personnel of international organizations who are responsible for establishing information guidelines and standards. As resources permit, the Library also answers requests from institutions in developing countries, international organizations and institutions in developed countries. In close collaboration with the Division's programme staff, the Library acts as a 'test bed' for technological and bibliographical developments and standards.

The Library's collection of books, documents, microforms and serials reflects the interests of IDRC. The areas of technology transfer, information systems, farming systems research, science policy, health issues in tropical environments, and economic and social development, are particularly well represented. The collection is current and includes about 60,000 books and documents and 5,000 serial titles.

Several special collections are also kept by the Library. The Bruntland Collection contains background papers, written submissions, tapes and transcripts and minutes of the World Commission on Environment and Development. An archival collection contains IDRC-supported publications, material written by Centre staff and publications about the Centre and its activities. InfoQuest is a collection of files containing current material (annual reports and brochures) describing more than 2,500 organizations, research centres and government departments located in Canada and abroad whose activities relate to IDRC's interests. This special collection also includes country files describing the current political, social and economic conditions in developing countries. A microforms collection includes copies of IDRC publications, documents from the Sahel collection of the University of Michigan, and documents listed in four databases: DEVSIS, SALUS, UNIDO (United Nations Industrial Development Organisation) and USAID (United States Agency for International Development).

To facilitate access to the collection, the Library uses MINISIS, a software package developed by IDRC. Items are catalogued, classified and indexed using the *UNISIST Reference Manual for Machine-Readable Bibliographic Descriptions*, the *Universal Decimal Classification* (UDC) and the *Macrothesaurus for Information Processing in the Field of Economic and Social Development* (New York, United Nations, 1985).

Access to the Library's collection is provided through computer output microform (COM) fiche indexes for personal and corporate authors, title and serials title, and serials corporate authors. Online searches of the Library's database, BIBLIOL, allows access in various ways, including by subject. The Library also publishes *IDRC Acquires*, a regular listing of what has been added to the collection.

To nonprofit organizations, the Library offers access to eleven development databases. Six are inhouse, IDRC databases, and the other five are from other international organizations. This service is provided free to more than 120 organizations around the world, though users must pay telecommunications costs. The six IDRC databases include information on the collection of the IDRC Library, acronyms related to the interest of IDRC, access to literature on development published in Canada, low-cost rural health care, and energy topics in the Third World. There is also a database called the Inter-Agency Development Research Information System (IDRIS) which describes projects funded by IDRC and several other organizations (see Box 2). Databases from four United Nations agencies including the Food and Agriculture Organization (FAO), the International Labour Organization (ILO), the United Nations Educational, Scientific and Cultural Organization (Unesco) and the United Nations Industrial Development Organization (UNIDO), as well

as the document database of the United States Agency for International Development (USAID) are accessible subject to the approval of the agency concerned.

The Computer Systems Group

Originally, IDRC's online bibliographic computer activities were based on a set of computer programs known as ISIS (Integrated Set of Information Systems) developed by the International Labour Office. These required a large computer, however, and operations were expensive. In 1976, the Information Sciences Division started to devise a similar set of programs, known as MINISIS, that would operate on a relatively low-cost minicomputer (the Hewlett Packard 3000) and might consequently find greater application within developing countries. (4)

MINISIS has proved to be very successful and is being widely adopted in many countries for bibliographic and other textual applications such as mailing lists, directories of consultants and databases for chemical toxicology, meteorological information, museum artefacts and so on. An application of MINISIS that furthers the objective of IDRC to encourage cooperation among donor agencies is IDRIS.

The multilingual capabilities of MINISIS allow for the storage, retrieval and manipulation of information in a variety of alphabets and character sets, including Latin, Greek, Arabic, Thai, Korean and Chinese. The MINISIS software, documentation and training are made available free to nonprofit organizations in developing countries; however, industrialized countries are expected to pay licence fees. There are more than 320 MINISIS installations worldwide, about two-thirds of which are located in developing countries.

The popularity of the MINISIS software is evidence that this particular tool is serving the needs of several groups. This very popularity has prompted the Computer Systems Group to set up a small experimental programme to support projects concerned with decentralizing MINISIS-related activities by building up local institutions as resource centres. IDRC recently initiated a major software enhancement programme designed to enable MINISIS to remain responsive to the changing needs of users and to operate on different hardware including microcomputers.

THE FUTURE

Although IDRC's typical style of operation is one of responding to developing-country priorities rather than directing the research agenda, it is still possible to anticipate some of the issues that will guide IDRC's programme of work in the information sciences. Despite the many changes taking place in the information field, IDRC's rationale and objectives, as described earlier, remain valid. The strategies for pursuing these objectives, however, continue to evolve in response to a combination of factors in the external and internal environments of IDRC, such as:

(a) the opportunities, expectations and limitations of using the newer information technologies;
(b) the problems of sustainability of information services on conclusion of donor support;
(c) the need to tailor services more specifically to meet the requirements of selected target groups (i.e. with implications for the types of user, information, institution and dissemination technique);
(d) the need for developing-country institutions and personnel to demonstrate the relevance, utilization and impact of information systems and services;
(e) development within IDRC of a more structured, coordinated approach to strengthening human resources in the information sector of developing countries;
(f) the opportunities presented for integrating sectoral and regional planning;
(g) the need for IDRC to balance allocation of its resources between experimentation with new initiatives and consolidation of past investments (geographical, sectoral and institutional);
(h) the prospects for responding to developing-country needs using a more holistic, interdisciplinary approach in partnership with sister divisions in IDRC and with other donors.

These factors will be taken into account during the ongoing review and adjustment of the Information Science Division's programme of work. Certainly, the literature on information systems and technologies for development is expanding (e.g. 12, 13, 14). But in a field where there is so much still to be done by the developing countries, one of IDRC's overriding tasks will be to determine how best to apply what it has to offer, i.e. where can IDRC's particular methodological approach, underlying philosophy and level of resources be applied most effectively? This must be done in a domain that holds so much promise for developing countries and yet is rarely identified in national development plans.

While society in the north routinely generates and consumes great quantities of information, the south is only just beginning its information revolution. While economies in the north have harnessed the 'information engine', the south remains disadvantaged by problems of information dependency. (15, 16) While Spaulding foresees the librarian of today evolving confidently into the 'knowledge counsellor' of tomorrow (17), the information workers in developing countries experience only limited visibility and recognition. But progress is being made. The opportunities are

Box 2

Inter-Agency Development Research Information System (IDRIS)

IDRIS was created in 1983 by a group of publicly-funded agencies involved in international development research. The main purpose is to encourage cooperation and coordination by facilitating access to information on the research projects and other development activities they are funding. While the participating agencies derive most practical benefit from IDRIS, the database is of potential interest to the broader international development research community.

At present there are about 5,500 records in IDRIS, contributed by eight agencies: BOSTID (Board on Science and Technology for International Development, Washington, D.C.); GATE (German Appropriate Technology Exchange, Eschborn); IFS (International Foundation for Science, Stockholm); JICA (Japan International Cooperation, Tokyo); NUFFIC (Netherlands Universities Foundation for International Cooperation); SAREC (Swedish Agency for Research Cooperation with Developing Countries, Stockholm); UNU (United Nations University, Tokyo); and IDRC. Additional agencies have declared their intention to contribute.

Each record includes the project description, name of the recipient institution, name of the researchers, geographical area under study, subject headings, and the amount of funding committed.

The database is in MINISIS format and is housed on a computer at IDRC in Ottawa. Online access is available via the IDRC Library. The IDRIS database is also mounted at several national and international institutions around the world. Copies are available on tape and diskette; some published directories are also available.

Participation in IDRIS is open to all research-funding organization willing to share information according to the protocols of the system. For further information about joining IDRIS or searching the database, contact:

IDRIS Project Coordinator, IDRC, Box 8500, Ottawa, Canada, K1G 3H9.

increasing steadily to help strengthen the skills, knowledge, networks, technologies and political awareness that will enable the developing countries to manage and use information more effectively to serve their own diverse needs. The International Development Research Centre intends to be part of the search for solutions.

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* also available in French.

Abstract

The first in a series of articles on the activities of the Information Sciences Division (ISD) of the International Development Research Centre (IDRC) introduces IDRC in general and ISD in particular. It traces the evolution of ISD as a substantive programme devoted to tackling information problems in developing countries, and reviews how the Division has responded to the changing global information environment of the past two decades. Statistics are provided on where and on what activities ISD resources have been directed over the years. General programme areas are described with examples of types of projects supported, including specialized information centres, non-bibliographic systems, networks, information technologies and human resources development, all of which are aimed at contributing to the social and economic advancement of developing countries. Also examined are inhouse information activities,

including IDRC's Library and bibliographic services, and the Computer Systems Group responsible for MINISIS software. Concludes with a look at various elements in the current information environment that are influencing the future direction of ISD so that it can remain responsive to the needs of developing countries.

Paul McConnell is Acting Director of the Information Sciences Division of IDRC

Support for information technology development

Peter Browne *and* Terry Gavin

INTRODUCTION

We are told: 'This is the information age!'. Information science graduates could be forgiven for thinking that they have chosen the golden path to prosperity. Yet, sooner or later, they discover that the tools of the trade are changing fast, and may become apprehensive about their ability to master these new technologies. This feeling can be especially acute in developing countries, where a realistic appreciation of the evolution of technology, and retraining opportunities, are hard to come by.

Since its establishment in 1970, the Information Sciences Division of the International Development Research Centre (IDRC) has been aware of the concern of information professionals in developing countries about keeping up with technology, and has provided a share of its resources to help deal with the problem. In the 1970s, the pace of change was relatively slow and help from the Division consisted of support for certain training activities as well as the development and distribution of a minicomputer-based software package for bibliographic storage and retrieval, MINISIS. With the advent of the microcomputer in the 1980s and its wide dissemination in developing countries, the need to keep information professionals up-to-date became much more pressing.

Several approaches were tried. For some years, the Division experimented with the provision of advisory services in information technology, to solve technological problems on the spot. However, it was evident that this could only be a stopgap measure as it could not result in any increase in the capacity of developing countries to solve their own problems. Thus, direct advisory services were eventually de-emphasized and priority placed on supporting the development, testing and adaptation of information technology.

Another approach was the provision to developing countries of relevant software by financing its creation or adaptation in industrialized countries. With MINISIS, the entire development was carried out within the Division. With other packages, the work was undertaken by other institutions. For instance, in 1983-84 the Australian National University, in collaboration with the International Council for Research in Agroforestry, developed, with IDRC support, a microcomputer-based version of its software package for the economic analysis of multi-period and multi-enterprise farm budgets (MULBUD). (1) In 1984-85, technical and financial support was given to the Commonwealth Secretariat for the development of its debt recording and management system, CS-DRMS (in response to the need of developing countries to find better methods of recording, managing and analysing information related to the country's external debt). (2)

Some of these initiatives are still active. Work on MINISIS is continuing and is described below. The Division is exploring ways of providing access to CS-DRMS for non-Commonwealth countries. However, as the capacity of developing countries to deal with software has increased, so the Division's support has shifted to assist them to build their own information tools. Support for information technology development thus comes from two of the Information Sciences Division's programmes: Information Tools and Methods (ITM) and the Computer Services Group (CSG). The approaches of each of these groups are different. ITM supports projects aimed at the production, testing and adaptation of new information tools and methods in the developing country context by the developing countries themselves. CSG has produced, continues to improve, and distributes to developing countries a specific information tool, MINISIS.

THE MINISIS PROGRAM

MINISIS is a generalized information management system, based on relational database theory, and originally designed and implemented by IDRC to run on the Hewlett Packard 3000 family of minicomputers. It is a member of the Integrated Set of Information Systems (ISIS) family of software. The members of the ISIS family are CDS/ISIS (Computerized Documentation System/Integrated Set of Information Systems), which was initially developed by the International Labour Office to run on an IBM mainframe computer under IBM's disk operating system in the early 1960s and has, since 1975, been further developed and supported by Unesco; and Mini-micro CDS/ISIS, also developed and supported by Unesco, which runs on IBM-compatible microcomputers and on VAX series minicomputers produced by the Digital Equipment Corporation. Although MINISIS, CDS/ISIS and Mini-micro CDS/ISIS are operated on different types of hardware, IDRC and Unesco cooperate to ensure that data can be exchanged between the three systems. These systems are distinguished by their ability to efficiently store, manage and retrieve information not

usually amenable to traditional data processing techniques: information in which data is organized into variable length fields and subfields which may repeat a variable number of times or not occur at all.

The practical application of the MINISIS software allows databases to be defined as selected parts of larger databases, selected parts of larger records, or combinations of databases and records. This flexible approach to database definition permits the sharing of common data and the definition of new databases without physical restructuring.

Although it was originally developed to permit the management of bibliographic databases, the design of MINISIS is sufficiently general that it is being used for a wide variety of text-based applications. It is currently operational at more than 320 installations around the world, with over 200 of those in developing countries.

At IDRC, for example, MINISIS is used in three main applications—the Centre's Library, the Communications Division mailing list and a databank called IDRIS (Inter-Agency Development Research Information System), to which IDRC and other donor agencies contribute data concerning research activities which they support. Other examples of the wide variety of applications supported by MINISIS include registries of correspondence, directories of consultants and experts, land databanks, press clippings services, record and music libraries, film archives, historical and museum artefacts databanks, germoplasm registries, legislative assembly documentation systems and chemical toxicology databases.

The software includes modules for entering, modifying and retrieving data, for performing arithmetical computations and for producing user-defined reports. The searching module of MINISIS supports the use of an online thesaurus. A Selective Dissemination of Information (SDI) facility supports current awareness services. The software can be used to produce annotated bibliographies, library catalogues and different types of indexes. In addition, MINISIS supports the exchange of databases by accepting and producing magnetic tapes to conform to the ISO 2709 standard, including MARC (Machine Readable Catalogue) formats.

The MINISIS software package provides a complete set of application programs. However, users with unique requirements can write specialized applications programs using the MINISIS routines to supplement the generalized processors provided with the system. The package also has a full range of utilities to assist the database administrator in creating and maintaining databases.

Among the unique features of MINISIS is its ability to interact with and store as well as manipulate information in the language and character set of the user. It is possible for users to access simultaneously the same information using the same software but conducting their dialogue with MINISIS in different languages. Organizations around the world are operating MINISIS or using it to store information in various combinations of English, French, Spanish, Arabic, Chinese, Dutch, Greek, Thai, German, Korean and Japanese.

The MINISIS Users' Group is a forum for users to share ideas and specialized software they may have developed. The group meets annually to discuss applications and problems as well as to provide input to IDRC on future directions for the development of MINISIS. A newsletter is published by IDRC for the benefit of the Users' Group, and members of the Group are encouraged to contribute MINISIS-related programs that they have written to a shared pool of software, maintained and distributed by IDRC, known as the MINISIS User-contributed Library.

One of the major components of the Information Science Division's programmes is to promote the sharing of knowledge. MINISIS was developed as a vehicle for sharing knowledge and the transfer of technology. The software is employed as a tool to permit organizations in Third World countries to manage their own information and easily exchange information with others. It is also used as a mechanism for exchanging application management and computer science skills, not only between developed and developing countries, but also among Third World countries.

MINISIS is used by some developing-country organizations not just to manage their own information but also as a tool to facilitate easier exchange of information among researchers and decision-makers nationally, regionally and globally. Examples include: the Scientech Information Centre of the Ministry of Machine Industries in China which has its own database of Chinese-produced engineering literature and also uses MINISIS to provide current awareness services on a range of foreign databases; the Southeast Asian Regional Centre for Graduate Study and Research in Agriculture (SEARCA) in the Philippines, which operates AGRIASIA, a regional system within AGRIS (International Information System for the Agricultural Sciences and Technology); the United Nations Economic Commission for Africa, which operates the Pan African Documentation and Information System (PADIS); the Centre National de Documentation in Morocco, which compiles a database of literature about Morocco or by Moroccans; and the United Nations Economic Commission for Latin America and the Caribbean, which operates the Caribbean Information System for Economic and Social Planning (CARISPLAN), a database of regional government planning documents. Many other MINISIS users exchange data with other developing-country organizations or acquire databases from developed countries to provide easier access to information.

Knowledge and concepts of the MINISIS software itself, as an example of a computing technology, are also transferred to developing-country information

and computing technicians. Through an intensive three-week training course, computer technicians as well as librarians and documentalists are taught the concepts of a sophisticated database management system, as well as the use and operation of MINISIS as a tool to manage information. The MINISIS applications are designed, implemented, modified and maintained by the developing-country technicians in cooperation with their users. Subsequent advanced training courses provide extensive instruction on more sophisticated aspects of the MINISIS software.

Because the users develop the applications themselves, communicating with technicians familiar with their language, culture and application requirements, there is a much higher probability of successful communication between the user and the implementer of the system and therefore a higher probability of a successful implementation of the application. At the same time, the users and technicians develop techniques for analysis, design and implementation which are suited to their environment. The major objective of this method of disseminating MINISIS is to cultivate the technical expertise of developing-country technicians, which will be automatically adapted to the local environment.

MINISIS has become a means for interorganizational transfer of skills and knowledge within developing countries and regions. Through a CSG programme to establish and support MINISIS Resource Centres, several developing-country organizations have become the source of technology in the transfer process. These organizations conduct local training courses, provide technical advice and produce as well as maintain specialized components of the MINISIS software.

A specific example of this South-South transfer of technology is the role played by the Arab League Documentation and Information Centre (ALDOC) based in Tunis. ALDOC produces the Arabic version of the MINISIS user documentation; conducts MINISIS introductory and advanced courses in Arabic; has installed the software in more than twenty organizations; has developed and maintains Arabic language software tools for use by various MINISIS users in North Africa, the Middle East and Europe; provides technical assistance to the several users; and has organized regional meetings of Arabic-speaking MINISIS users.

This experience is being replicated in China, India and West Africa through the establishment of additional MINISIS Resource Centres.

In addition to the establishment of these Centres, the CSG of the Information Sciences Division is currently making significant modifications to the MINISIS software to improve its capabilities, enhance its user interface, provide more tools to simplify the development of applications by users and to facilitate the portability of the software to a variety of computers.

The objective of these activities is to produce an information management tool that will allow MINISIS users, particularly those in developing-country organizations, to collect and administer, more effectively, information that will enhance their development. It is also the objective of this plan to ensure that the dissemination, support and further development of the MINISIS software is decentralized to the greatest extent possible. This is the natural next step in the evolution of MINISIS to ensure that it is a relevant information tool for years to come.

INFORMATICS PROGRAMME SUPPORT

There are three main subprogrammes in the Information Tools and Methods programme: Informatics, Telematics (3) and Cartography and Remote Sensing. (4) The Telematics subprogramme supports institutions in testing, adapting and using computer messaging, bulletin board and conferencing systems using nonreal time and relatively low-cost data communication techniques, regular telephone networks, packet-switched networks or even satellite-or ground-based packet-radio networks. The Cartography and Remote Sensing subprogramme is aimed at enabling research institutions that wish to investigate the usefulness and appropriateness of modern mapping techniques, such as remote sensing, geographic information systems and computer-assisted mapping, to respond to the information needs of their countries and regions.

This paper concentrates on the Informatics subprogramme and its growth. Two of the global trends to which the Informatics subprogramme is a response are the increasing diversity of information technology and the growing sophistication and knowledge of these technologies by Third World information workers.

The diversity is well described in the Advanced Technology Alert System (ATAS) of the United Nations Centre for Science and Technology for Development, which devoted *ATAS Bulletin* numbers 2 and 3 in 1985 and 1986 to microelectronics and new information technologies. The diversity showed itself in hardware, notably in microcomputers, digital communications, networks of computers, facsimile and optical disks; and in software, in database systems, decision-support systems, graphics and artificial intelligence applications.

Thanks partly to the publicity given to these new technologies by such media as the *ATAS Bulletin* and publications of the United Nations Department of Technical Cooperation for Development (5) and the Board on Science and Technology for International Development, (6,7) and partly to their increased ability to try these technologies because of plummeting costs, Third World information workers have become aware of them during the 1980s. This is attested to by the formation of new institutions,

technical journals, popular periodicals (for example, the creation of the Computer and Information Technology Council of Sri Lanka in 1986 and the publication of *Asian Computerworld* in 1984, *Computerworld Argentina* in 1983, *East African Computer News* in 1985, and *Information Technology for Development* in 1986), the development of information technology industries (for example, the introduction of microcomputer manufacturing in at least five African states south of the Sahara since 1987) and the rapid computer penetration of administrations in even the poorest countries (for example, in Myanmar, Burma (8) and Zambia (9)). Despite these advances, however, information workers in most developing countries have realized that the cutting edge of information technology remains largely out of their reach, and they have lacked direct experience of many of these technologies. This has led to requests for assistance from the Informatics subprogramme.

Another factor which has influenced the selection of support which the subprogramme can give is the mandate of the Information Sciences Division of IDRC. This has been broadened in recent times to encompass more classes of information users, from researchers to planners and decision-makers, who guide the development process, as well as practitioners who implement development change, especially for the rural and urban poor. The provision of information to researchers as well as to planners and decision-makers is easier to justify, because of the potential multiplier effect, than the supply of information directly to development practitioners. The practitioners targeted by IDRC are principally in rural areas.

To extend the reach of the programme, the Information Sciences Division has followed the strategy of using information professionals as key agents of intervention. Even though the beneficiaries (researchers, planners, decision-makers and development practitioners) are not lost sight of, each information professional in contact with these groups is capable of improving information flow to many members of the group, so there is a further important multiplier effect. Thus most projects of the Informatics subprogramme are designed to enhance the ability of information professionals to improve information flow to a target group by exposing the professionals to a new information technology, either in a broad sense or as a trial focused on a particular user group. The concept of 'information professional' has been widened to include, not only library workers, but also computer and training professionals who channel information to the ultimate user groups.

Projects for information professionals

Several projects for information professionals supported by the subprogramme were reported on at the North-South Roundtable on the Informatics Revolution and Developing Countries, held in Tokyo, Japan, in October 1987; (10) some of these have now been completed.

One such project was in the Institute of Scientific and Technical Information of China (ISTIC) in Beijing. Its purpose was to produce a union catalogue of Chinese-language scientific and technical periodicals. The first edition of the union catalogue covers approximately 10,000 Chinese language scientific and technical periodicals held in fifty-six institutions related to the ISTIC network. It provides a firm foundation for further work in the storage and dissemination of scientific and technical information in China. In addition, a computerized database of the catalogue, on which future versions will be built, was produced. This uses the Common Communication Format (CCF), permitting the interchange of data with institutions worldwide. The development of a methodology for producing Chinese-language union catalogues will permit similar catalogues to be made in other fields, such as the social sciences. More widely, the project resulted in the successful development of a methodology of Chinese-language data capture and online information retrieval, which has already been used to set up three other Chinese-language databases.

Another project was conducted by Cuba's Institute of Scientific and Technical Documentation and Information (IDICT). One of its objectives was to develop an experimental microcomputer-based local area network (LAN) to automate periodicals management. Not only has the LAN been successfully implemented, but the LAN technology has been mastered by IDICT staff to such an extent that they have been able to act as consultants for other information projects in Cuba for which the technology is appropriate.

Local Area Network in Cuba's National Scientific and Technical Library. (Photo: Shirley Browne)

In the Training Department at the International Rice Research Institute (IRRI) in the Philippines, a project has been supported to create a microcomputer-based information retrieval system for training objectives and training content modules (for example, computer-aided instruction courses). The methodology is not confined to training in rice production; it has been disseminated through IDRC-supported workshops to other training institutions in Southeast Asia as well as to the training departments of other international agricultural research centres.

Computer editing of video images at the International Rice Research Institute. (Photo: Peter Browne)

Two recent projects for information professionals have been directed at French-speaking African countries. One is to help overcome the shortage of human and technological resources in information science in that region by establishing a network of library schools in Senegal, Morocco and Canada. They will work together to produce new microcomputer-based teaching tools for library and documentation centre automation, as well as to evaluate existing tools and to develop elements of common curricula in this field. Since the two African schools train students from all over the region, this project should result in a wide dissemination of experience with modern information technology.

Another project at the Institut Africain d'Informatique (IAI) in Gabon aims to develop and put in place the first information system on the technologies of informatics and telematics (SITIA) in eleven countries in French-speaking West and Central Africa. The users of the system will be informatics and telematics institutions and professionals throughout the region; the information it provides will be that which is either generated regionally or which has a regional significance. It will encompass mainly factual information on institutions, (including training activities, equipment installed, software used, applications developed, personnel employed), specialists, professional services, professional associations, new products in software and hardware, job vacancies, and so on, as well as bibliographic information on the IAI document collection. Though SITIA itself will be based at the IAI and directly accessible to users in the member countries, a focal point in each country will coordinate user training and the input of information to the system. Dissemination methods will include directories, newsletters and online enquiries.

Regional information system on informatics and telematics at the Institut Africain d'Informatique. (Photo: Peter Browne)

Projects for other information users

In addition to these projects which have been directly aimed to help information professionals update their skills and knowledge, with the expectation that this approach will ultimately benefit information users by a 'trickle down' effect, the Informatics subprogramme has supported projects which have an immediate benefit for other information users. They have been conceived by information professionals (using the term in its wider sense) and will provide users with new experience of information technologies. The technologies chosen have followed the main recent waves of information technology as these have struck, first, the industrialized world, and later, the developing countries.

First came the microcomputer. The very ubiquity of these machines has been an important moving force in nearly all projects supported by the Informatics subprogramme. However, a microcomputer is useless without software. The first type of software with which information professionals requested help from the subprogramme was the database management system (DBMS).

The advantage of a DBMS is that it offers an integrated toolkit for data description, storage, updating and access, replacing diverse tools previously hidden in the programming language. There are many DBMS available on microcomputers, and they have become versatile and powerful information tools during the last decade. Certain of their capabilities were seized upon for exploitation in different projects.

For example, the Population Data Archives project in the Philippines emphasized the use of a single DBMS to provide a framework for the standardization

of data. The project sought a solution to a problem caused by the fact that a large number of proposals in that country continued to seek funding for the collection of demographic and population data which already existed. Institutions or researchers would not release data, or inadequate description or storage and retrieval mechanisms rendered the data impotent. The solution was to get agreement from the data holders to make the data available to the project, and then to convert these disparate data sources, using microcomputer software, into a set of databases using the dBase III+ software which could be easily accessed on any IBM-compatible microcomputer.

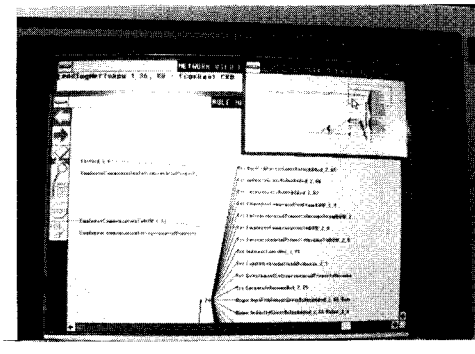
A second project concentrating on DBMS technology is getting under way at the Cooperative College at Moshi, Tanzania. There is renewed interest in the cooperative movement's involvement in the Tanzanian economy, but concern also that modern management tools are not being used or, indeed, are not well understood. This project will establish databases on microcomputers that will serve as models for those ultimately to be put in place by various sectors of the cooperative movement, to help improve management by making relevant and updated information readily available.

In another ITM-supported project, with the Latin American Demographic Centre (CELADE) in Santiago, Chile, a software package, REDATAM, has been built around the access capabilities of a custom-built microcomputer-based DBMS, to make small-area census microdata available for planning purposes at affordable cost to public and private sector users. The need became evident with the impossibility of central government census offices to fill the demand for analysis of small area data in many parts of the country. REDATAM is being used in several countries in Latin America and the Caribbean, and interest has been shown in other regions. The Informatics subprogramme has provided further support to enhance REDATAM as described below.

Proposals for database projects were most numerous in the mid-1980s. In the later part of the decade, as database technology entered the mainstream of microcomputer applications, some other trends became evident which can be characterized as the creation of interfaces to information sources, tailored to specific user needs. Projects supported by the Informatics subprogramme have used for this purpose the information technologies of microcomputer-based graphics and expert systems, while those of natural language processing and hand-held programmable electronic devices are possibilities in the near future.

Graphical elements in user interfaces have so far been relatively few in supported projects, but are expected to become much more widespread. They have played a big part in the computer-aided instruction courses which formed an important component of the project at IRRI which is referred to above. In the enhancement of the small area census package REDATAM at CELADE, an interface is being provided to mapping and geographic information system (GIS) software, to permit easy definition of areas being analysed and the production of graphical outputs.

Expert system applications so far supported have been designed with national planners in mind as the ultimate users. An expert system, ECOKNOWMICS, has been built on microcomputers at the National Economic and Development Authority in the Philippines. It enables planners to obtain data more readily from the national economic databases and to utilize more effectively the macroeconomic models available on the Authority's computers.



Expert system to help in the solution of balance of payments problems in the Philippines. (Photo: Peter Browne)

Another project is for the development and testing of public enterprise evaluation by expert system in Peru. Existing tools to evaluate the performance of public enterprises (which comprise a significant sector in most developing country economies) leave much to be desired. The International Centre for Public Enterprises in Developing Countries in Ljubljana, Yugoslavia, has developed a new methodology for such evaluation which showed promise after testing on historical data. The project is in the process of testing these tools in the context of the actual evaluation needs of the Corporación Nacional de Desarrollo, the body charged by the Peruvian government to monitor public enterprise performance. The expert system encapsulates the methods of Peruvian and international experts on the evaluation of public enterprises.

These two expert systems have been welcomed by their host institutions not only for their intrinsic usefulness as information tools, but also because it gives these institutions the opportunity to experience firsthand the new and powerful technology of expert systems. The projects include significant training in the technology, so that the host institutions will be able to continue the development of such tools. Though expert systems have had a lot of exposure in developed countries, especially in the private sector where they are viewed as an important means of

increasing commercial competitiveness, there have been few applications reported in the public sector in developing countries. The Informatics subprogramme has been keen, for these reasons, to support trials.

Expert systems have the potential to act as a vehicle to bring expert advice to much wider groups of users than national development planners. The group which IDRC is most anxious to help is the mass of farmers. The results of work at the many agricultural research stations worldwide have produced a treasure trove of information, hidden behind barriers of technical language on the one hand and illiteracy, ignorance and inaccessibility on the other. Many media have been tried to disseminate this accumulated knowledge, including newsletters, radio, community information centres and agricultural extension services. Expert systems are seen as a means of reinforcing the last two. They will provide an expert advisory service relevant to the local needs of the people. A first such project is under development. It will produce a microcomputer-based prototype expert system to provide advice on the identification and management of weeds growing in crops. The advantages foreseen are the flexibility of the expert system to respond directly to problems presented, the interactive and guided probing of its knowledge base, and the availability of graphic display to help communicate appropriate advice. Nevertheless, the difficulties of cost-effective implementation are not being minimized, and a lengthy gestation period is anticipated.

CONCLUSION

Both programmes of the Information Sciences Division which support information technology development—MINISIS and Information Tools and Methods—are addressing the real concern of information professionals in developing countries about keeping up with the technology. Two approaches are being taken simultaneously.

On the one hand, software products are being developed and provided for use in developing countries, and these products are themselves evolving to take advantage of improved technology. Thus, users can be confident that these tools are 'state-of-the-art'. The prime example is MINISIS, which is undergoing further enhancements of its capabilities. Another is REDATAM, which having successfully met its first objective of making small area census microdata available for planning purposes, is now being provided with a GIS interface to facilitate and extend its use.

The other approach is to furnish responsive support for tests, experiments, adaptations and pilot projects which fill the need for knowledge of everchanging new domains. This serves to help build the capacity of developing countries to integrate these new technologies into their experience base, and provide a growing foundation for further progress in using information technology effectively.

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Abstract

The second in a series of articles on the activities of the Information Sciences Division (ISD) of the International Development Research Centre (IDRC). Examines the widening scope of ISD projects in response to a broader client base, the increasing diversity of information technology and the greater sophistication and knowledge of Third World information workers. The generalized information management system MINISIS, developed at IDRC and distributed to many countries, is described briefly. Examples of projects indicate that ISD's support of informatics is aimed at providing assistance to developing countries' researchers, planners and decision makers, development practitioners and information professionals to acquire the skills for implementing and making use of diverse information tools from microcomputers to expert systems. Concludes that ISD's informatics programme is concerned not only with producing software for developing countries, but also with filling the need for knowledge to build an indigenous information technology capacity.

Peter Browne is Senior Program Officer, and **Terry Gavin** is Associate Director, at the Information Sciences Division of IDRC.

The role of the information professional in development

Pauline A. Oswitch

Tinker, tailor, soldier, sailor—rich man, poor man, beggar man, thief, goes the children's rhyme: what will you choose to be? What is an information specialist—all things to all people, a quick-change artiste, or a special advisor to a select few? The choice is open and the practice infinitely variable, as is reflected in the miscellany of views—and titles—to be found in the professional literature. Keeper of the Books; Information Scientist; Librarian; Mediator; Gatekeeper; Resource Manager: as my father used to say, 'you pays your money and you takes your choice'.

'Information professional', as described by Debons, Horne and Cronenweth in their book, *Information science: an integrated view* (1988), (1) is a hospitable term that gained acceptance in the late 1960s and was popularized by the American Society for Information Science (ASIS) during the succeeding decades. It has, potentially, one pre-eminent advantage; with such wide-ranging definitions, and such a miscellany of roles implied, there is an implicit need, as well as explicit scope, for an emphasis on cooperation, collaboration and consolidation. As in so many fields, we depend upon the definitions, and this book is a fine compendium and source of eminently usable definitions: job titles, professional categories, information functions, core educational courses, competencies and academic disciplines and interdisciplinarities.

The authors collect and pose a number of questions, and even present a few answers: these are particularly helpful in the development context of the emphasis on interdisciplinarity. The categorization of the information professional as 'concerned primarily with users of information' and 'only secondarily with [the] logistics of handling information materials' is also apposite. They conclude that information professionals have in common a concern with information flows 'within the general systems paradigm' and that the close relatives—computer science, communication science, library science and information science—are interdisciplinary

> because they are concerned with applied and practical problems and need all the knowledge resources available (from whatever field of interest) to resolve them

—a particularly useful focus in the development context.

Box 1

The information professional: some role titles

Information scientist
Mediator
Gatekeeper
Resource manager
Teacher
Researcher
Practitioner
Librarian
Archivist
Manager
Keeper of the books
Fact checker
Information 'source'
System designer
Leader and supervisor
Negotiator
Writer
Speaker
Fund raiser
Subject expert
Database searcher
Collection builder
Budget analyst
Statistician
Consultant
Telecommunications expert
Entrepreneur
Indexer
Abstractor
Information officer
Facilitator
Knowledge counsellor
Communicator
Technology transfer agent.

What choices are open to the practitioner in developing countries—where *all* choices are more severely constrained than in the opportunity-rich West or North? Where do the directions of greatest need, the opportunities to make a difference, lie, and how will we meet the costs? These questions must concern the professional in general, and the aid programme of the Information Sciences Division of the International Development Research Centre (IDRC) in particular, directed as it is specifically to supporting information systems and services in developing countries.

Box 2

Information and development

'There will be a growing need to link up the development process with the use of information systems in order to satisfy information needs and to make the systems dynamic. These are issues related to national information policy formulation. Information should be considered in the same manner as food, shelter, clothing, etc., and treated as such in development planning ... libraries in the absence of other information services—have sometimes to play multiple roles ... it would be more appropriate to designate these professionals as information managers.' (2)

Searching the literature reveals something of the contours of the dilemma. The profession and the discipline are more strictly collections of specializations, spanning sister sciences, but largely grounded in social science, aimed at facilitating 'the communication of (recorded) information between human beings'. (3) In sharing this function, we share similarities as well as generate differences. Different titles, different audiences, different products, different roles, perhaps, but functional similarities, tasks and activities—and all for the sake of service! There are only so many things one can do to acquire the stuff of information, organize it, store it, retrieve and repackage it for user and for use. Here is our common ground, as the users are our common cause.

In 1975, Thomas Deahl presented the annual conference job opportunity service of ASIS as a two-dimensional matrix. (4) In 1982-85, the matrix gave way to keyword access to a microcomputer database. In 1989 the ASIS JOBLINE flyer lists seventeen categories of information professionals that employers may hope to reach through its recruiting service, and adds: 'and more' (see Box 3). The matching of skills, tasks and people is a whole field of its own—like so many dealt with by managers implicitly and from practice and experience over the decades, and finally made more formally explicit in checklists, teaching and now in computer-based expert systems. We can learn from the matching of services and clienteles in many fields, and from the attempts to develop harmonized educational curricula across specializations and countries. The computerized reference librarian or the tutor-in-a-box simulacra may provide the path to progress. The knowledge and skills of the people these systems are trying to capture most surely do.

Keywords or key phrases, the information shorthand of our profession, and the classification of our knowledge bases, semantically map our concerns: automation, data storage and retrieval, document control, information management, marketing, systems analysis and evaluation, database development, telecommunications, economics of information, online searching, librarianship—and so on. Teacher, researcher, practitioner, librarian, archivist—we are many, and then there are those that got away—the computer scientists, the data managers, the semioticists!

Box 3

Tasks and roles

'The things we do just don't fit the standard job nomenclature. They involve various degrees and mixes of librarianship, records management, literature research, thesaurus construction, indexing and abstracting, systems analysis and design, computer programming and operation, data-base maintenance, retrieval query formulation, and what have you. This year, under the auspices of the ASIS Membership Committee, the Placement Service will feature a Job Applicant/Job Opportunities Matrix ... Since we haven't yet agreed on a definition of information science, it is unlikely that there will be agreement on the compass and compartments of the career field. To be on the safe side, we plan to include a catch-all 'Miscellaneous/Miscellaneous' category for those 'frontier jobs' and folks who either refuse to be forced-fit or claim expertise in all areas ...' (4)

ASIS Jobline professional categories:

Library automation, research and development, data storage/retrieval, publications management, marketing, systems development/design, computer systems analysis, finance and economics, document control, librarianship, database development, online searching, information science education, library science education, telecommunications, abstracting/indexing, information management ... and more.

The scope of the IDRC Information Sciences Division provides a microcosm of the universe sketched above. As McConnell has outlined, (5) our major foci cluster around socio-economic, cultural, scientific and technical information systems and the tools and methods of the new technologies—computer and telecommunications systems and services. We do not claim all subject specializations, but the specialization of information to provide systems and services in and across the subjects of concern to development and its problems.

IDRC has stressed the importance of information to the development process from its beginning, to the extent of establishing an Information Sciences Division from the organization's inception in 1970. The Division supports projects concerned with developing indigenous capacity to identify and rank information needs, locate and select information sources, manipulate and process acquired

information, and to retrieve, repackage and disseminate information to clearly-defined target audiences. The concepts which guide this programme focus on local and regional resource sharing and cooperation, capturing and using indigenously generated information, fostering the skills needed for selecting, processing, storing and using relevant information; and the management and effective use of resources. (6)

Continuing attention to the evaluation and assessment of programmes and projects, and to the experience of the information professionals in developing countries, helps to ensure that the programme remains responsive to development information needs. Desirable emphases include projects which support the management of information and provide information support to development planning and development projects, the continuing development of human resource capabilities, and projects which research the 'process' of information transfer and assess and communicate the impact of development information services. Support emphasis has shifted over the years from global and regional information systems to subregional, national and subnational information systems, and to facilitating the appropriate and necessary linkages between existing systems and projects and other information systems at local, national, regional and international levels.

In the projects which the Information Sciences Division has supported over the twenty years of its history, the role of the information specialist has been implicit rather than explicit—taken for granted, much as information sources and services are taken for granted. In more recent years, with the increasing scrutiny of the Division's experience and the critical self-appraisal of IDRC as a whole, much formerly implicit reasoning has been transferred to explicit rationales. Objectives are itemized, criteria defined and budget priorities determined. Proposals are subjected to peer review, and programmes as well as projects are evaluated.

The expected role of the information professional remains implicit in the project documentation, mostly sketched in in the paragraphs on objectives and activities and in predictions of results and impacts. The broad range of programmes entails support to an equally broad range of activities, and the information professionals in IDRC projects propose themselves for, or find themselves taking on, many and varied roles. As in the profession generally, the opportunities are there, though with major and often crippling constraints. Lack of funds for basic materials, lack of personnel, lack of recognition, lack of training facilities, lack of local professional support— a familiar litany with which all information professionals live to some extent, but the intensity of the need in developing countries is painful. When economic crises hit countries' organizations, research and information services are traditionally in the front line of impact, and budgets are cut. When economic crisis is a way of life; when people lack the basic necessities of food, clean water, shelter, employment and peace, then the hope that the application of knowledge gained from accumulated human experience and research will help solve these problems is a remarkable act of faith—or desperation.

Analysis of the information professionals' tasks and activities in a sampling of the projects the Information Sciences Division has supported reveals some of the implicit roles. Projects focusing on information networking include a whole set of tasks: the development of the network, including the identification of potential participants and definition of coverage in terms of subject, region and time periods; the design and implementation of standard methods for the acquisition, control and exchange of information; training and support to members and colleagues (both in substantive subject content and in information-handling methodologies), or active participation in information networking activities, depending on the role of the recipient organization as coordinating centre or national focal point; the application of new information technologies, especially microcomputers—and now, more and more frequently, telecommunications linkages; information dissemination to network participants (both information professionals and users) by both traditional and novel means (newsletters, abstract journals, specialized bibliographies, videotapes, computer conferencing, electronic mail, online database searching); and making appropriate linkages with other relevant information systems and networks. Projects in this category include the Latin American Centre for Development Administration (Centro Latinamericano de Administración para el Desarrollo: CLAD), the International Development Information Network on Research in Progress (IDIN), the Women's Environmental Development Network (WEDNET), the Caribbean Agricultural Information System (CAGRIS), the Latin American Information System for Planning (Sistema de Información para la Planificación: INFOPLAN) and the International Population Information Network (POPIN).

Non-bibliographic information projects involve information professionals in a wide range of activities including the establishment of databases, information dissemination and referral services, the promotion and marketing of information through training of colleagues and end-users, sharing technical knowledge and information, and establishing linkages with existing national, regional and international information services and databases to facilitate greater cooperation and collaboration. The database may be textual, such as directories of researchers, current research projects or institutions, or numerical—providing, for example, statistical information to facilitate research and policy-making. The emphasis is often on networking and on providing rapid access to data using modern

computerized techniques; and partnership with the researchers gathering and analysing data from the field is crucial. Examples of such projects include IDIN, WEDNET and CAPMAS (Central Agency for Public Mobilization and Statistics).

Some projects focus on specific subjects or sectors within the programme portfolios of the Information Sciences Division's groups dealing with scientific and technical or socio-economic information. The information professionals in these projects function also as subject specialists, with a particular knowledge of the literature and the information systems in their field. Specifically, they will help to create a greater capacity within their organizations for the selection and dissemination of current information from regional and international sources. They will enable their organizations to prepare synopses, state-of-the-art reviews and compendia of term reports and syntheses to keep specialists in their field up-to-date on current literature and relevant research; to function as specialized information analysis centres focusing on information relevant to the specific conditions and cultures of their countries and regions; and to participate in cooperative information projects at national, regional and international levels, as applicable. Examples of such projects include CAGRIS, POPIN, the Caribbean Agricultural Research and Development Institute Literature Service (CARDILS) and the Semi-Arid Tropical Crops Information Service (SATCRIS).

Information professionals in these projects are heavily involved in activities that build the necessary national infrastructures for sectoral and multi-sectoral information systems. They establish regional union lists of national publications and local holdings, develop regional cooperative acquisitions and resource-sharing policies, train core groups of colleagues to act as trainers, and coordinate services offered by libraries and other documentation units specializing in related subject areas, in order to make a much wider range of resources available to any one of the information components of the national or sectoral system.

In a project in Cuba, for instance, information professionals are needed to support Cuban participation in the Caribbean Information System for Economic and Social Planning (CARISPLAN); to enhance the coordination mechanism of the national plan for the acquisition of scientific and technical serials so as to avoid costly duplication; to develop a national union catalogue of scientific and technical serials; to introduce and extend the use of microcomputers as a means of data input and searching; to acquire, adapt and develop software for the achievement of the goals of the project in the areas of database management, communications, word processing, electronic mail and multi-user operating systems; to prepare prototype systems suitable at both national and sectoral levels; and to train personnel from the Institute for Documentation of Scientific and Technical Information (IDICT) and other organizations. Other projects with similar characteristics include CAGRIS, CARISPLAN, INFOPLAN and POPIN.

Some projects focus on the automation of existing systems and services, and necessitate the active involvement of information professionals in the conversion of existing databases into computer-readable form, the design and implementation of interactive access systems, the provision of input to regional and international information systems, the creation of machine-readable databases (including subsets of databases created elsewhere), the development of microfiche collections and microfiching capabilities, the organization of a series of workshops to promote the use of the system and the building of contacts with fellow librarians and documentalists. Information professionals are involved in the system development, pilot tests in countries, system improvements and evaluation and the development of distribution strategies. Two examples of projects of this kind are SATCRIS and REDATAM (Microcomputer-based System for Small Area Data Retrieval, Latin American Demographic Centre, Santiago, Chile).

Other projects centred around the use of the new technologies include tasks related to the evaluation of technical aspects of the delivery of bibliographic information via Compact Disc—Read Only Memory (CD-ROM), the exploration of the impact this technology may have on the delivery of information to developing countries, and the provision of some hands-on exposure to the technology in five projects supported by the Information Sciences Division and in the IDRC Library. In another project in this group, the information professional will review, collect and document the literature on computer-based expert systems, design and encode appropriate databases and rule sets for economic planning in his country, test and debug the rule sets, design user interfaces and prepare user manuals, conduct training seminars and evaluate and test the resulting prototype software. The software package developed in this project, ECOKNOWMICS (at the National Economic and Development Authority in the Philippines), will assist decision-makers in organizing the information needed to build alternative future scenarios, identify potential problems and test possible solutions.

A project at the Institute of Scientific and Technical Information of China (ISTIC) is important because it adapts the technology to support resource-sharing and the effective management of large-scale information systems—a basic guiding principle for all information professionals, but especially relevant to the vast scale of infrastructure-building in China. The major tasks in this activity include producing a union catalogue of Chinese-language scientific and technical periodicals, building a machine-readable database of scientific and technical periodicals, training Chinese

information personnel in the management of information collection operations and in current techniques of computer programming, testing and promoting the use of Chinese bibliographic information standards, and integrating the union catalogue with the general information automation activities of ISTIC.

Examples of some of the roles implicit in these projects are summarized in Box 4.

Box 4

Examples of roles implicit in IDRC projects

CAGRIS	**teacher, facilitator, documentalist, coordinator, liaison, communicator, information disseminator**
CAPMAS	**systems designer, technology transfer agent, labour information analyst**
CARDILS	**teacher, facilitator, communicator, author/compiler, analyst, liaison, consultant, information disseminator, intermediary, documentalist**
CD-ROM	**consultant, evaluator, technology transfer agent, trainer**
CLAD	**teacher, facilitator, technology transfer agent, pioneer in computer-based systems, communicator, author/compiler**
ECOKNOWMICS	**researcher in information systems, systems designer, analyst, technology transfer agent**
IDICT	**systems designer, trainer, technology transfer agent, consultant, documentalist**
IDIN	**trainer, systems designer, information disseminator, organizational support (member of 'life-blood' of organization), researcher, practitioner, evaluator, clearing house agent, 'referee', 'locator', sensitizer, intermediary, facilitator, technology transfer agent**
ISTIC	**documentalist, compiler, trainer, systems designer, technology transfer agent, consultant**
REDATAM	**systems analyst/designer, technology transfer agent, statistician, documentalist, trainer**
SATCRIS	**systems designer, information disseminator, analyst, compiler, communicator, liaison**

As McConnell notes (5), the mission of the Division, as spelled out in the 1986 Program and Policy Review document, is

> to promote the social and economic advancement of developing regions by providing researchers, policymakers and practitioners in developing countries access to the scientific, technical and other information they require for application to the problems of development.

As the experience of those who have worked in developing countries confirms, the term 'information professional' covers many occupations in the information field and many aspects of one information professional's occupation—from supplying books to providing information to tourists. The tasks, and associated roles, include anything involved in transferring ideas or news, from the ideas themselves through the act of transfer and the means by which they are transferred to the complex of activities involved in the acquisition, storage, retrieval and dissemination of ideas or the media on which they are recorded.

The roles of information professionals in the projects supported in these programmes may be constrained by the local context, but essentially respond to the needs of the users which these systems serve. Target audiences, clients or patrons (yet another set of roles to be accommodated) include researchers, policymakers, development practitioners and other information specialists—and latterly, the people all the development plans and projects should benefit, the 'ultimate' (if often long-term) beneficiaries, the rural and urban poor.

IDRC is also directly involved in providing information services through its own Library and its staff of dedicated professionals. As well as the full range of traditional tasks and roles noted as general to the profession and to IDRC projects, the Library acts as a test-bed for technological and bibliographic developments and standards that may be appropriate for adoption by IDRC and its projects, by developing countries or by the international community—'pioneer' and 'official taster' *par excellence*!

One last question, nagging behind the preoccupation with evaluation and the management of information systems and services, and addressed clearly in the American Library Association's 1987 report on the President's Task Force on the Value of the Information Professional: what is it all for? —

> What is the information professional's value/worth? ... the information specialist is like a spindle. We take raw information, like the raw cotton, and process it in such a way that it can be used most effectively by our ... customers, like the weaving machines ... we add value by putting the information in the best, most usable form ... what is the difference in value between the information

Box 5

Goals and objectives of the IDRC Library

In accordance with the objects and powers of the International Development Research Centre, the Library has as its goal to stimulate and facilitate access to information about Third World development with particular emphasis on research in adapting scientific and technical knowledge to the economic and social advancement of developing countries. To meet this goal, the Library has as its objectives to:

1. **Provide information and library services to the following groups: (a) IDRC staff in Canada and abroad; (b) IDRC projects (in cooperation with Regional Offices where appropriate); (c) the Canadian community (governmental, academic and voluntary) concerned with Third World development; and, as resources permit, (d) other communities concerned with Third World development (institutions in the developing countries, international organizations and institutions in other developed countries).**
2. **Provide advice and training to: (a) IDRC staff in Canada and abroad; (b) IDRC projects; (c) developing-country institutions; (d) international organizations with responsibilities for establishing guidelines and standards; and (e) Canadian institutions concerned with Third World development and/or the training of information specialists.**

> in a jumble on the floor, and the information in usable form—wound on a spindle? (7)

The report goes on to present some answers in the form of anecdotes from information managers—the value we still need to add to our performance and evaluation statistics, perhaps.

In summary, and to keep it simple, Belkin and Robertson's definition of the purpose of information science can give us a ROLE title in which all other roles can take their place. If the purpose of information science is

> to facilitate the communication of information between human beings

then the role of the professional is that of FACILITATOR and COMMUNICATOR—moving information, in whatever medium and through whatever methods, in appropriate systems and services. These hospitable role titles capture the service orientation common to the variety of information-related specialisms we can mix and match to meet the needs and necessities in all countries.

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Abstract

The third in a series of articles on the activities of the Information Sciences Division (ISD) of the International Development Research Centre (IDRC). Presents a brief literature review of the evolving role of the information specialist; discusses IDRC's support of projects which contain implicit and explicit functions for the information professionals involved in identifying information needs and in processing, retrieving, repackaging and disseminating the acquired information to targeted audiences for development purposes. This provides many opportunities and, with always limited resources, many challenges. Describes specific roles involved in establishing networks, operating non-bibliographic information systems, designing subject-specific projects, implementing national and regional infrastructures for information systems, and introducing automation of information services. Examples are provided from countries and projects. IDRC's Library is

also described briefly. Concludes that the information specialist's role can best be understood as 'facilitator and communicator'—but the choice is wide open.

Pauline Oswitch is a Senior Program Officer at the Information Sciences Division of IDRC.

Regional information networks: some lessons from Latin America

Shahid Akhtar

They that weave networks shall be confounded
(Isaiah 19:9)

THE ROLE OF INFORMATION IN DEVELOPMENT

Information plays a vital role in assisting the advancement of economic growth in developing countries. While the quantity of available development information is increasing, lack of specific types of information leads to uninformed decisions, unsound projects and missed opportunities. The use of relevant, accessible information in meeting stated objectives, however, is an invaluable and increasingly powerful tool to effect change.

Developing countries generally depend on information which is produced in and controlled by the West. Indigenous efforts to generate relevant information are largely uncoordinated and mismanaged, thus reliance on Western experts continues. However, without self-reliance in the procurement, management and utilization of information, self-reliance in economic development is an unrealistic aim.

It has been noted that

> information gains value once it is exchanged or consumed ... [therefore] ... it must be transferred or delivered' (1)

Networking is one effective way of communicating, exchanging, transferring and delivering information. Simply put, information networks constitute groups of individuals or organizations who share common interests and exchange information in various forms on a regular or organized basis. This sharing of resources is a practical way of utilizing available resources to meet the increasing demands for further information. (2)

IDRC AND THE LATIN AMERICAN NETWORKS

As indicated in the accompanying article by Paul McConnell, (3) the Information Sciences Division of the International Development Research Centre (IDRC) has been supporting cooperative information systems and networks worldwide since the early 1970s. It has done so in areas such as agricultural information in support of a research network. For instance, the West African Farming Systems Network (WASFRN) is a collaborative effort between the Information Systems Division and the Agricultural, Food and Nutrition Sciences Division (AFNS) of IDRC, to ensure that adequate attention is paid initially to building sufficient resources to create effective information flows.

Another example would be in the area of energy information with the International Network on New and Renewable Energy Resources and Technologies for Asia and the Pacific (INNERTAP), a structure of six national focal points working on similar energy issues.

Close to a dozen regional networks have been supported in Latin America alone. They handle all types of information—bibliographical, factual, statistical, ongoing research, referral, and so on—and cover a variety of subject fields. These networks are listed below.

AGRINTER The Interamerican Agricultural Information System (Sistema Interamericano de Información Agrícola) was established in 1972 under the auspices of the Instituto Interamericano de Ciências Agrícolas (IICA) in San José, Costa Rica, within the framework of the International Information System for the Agricultural Sciences and Technology (AGRIS) of the Food and Agriculture Organization of the United Nations (FAO). AGRINTER helped to establish or strengthen national agricultural information systems and networks and improve access to available information in twenty countries in Latin America and the Caribbean before it ceased operation in 1986; however, the national centres continue to function.

BIREME The Latin American and Caribbean Health Sciences Information Center, originally established as the Regional Library of Medicine and Health Sciences (Biblioteca Regional de Medicina y Ciências de la Salud) in São Paulo, Brazil, in 1967. It aims to promote improved health care through better information sharing among health

professionals in the region and covers eighteen countries.

CLACSO An information network for the Consejo Latinoamericano de Ciências Sociales (Latin American Social Sciences Council), based in Buenos Aires, Argentina. It was created in 1967 to improve the flow of information about social science research throughout its twenty-two member countries in the region. Since then, international links have been formed with similar networks in Asia, Africa and Europe.

CLAD (Centro Latinoamericano de Administración para el Desarrollo: CLAD). A Latin American information and documentation network on public administration based at the Latin American Centre for Development Administration in Caracas, Venezuela. It was created in 1985 to promote access to information among governments, the academic community and any other institution committed to administrative reform in Latin America. The network covers seven countries.

DOCPAL The Latin American Population Documentation System (Sistema de Documentación sobre Población en América Latina) was created by the Latin American Demographic Centre (Centro Latinoamericano de Demografia: CELADE) in Santiago, Chile, in 1976, to improve the flow and use of demographic information in socio-economic development work. It covers fourteen countries.

ILET The Latin American Institute for Transnational Studies (Instituto Latinamericano de Estudios Transnacionales) forms a network based in Santiago, Buenos Aires and Mexico City, with the mandate to study development problems in Latin America. ILET has stimulated networking in the region through studies and experiments in the use of new information and communication technologies.

INFOPLAN The Latin American Information System for Planning (Sistema de Información para la Planificación) network was created in 1979 in Santiago, Chile, to respond to the need among professional planners in the region for greater knowledge about planning methods, strategies and experiences. It serves eleven countries.

LATINAH The Latin American Human Settlements Information Network (Red Latinamericana de Información sobre Asentamientos Humanos) was formed in Bogotá, Colombia, in 1979 to compile, organize and foster wider dissemination of existing information resources related to human settlements in Latin America. During its active life, LATINAH served ten countries. It is presently inactive.

PLACIEX The Latin American and Caribbean Program for Trade Information and Support of Foreign Trade (Programa Latinamericano y del Caribe de Información Comercial y de Apoyo al Comercio Exterior), originally established as the Latin American Trade Information Network (RELIC), in Caracas, in 1981, to strengthen intra-regional trade exchanges and promote greater knowledge of trade opportunities in countries of the region.

REDUC The Latin American Network of Documentation in Education (Red Latinoamericana de Documentación en Educación) was established in Santiago, Chile, in 1977. It supports the information needs of the educational research community by facilitating the dissemination and exchange of information on educational developments and current research. Covers seventeen countries.

REPIDISCA The Pan American Network on Information and Documentation in Sanitary Engineering and Environmental Sciences (Red Panamericana de Información y Documentación en Ingenieria Sanitaria y Ciências Ambientales) was originally created by the Centro Pan-Americano de Ingeneria Sanitária y Ciencias del Ambiente (CEPIS) in Lima, Peru, in 1979, to identify and disseminate documentary information useful for improving drinking water supplies in Latin America and the Caribbean and to reduce environmental contamination from waste disposal. The network has since expanded to include information on ongoing research and covers twenty countries.

RIALIDE The Latin American Network of Development Finance Institutions (Red de Información de las Instituciones Financieras de Desarrollo de América Latina) is the information network of the Latin American Association of Development Finance Institutions (ALIDE) and was established in Lima, Peru in 1979 to stimulate cooperation among ALIDE members, facilitate and improve decision-making, carry out

research studies on topics related to development banking in the region, and provide a mechanism for the exchange of information among its seventeen member countries.

Each network has its own unique policy and organizational structure and style, and a distinct product, service and marketing strategy. Each has a unique formula for sharing work, assessing cost effectiveness, measuring self-sufficiency and establishing pricing policies. Furthermore, they are all at different levels of development and sophistication. In sum, each has its own formula for network management.

Many of these differences are due to the unique needs of the users of each network, but perhaps not all these differences are deliberate. In some cases, one might suspect that they have simply not benefited from each other's experience—each being designed, implemented and evaluated within the confines of its own member constituency. Population information centres talk only to other population information centres; the agricultural information centres only to other agricultural information centres.

There has been little progress on making the networks themselves interactive, even though 'development' is a multi-disciplinary concept, and many of the topics are directly related or complementary. Whilst it is true that many of the network managers meet and present papers alongside each other at international seminars, such venues have all focused on the individual subject areas of their information bases and the technological dimension. They have not facilitated the sharing of detailed organizational and management experience specific to designing, implementing and operating information networks that could help them improve the effectiveness and efficiency of the systems and expand their mutual access.

It was with this in mind that IDRC brought together the managers from all these networks into one workshop, at which each could provide detailed reports on the management of their respective systems. This was seen as an opportunity for current and prospective network managers to reflect upon the design, management and operational experience of the information systems that have been set up in the region. This paper presents the theory and practice of, and therefore IDRC's experience with, information networking. It is based primarily on some key lessons learnt in the development and management of Latin American information networks over the past two decades which were discussed at a workshop in Havana, Cuba, in late 1988. It is believed that the characteristics displayed by these networks, and the lessons learnt from them, can apply generally to most developing regions of the world.

WHY NETWORKS?

Networking is concerned with interaction, consultation and information flow within and among institutions and individuals. The overriding objective, therefore, is resource-sharing which promotes the pooling of experience and intellectual and other resources for the attainment of common aims, eases the spanning of boundaries between the jurisdiction of different institutions and promotes the transfer of experience. (4)

The need for resource-sharing is based on several factors. First, no information unit, library or organization individually contains all the information required. Secondly, information has no boundaries, hence it makes sense to share what others have generated in their own countries. Thirdly, there are often not enough funds available to acquire all necessary resources. (5) The advent of networks is, therefore, a response to the following information needs: to improve the exchange of information and communication between information units and between researchers or specialists in a given area; to compile and disseminate information produced in a particular region on a given area of knowledge; to provide integrated information for different economic sectors; and to create a wider base of information for poorly- defined sectors. (6)

In meeting these needs, information networks offer advantages such as the better utilization of existing scarce resources, a larger base of knowledge available to serve local needs, the capacity to reach a greater number of users, and greater economy and efficiency of operations. Networks confront the economic impracticability of massive duplicate collections proliferating in different locations. (7) Ever-advancing communications technology can ensure the free flow of information with equal access to available knowledge no matter where people reside or where information is located. Furthermore, information is provided in various forms other than print. Based on the assumption that cooperation between network members would lead to a saving in resources (human, material and financial) and to increased efficiency, networks not only meet various information needs, but also provide a valuable service in consolidating information from all sources for a specific purpose.

BUT WHAT IS A NETWORK?

The term 'network' dates back to 1560 and generally describes any cooperative activity between individuals or institutions. Choi finds that

> precision in the use of the term declines as network-like activities proliferate. (8)

Networks differ in mandate, structure and organization depending on the type of contact to be established. Hence, there are many different types of

network (for example, research, library, information, computer), both formal and informal, but they all share the need for communicating information through linkages.

Unesco defines a network as

> two or more libraries or other organizations engaged in a common pattern of information exchange. (9)

Lindsay defines it as

> a forum for communication among people who have a community of interests. (10)

He refers to it as 'the old way' whereby a network arises out of the need for people in a particular discipline to share their experiences for mutual benefit. Lindsay also provides a more technical definition of information networks as

> the interconnection of a series of computers such that data can be moved among them in digital form, usually without having to be converted into an external medium.

For this to occur a formal structure and common procedures are established that take into account the needs of all the participating organs. The participating units thus create an information network.

This introduces the concept of computer networks which are interconnected collections of autonomous computers. Two computers are said to be interconnected if they are capable of exchanging information through any transmission medium including copper wire, fibre optics, lasers, microwaves and satellites. (11)

In sum, a network consists of independently-administered units which have formed operational links either for the purpose of maximizing resources or improving the efficiency of their internal procedures. All networks are interrelated since they engage in the same overall function, namely, providing access to needed information.

TYPES OF NETWORKS

Networks can be centralized, decentralized or distributed; these structures indicate the manner in which the information actually circulates amongst participating institutions. A centralized approach means that all units are coordinated by a single institution which usually functions as a 'centre of excellence' on a particular topic. The other units, branch offices for the acquisition of relevant material, disseminate products of the service. (12) A decentralized solution occurs where much more information needs to be gathered on a broader topic and where individual partners themselves need to develop skills over the whole range of processing and operation. Distributed networks have certain functions or geographical sectors which are centralized or decentralized.

Within these general network structures, various other configurations can be seen. The 'tree' has a hierarchical structure, where the terminals connected to the central host can themselves be hosts to terminals at a lower level; the 'mesh' relies on a series of interconnecting hosts, each of which controls its own terminals; the 'bus' and the 'ring' are generally more associated with Local Area Networks (LANs) than with inter-institutional, international networks. (13) These configurations are depicted in Figure 1.

THE LEGAL, ORGANIZATIONAL AND MANAGEMENT FRAMEWORK

The success of resource sharing, the fundamental premise of information networking, depends not only on having appropriate goals and objectives, but also on creating and operating a service within the right legal, administrative and fiscal framework. (14) Legal structure, membership and governance are the foundations upon which networks are built.

Networks often result from a process of intergovernmental consultation as individual governments designate certain institutions that are to be partners. This requires a process of regional consultation by which the qualifications of candidate partners are seriously considered. This results in each partner receiving a 'mandate' from its government or the professional community to take on a defined role. Thus, membership of the network provides the market, financial support, the needs to be served and the interests to which to render account. Carlisle sees the legal structure of the network as

> the formal, organic ordering of the activity pursuant to the law from which it derives its existence and authority to act. (15)

Governance powers include

> the basic and essential definition and continuity or purpose and existence of the corporation

or network. Using partly as our guide a checklist developed by Carlisle, and drawing from the experience of Latin American networks, we shall now discuss the characteristics that any network should reflect in its legal structure, governance, membership and operations.

1. **Balanced representation of diverse members in the governance, either directly or indirectly.** One major element of networking involves coordinating mechanisms consisting of consulting/technical committees, representing not only network members but also end-users. These committees ensure equal participation by

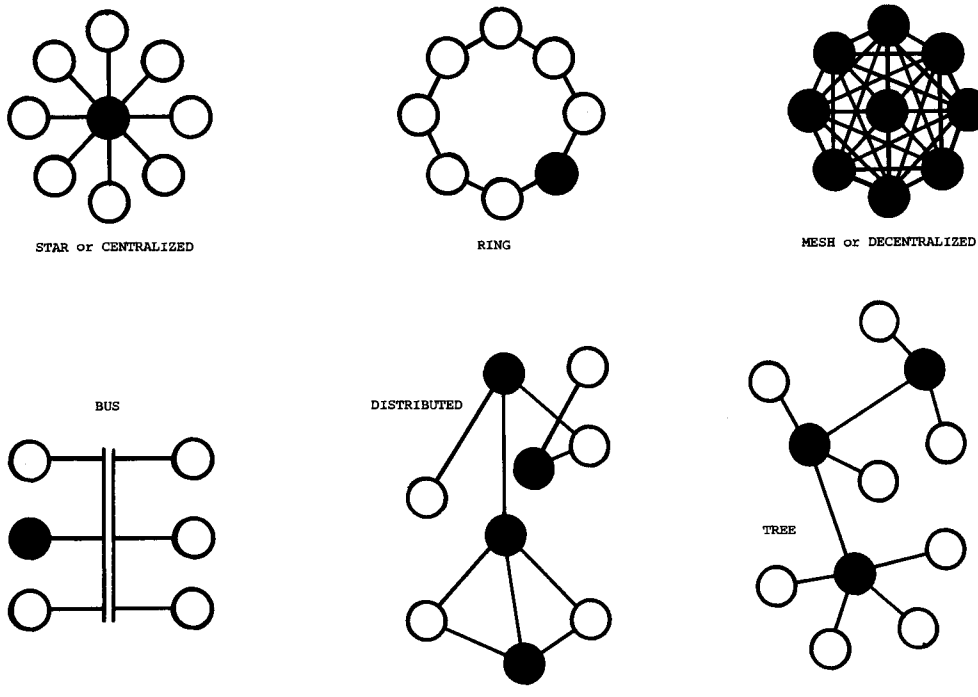

Figure 1. Network configurations.
(Adapted from: Royan, Bruce. Networking models: a comparison of experience in three countries. *In*: Congress of Muslim Librarians and Information Scientists, COMLIS III, 24-26 May 1989, Istanbul. Ankara, Ministry of Culture, 1989. p. 171)

all members by involving them in decision-making on policy and technical matters.

2. **Two-way communication and accountability between members and governance regarding the needs and resources of the network.**
Each member of the network, simply by agreeing to participate, assumes a number of obligations with respect to the management and financing of the network's operations. Members also have certain rights, namely, to receive the results of joint work and to benefit by the services designed for the network.

3. **Flexibility to assume participation in or with various other governments or private entities and programmes, both today and as they change over time.**
Clear and consistent policies regarding participation are critical both to the efficient operation and further development of the network, and experience suggests that they can also assist individual member units when appealing for funding to national authorities in order to meet their respective obligations. Mechanisms to ensure balanced participation for diverse members and flexibility are key contributing factors to successful networking.

4. **Authority and power to execute the purpose of the network.**
The institutional strength of a network depends upon sufficient consensus within each country for the role the member entities perform.

5. **Authority and power to enforce membership in accordance with the purpose of the network.**
Informally-structured network initiatives may be easier to set up, but they also tend to decline quite rapidly because of the lack of continuity amongst personnel, a weak sense of obligation or reliability amongst members, or the disappearance of participating organizations without alternative arrangements. The establishment of a regional information network should not be approached by simultaneously attempting to undertake or encourage the same level of participation by each country. Each country has a distinct development character, yet many networks start out aiming to establish national focal points in all member countries and expect the same level of participation from each. This approach has consistently led to failure, a costly and disillusioning experience for those networks that did not adjust to the heterogeneous circumstances before them.

6. **Ability to foster interdependent interaction and mutual trust.**

In a network of diverse membership, each partner accepts certain obligations to the other members. Specifically, a network's function is to 'marshall resources from its environment to accomplish results beyond the ability of any one of its members.' (8) Network members are, therefore, not passive clients but active participants in the gathering, processing and dissemination of information.

7. **Ability to coordinate cooperative planning of shared resources, both those in existence and those to be developed in the future, by contract with third parties, cooperation among members and internal development.**
Planning, cooperation and coordination are three of the basic principles of network functions. For instance, capacity training within a given network can be carried out optimally and with tremendous cost savings if training programmes and materials are prepared for the network members as a whole rather than individually.

8. **Ability to balance centrality of control and direction with the diverse needs of the members, avoiding over-distribution of power while rendering the governance responsive to the members.**
An information network requires an explicit organizational structure defining the responsibilities, obligations and rights of each participating entity in regard to provision and dissemination of data, as well as managerial and administrative collaboration. A coordinating centre must also be accountable to network members, for only mutual trust provides it with the authority to maintain the purpose of the network in spite of occasional differences.

9. **Provision for proper network conceptualization and design.**
Sewell (14) has identified several constraints or difficulties that should be kept in mind at the network design stage. First, lack of adequate preparatory analysis may lead to inaccurate objectives which would conceal fundamental weaknesses in structure. Second, lack of good planning, of a continuing education programme for staff and of a well-conceived organizational structure may prevent effective resource-sharing. Third, inadequate monitoring services would render feedback mechanisms useless. Fourth, there may be a lack of recognition that the operation of resource-sharing arrangements usually costs money and that benefits may not be seen immediately, but only become apparent in the medium and long term. Fifth, poor transport and communication facilities may inhibit the development of satisfactory networking schemes. Finally, lack of momentum or commitment may arise through changes of personnel, leading to unresponsiveness to new initiatives. For an information network to remain viable, it must be capable of maintaining durability and stability over a period of time and must have the machinery to adapt to changing conditions in its external environment, mainly due to new information needs of users and changes in available resources and technologies.

10. **Ability to respond to end-user needs through initial involvement in the feasibility study and design stages and, eventually, feedback.**
Choi (8) has identified five groups of information users, namely, research and development institutes, higher educational institutions, industrial organizations, government departments and agencies, and the general public. With respect to development efforts, information users include decision-makers and planners, researchers, development practitioners, the rural and urban poor and information professionals. A network is enhanced only by its utilization by the many information seekers involved in implementing development. Potential users of network services and products should be directly involved in their design. Networks that have involved users in system design find clients who are more articulate and precise about their needs, more interested in using the information, and who demand better services. User confidence in the network depends on the quality and speed of information access in relation to their own specific needs.

11. **Ability to set network norms, standards, procedures and guidelines for action by members and by management.**
If members of a network are to share information by transmitting it back and forth, a common frame of reference for compatible standards, procedures and protocols, and the use of compatible technologies (hardware and software) and exchange formats for systems interconnection, are essential.

12. **Ease of implementation and operation and provision of information services.**
The responsibility for delivering products and services to users should normally rest with each of the participating entities in a network, rather than with the coordinating centre of the network itself.

13. **Ability to communicate with and direct management, ensure continuity of internal control and direction and generate correct and intelligent decisions quickly and under pressure.**
The management of a network must be essentially democratic if the participants are to see themselves as equals. Managers and staff

of networks and their participating institutions should not only provide leadership but be technically competent and politically and financially astute, to keep a network alive over many years.

14. Ability to assess and utilize new information and telecommunication technologies.
No mandate decrees all information networking activity to be computer-based. However, a network's capacity to handle information effectively will, to a large extent, depend on how well and how rapidly it integrates new technologies such as Compact Disc—Read Only Memory (CD-ROM), electronic mail, packet-switching and computer conferencing into the mainstream of its information activities.

15. Ability to attract funding on a general cooperative basis to ensure financial stability and, hence, self-reliance.
A key element in the successful establishment and maintenance of a network is the provision of assured and adequate funding. Funding requirements usually fall into the following categories: design (systems analyses and feasibility studies); implementation (the cost of starting up); operation (annual costs of staff, overheads, hardware); expansion of services (demonstration projects, software development, production of cooperative tools such as union lists, training costs, acquisition of new technologies and software). (16) Channels of network funding include internally-generated funding (membership dues, service charges, support from a parent organization) and external funding (federal, state and local authorities and private or foundation grants). Initial funding may also come through international or bilateral aid programmes, but this funding is rarely, if ever, on a protracted basis. It is usually seen as 'seed money' to help lay the foundations. Regular funding will come mainly from institutions housing the network focal points, from membership fees and from charges levied for services. As with any 'public good', information networks should not be expected to become self-financing on a commercial basis. If, in order to fulfil their own mandates, national institutions require the type of information they can obtain from networks, then they should also share in their financing.

16. Ability to act on behalf of, protect and shield network members.
Experience has shown that the success of political negotiations needed to keep networks intact depends primarily on the coordinating centre. The greater the prestige of the coordinating centre, the more successful the network.

17. Ability to avoid political obstacles to performance.
National and regional differences need to be kept in mind while planning and developing a network. The lack of political and economic stability of participating institutions constitutes a real and serious problem for networks and can lead to waste of effort and resources—for example, trained personnel may be lost, political lobbying may be needed to stay afloat, and extra resources may be needed to re-initiate activities that have been interrupted.

18. Ability to measure impact, self-criticize and evaluate the performance of the network.
The impact of network information products and services should, at the very minimum, be assessed from the perspective of end-users, information specialists and people involved in the development of national and regional programmes and policies. Any evaluation should consider at least the following aspects: management and organization; operational effectiveness; training and human resources capabilities; technological innovation and adaptation; service and product quality; user satisfaction; and network sustainability. Generally, however, networks offer tremendous advantages if they display the following characteristics: cost effectiveness, reliability, flexibility, the ability to build on strengths, quality control and effectiveness in relating to changing user needs. (14) Possible adverse factors to look out for are political, geographic and human constraints, deficiencies in infrastructure,human values and the personalities involved.

CONCLUSION

Networks, like all living things, have a life cycle of their own. Their needs, as well as their reasons and circumstances for existence, change with time. Their life cycle will be longer or shorter in direct relation to their ability to generate products and services that correspond to the expectations of those who made the decision to set them up, as well as their ability to redefine their objectives every time they to be modified.

Presently, most Latin American networks are facing new challenges. When they were first established in the 1970s, their structures, products, services and activities were a response to the state-of-the-art of information handling in the region at the time. In the 1980s, they adopted new information processing technologies and, in the process, redefined their respective roles, where necessary. There is a general feeling that they are, once again, at the crossroads. It is unlikely that the networks of the 1990s will be like those in existence today. They continue to evolve. Aside from continuing to adopt

the latest available technologies, they are also adopting new concepts such as the provision of multidisciplinary and integrated information services, through the development of communication and other linkages between and among networks. A multidisciplinary world requires just such a multidisciplinary response—one that is not possible for any one system or network to respond to, but one which may certainly be feasible through an electronic network of networks.

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Abstract

The fourth in a series of articles on the activities of the Information Sciences Division (ISD) of the International Development Research Centre (IDRC). Examines the role of information networks in transferring, disseminating and sharing information across national boundaries. Presents the theory and practice of information networking based on key lessons learned from ISD experience with the development and management of Latin American information networks over the past two decades. The prime objectives of information networking are the promotion of resource-sharing and cost-effectiveness and the pooling and transfer of experience. This is particularly important for developing countries where information and financial resources are scarce and services scattered. A number of characteristics are suggested that any network should reflect in its legal structure, governance, membership and operations. Information networks continue to evolve in response to ever-changing information processing technologies.

Shahid Akhtar is an Associate Director at the Information Sciences Division of IDRC.

Is there a user in the house? Connecting with the user of information services

Gisèle Morin-Labatut

Citizens have a right to inform and be informed about the facts of development, its inherent conflicts and the changes it will bring about, both locally and internationally. Under present conditions, information and education are only too often monopolized by the power structure, which manipulates public opinion to its own ends and tends to perpetuate preconceived ideas, ignorance and alienation. (1)

INTRODUCTION

Twenty years of massive efforts to organize the ever-growing quantity of scientific and technical literature produced throughout the world have, to a considerable extent, brought the 'information explosion' under bibliographic control. The sheer magnitude of the task, the sense of urgency that accompanied it, and the emphasis placed on quantifiable measures of success, all combined to favour the design of information systems more oriented towards products, such as bibliographies and catalogues, than towards services. (2)

In an environment where information-supplying activities are so costly in terms of financial and human resources, the imbalance between available information products and services and their use—between information supply and information demand—has provoked numerous studies attempting to better understand the consumers of information in order to increase utilization. Thus, in trying to understand the needs of users, information scientists have built up a considerable body of knowledge about their attitudes and information-seeking behaviour, recognizing that it is the users who must become the central focus of information systems. (3,4,5) In constructing its own theory, information science has learned and borrowed from the disciplines of psychology and statistics, and also from sociology and communication. This theory has informed practice, and helped determine, as Shiraz Durrani points out

> the type of information services, how they are provided, the type of user they are aimed at, and what will be the content and languages of the information disseminated. (6)

This approach, despite its emphasis on the user, gives the central role to the information provider. It is grounded in traditional mechanistic emitter-receptor models in which the user is viewed as the last element in a process originating with the information source. It does not take into consideration the mental universe of the user, which is the context in which the most important acts of communicating—formulating a problem, interrogating, interpreting, solving, answering—are performed. (7) Some researchers argue that it is only by focusing on the users, and integrating them fully into information systems, that the problem of under-utilization can be solved. (8)

The community of information researchers and practitioners has come a long way from viewing users as passive recipients who must fit the Procrustean bed of products and services predesigned by the professionals, to considering them as the central actors, and sometimes even the co-producers, of the systems to be set up. But always, the object remains the same: to increase access to, and use of, information by reducing the obstacles that stand in the way. Starting from the premise that the need for information is universal, this article will consider some of the factors mentioned in the literature which account for the under-utilization of information services in developing countries, particularly among the least privileged sectors of society. It will then attempt to outline the conditions required for these populations to take advantage of information services and take a step towards participatory self-directed development.

THE NEED FOR INFORMATION

If people do not take advantage of information services made available to them, few would argue today that it is because they have no information needs. Indeed, everyone requires information at some time or another, for a variety of purposes. The type of information required depends on the context in which it is being sought—whether for research, to accomplish a specific task, to redistribute or repackage it in another form, or to solve a problem in day-to-day life. Information-seeking patterns of behaviour will vary for one person according to the circumstances, and from one person to another according to his or her cultural, social and educational background.

Among the many classifications of information found in the literature on user needs are those which define categories in terms of levels (policy and management, scientific and technical, operational), knowledge content (know-why, know-how, show-how) and users (decision-makers, researchers, information repackagers and transfer agents and so on). (2) The point, as W.J. Martin puts it, is that

> information is the essential element [and] what matters most is the provision of information to those who need it. (9)

All societies have evolved their own means of dealing with their need for information and methods of collecting it and transmitting it from one generation to another. Precisely how information is gathered, integrated into the body of societal wisdom and passed on, is intimately linked to the social structure as a whole, its institutions, culture, language(s) and thinking processes. Initiation rites, for example, constitute one of the responses of oral societies to the problem of ensuring that knowledge painstakingly acquired over centuries of experience is transmitted to young people.

Some very ancient cultures, having developed or acquired the art of writing, were able to record certain kinds of information and store the documents in temples or libraries for safekeeping. Access to these documents was restricted to a privileged minority of literate priests and scholars. But even in these societies, the majority of the people relied on alternate, oral means of information exchange.

UNDER-UTILIZATION OF INFORMATION SERVICES

A review of the literature on user studies yields a variety of explanations for the apparent lack of interest in, and use of, information services on the part of important segments of the population, even though these services may be well publicized and available free of charge. Let us consider here some of those which are more relevant to developing-country environments and which are linked to structural, technical and cultural factors, recognizing that they combine in many different ways and affect each category of user differently.

Contemporary libraries are, like schools and hospitals, part of a set of institutions of a country and, as such, profoundly marked by their history and the political, economic and social context. In most Third World countries, they were introduced during the process of colonization. Created to serve the needs of the administration, and implanted in essentially oral societies, libraries and information centres were an artificial construct of a foreign culture. (10) Bureaucratic structures in Third World countries carry with them a set of scientific, technical, organizational and ideological underpinnings characteristic of the societies in which and for which they were originally created. (11) But they are not impervious to societal changes around them, nor to the contributions of the people who staff them. Maintaining an internal, institutional coherence which is in harmony with the changing environment and overall societal objectives, without stifling creativity and effectiveness, constitutes one of the major challenges facing governments today.

Certain policies (stated or not) of some Third World countries actually hinder the free flow of information. This may be explained in many ways, such as concern over national security which leads to classifying too much information as confidential, belief that sharing information will give others access to more power, and resistance to increased social participation of citizens. (1,8) Access to information, then, is more often considered a privilege than a right, and this is bound negatively to affect the interaction between information user and information provider.

Financial, administrative and technical obstacles often severely limit access to commercial databases and publications produced in industrialized countries. This may reduce the motivation of some users, discouraged by the small size of the collections of documents made available to them, particularly if they were educated in institutions boasting well-endowed libraries. Also, the relevance of the information contained in foreign databases and publications has been questioned in terms of content, organization and presentation. (12, 13)

For these and other reasons, the need to develop indigenous capabilities for collecting, organizing and disseminating the information (whatever the origin) required in pursuit of institutional and societal objectives is widely recognized. It is a belief of the Information Sciences Division of the International Development Research Centre (IDRC) that appropriate information systems managed in, by and for developing countries are essential components of autonomous development, as is the fostering of indigenous social, scientific and technical research capabilities. Accordingly, the creation of information infrastructures and the training of the professionals needed to manage them and facilitate their use, constitute the cornerstone of its support.

We will now turn to the social and cultural factors which affect the process of information transfer in developing countries. It is recognized today that information is a complex cultural product. The bulk of information held in libraries and information centres is tied into the 'cultural and technological matrix' of the industrialized world, with a few exceptions such as some extension material (both written and audiovisual) especially designed with a particular audience in mind. (14) Not only is information written according to western forms of logic, but the documents are usually arranged according to western-inspired classification systems.

This poses no particular problem to a large number of people in the categories of user defined as researchers, policy-makers and planners or, generally speaking, to administrators and technicians working in bureaucratic and academic institutions. Their educational background, the organizational structures within which they work and the purposes for which they require information, are all more or less congruent with the type of information resources available. If such people prefer to call upon colleagues or rely upon their memories or personal notes and documents, it is not because they are unable to deal with the information or to understand it. Efforts to increase the use of information resources include trying to enhance the abilities of information professionals to interact with users and potential users.

As well as supporting the training of information professionals, the Information Sciences Division is increasingly turning its attention to the challenge of giving users a greater say in the design of the information services they require. In Thailand, for instance, support has recently been approved for the creation of an integrated information system to assist local and regional planners to collect and analyse appropriate sectoral data in line with recent national efforts to decentralize planning, monitoring and evaluation and increase the participation of all levels of government. At the high end of the technology scale, the Division supports experimental projects whose purpose is to give planners, technicians and administrators the tools and technical know-how needed to collect and process information using microcomputer technology. These are discussed by Browne and Gavin in another article in this issue. (15)

While recognizing and applauding the remarkable progress made in the use of sophisticated information storage, processing and retrieval techniques among information professionals and technical and administrative workers in general, we must not lose sight of basic numbers. Unesco estimates that roughly 30 percent of the world's adult population is functionally illiterate. While some developing countries have virtually eliminated illiteracy, in others the proportion of illiterates can be as high as 90 percent. The printed word may be the most efficient means of *recording* information, but it is certainly not always the most efficient way of *communicating* it, as Elaine Kempson reminds us. (16)

People who do not read and write suffer from a far greater handicap in their quest for information, and a special effort is required to understand their needs and try to respond appropriately. To do so, one must begin by understanding the importance of the socio-cultural context by which individuals define themselves, and which so profoundly affects all aspects of life.

THE SOCIO-CULTURAL CONTEXT

Question: All the cocks in Kasombe Village are white. Lute Mirla saw a cock in Kasombe Village. What colour was the cock she saw?

Answer: Lute Mirla went to the market yesterday to sell two chickens. Lute Mirla has a sister she goes to see in Kasombe Village. Ask Lute Mirla when she comes back. (17)

This Bemba riddle from Northern Zambia is used by Andreas Fuglesang to illustrate the relativity of the notion of rationality or logical thinking. Every culture has its own way of interpreting reality using the language and logical tools it has developed, and of defining problems and formulating solutions. In certain cases, information may be required to solve a particular problem, but here again, cultural factors will be brought to bear on what information is sought, how it is obtained, and from what sources.

Patterns of social integration and views of the universe—or belief systems—are generally such, in oral cultures, that when a problem is identified it is not defined as an isolated phenomenon. Rather, it is perceived within a causal universe encompassing not only material, but also spiritual, elements. A child's illness, for example, may be due to the spirit of a dead relative irritated because of a fault committed by one of its parents. The search for a solution must necessarily take into consideration a variety of possible causes, both in the material and the spiritual environment of the child's community. The problem of that particular child is not perceived as affecting only one individual; rather, it concerns the entire community. Yet the problem is unique in that it results from a particular conjunction of causal factors. The next time a child in the community displays the same symptoms, they may be attributed to totally different causes. By the same token, information concerning the cause or causes of a problem, and its solution, is to be found within the community and must be sought from a trusted source—often an elder, traditional healer or community leader.

This view is not irrational, as some anthropologists have classified it. It is part of a belief system which does not partition the physical world from the mental and spiritual. Insofar as systems such as these have persisted, it is because of their effectiveness in terms of their ability to explain and provide solutions to problems—solutions which are consistent with, and which reinforce, the social system.

It is understandable, within this logical framework, that information concerning the solution to a problem similar in its outward manifestations, but having occurred elsewhere, has little relevance or impact, because the circumstances are different. This type of cultural environment is clearly not one to benefit from health information—or any other practical

information—which might be communicated as a series of recipes handed out by an extension worker who was born and raised elsewhere.

Few, if any, communities live in total isolation. Contacts with the outside, and changes in the physical, economic and political environment, have profoundly affected previously stable societies, giving rise to new problems whose solutions lie outside their own narrow confines. Where people have traditionally turned to friends and relatives for information, the growing complexity of society renders these sources inadequate. (18)

Communication science has gone a long way towards helping us understand the mechanics of information transfer and in applying techniques to facilitate it. Andreas Fuglesang's seminal work in Zambia and Ethiopia in the late 1960s and 1970s allowed him to explore and systematize the tremendous difficulties involved in cross-cultural communication. The process of communication or information transfer rests on the recognition and acceptance, by the parties involved, of a shared system of signs and codes, including language, and shared assumptions and patterns of logic. The same physical evidence does not conjure up for all observers the same picture of reality, particularly when their languages and cultures differ. Nothing less than an understanding of how people structure reality and encode it through language is required, if effective communication is to take place.

To be comprehensible and acceptable, information must conform to

> cultural patterns, which have to be defined, at the micro-regional level within each particular country, with regard to its form, content, language and medium. (14)

When Radio Bamenda began broadcasting a weekly programme entitled 'Rural Rendez-vous', produced with IDRC support by the Cameroon national branch of the African Institute of Economic and Social Development (INADES), people in the nearby district of Buea asked INADES to prepare broadcasts specially for them, because weather and soil conditions were different and because 'we want to hear about people we know from our area'. INADES is now looking into the possibility of preparing some trial broadcasts in Pidgin, which is more widely spoken than English or French, the official languages of the country.

The role of language in information transfer is one of particular interest to the Division. In the mid-1980s, research was funded on policies and practice affecting the use of French lexicon-based Creole in five islands of the Caribbean, and the types of linguistic tools and technical skills which would be required as input to community-based information dissemination projects in Creole.

Understanding information—knowledge—is the first step to integrating it into one's world view—attitude—and translating this into action—practice. The information practitioner is mainly occupied with ensuring that, when people need information, information is available to them which is appropriate in terms of content, organization and presentation, so that it can be understood.

People will integrate externally-generated information into their belief system only if they understand this information and if the messenger is credible; he or she must be known to the community and have gained its respect. For rural sociologist Rui Ribeiro of Guinea-Bissau, rural populations believe what extension workers tell them only if they are willing to take off their shoes, let the mud come up between their toes, and live as the villagers themselves do. This, and nothing else, he insists, was the secret of the freedom fighters in the last years of Portuguese colonization when they were trying to promote health and agricultural extension programmes in the liberated areas. (20)

Appropriate or not, information will be sought out and used if it is perceived by the individual or group as potentially beneficial and rewarding to do so. The perception of one's interest is closely linked to one's cultural and social context. Increasing productivity may mean that an artisan will earn more, but if this also means that he or she will then become responsible for supporting a larger number of jobless

Teaching aids with pictures have been used extensively in health and nutrition education. The effect, however, is unclear.

To an old woman in Luapula, Zambia, I gave a picture handout of a woman breastfeeding her baby. The handout was A4 in size and printed on glossy art paper. We asked the old woman what she saw on the paper. She seemed not to understand the question. Instead, she lifted the picture to her nose, smelling it and feeling its smooth surface with her fingers. It was the intense whiteness of the paper, its straight edge and sharp corners which attracted her. Obviously, for the moment, she simply did not see the picture because she was focusing completely on the paper itself, on this strange material rarely seen in her remote village.

We are inclined to interpret this situation as if the old woman were incapable of seeing the picture. Rather, we should recognize that people's ability to read pictures is correlated to the amount of pictorial stimulation to which they have been exposed in their social environment. The ability to interpret pictures is largely a consequence of urbanization and the subsequent introduction of media providing pictorial representations to traditional societies. Exceptions are found in cultures with a pictorial tradition. (19)

relatives, there may be little motivation to learn more efficient techniques.

In practice, the line between making information available to those who need it, and setting out to deliver information using development communication techniques to bring about planned social change is a thin one. It is often development personnel, whether affiliated to government agencies or to non-governmental organizations, who constitute the privileged source of externally-generated information for rural and urban communities—not information professionals.

It is tempting for busy community development workers or extension agents to deliver recipes and prescriptions for improved farming techniques or health practices, without first trying to understand what their clients consider to be their problems or needs. The result is that they try to 'manage' and organize the communities they want to serve according to externally-defined priorities and programmes. Similarly, few planners believe that illiterate populations have anything really worthwhile to contribute to the planning of development, and tend to consider them as passive recipients of government programmes. This approach embodies a total disregard for indigenous knowledge and problem-solving methods, which have the merit of being solidly grounded in a profound understanding of local social, economic and environmental conditions. It carries within itself the seeds of failure of development projects and of social dysfunction. (21)

The question which imposes itself is whether ways can be found whereby necessary externally-generated knowledge and know-how can be usefully integrated into Third World societies in transition, to serve their development priorities without destroying the host cultures. Some answers may be found in the principles of people-based participatory development.

PARTICIPATORY COMMUNICATION AND INFORMATION MANAGEMENT

> Communication is a dynamic process which is more effective if it is participatory. Participatory communication provides people with an opportunity to be directly associated with policy formulation and implementation, giving them a sense of commitment on national issues. For this reason, the concept of participation is crucial to the communication process. (22)

For the information broker (development agent, extension worker or information practitioner) in contact with community groups and individuals, this implies first of all an ability to listen, and to allow people to formulate their needs according to their own priorities. Secondly, it requires an acceptance of the principle that literacy is not a prerequisite for knowledge or information transfer—a recognition of the oral dimension of a culture. Thirdly, it is necessary to recognize the importance of cooperative (horizontally-transmitted), as opposed to vertical (top-down), information transfer.

Horizontal transmission of information can be as simple as recording an individual or group's experience on a specific topic (or better yet, giving the group the means to do the recording itself) and sharing this recording with others who can benefit from it. This confers value and status to non-written information while allowing the information provider to maintain a sense of control. (23) By understanding, through their own experience, that oral information can be usefully shared among people who do not know each other, people can be introduced to information generated even further away and yet still retain a feeling of control over their lives.

In this environment, a multiplier effect will take place through a desire to repeat an initiative seen as successful and deemed to be relevant to one's own situation; most achievement comes about by imitation, says the Bahaya proverb (Tanzania), not by coercion. The information broker may deem his or her work truly successful when the community served selects and integrates the information it wants into its own rationale, to use that information to meet its needs as it sees fit—when the information, in short, escapes from the control of the information provider, to become a tool of the user. It is only then that we can begin to talk about self-reliant development.

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Abstract

The fifth in a series of articles on the activities of the Information Sciences Division (ISD) of the International Development Research Centre (IDRC). Discusses some factors affecting the use of information products and services, particularly among the least privileged sectors of society. Argues in favour of developing indigenous capabilities for collecting, processing and disseminating both locally- and externally-generated information. Stresses the importance of socio-cultural factors in the communication of information, especially in societies with an oral tradition, and the pivotal role played by community development workers in disseminating information. Advocates the application of the principles of participatory communication in which people are more directly involved in generating, using and exchanging information suited to the information needs which they have defined themselves.

Giséle Morin-Labatut is a Program Officer in the Information Sciences Division of IDRC.

Information needs for rural development

K.P. Broadbent

HISTORICAL BACKGROUND

There is no commonly accepted view of what constitutes 'rural development', nor how it is best promoted. Different schools of thought exist. Prevailing definitions reflect not only specific national situations, but also normative views of the priorities and strategies of development. Although most planners and policy makers agree upon poverty eradication as the key objective of rural development, there are often divergent views on methods. In developing countries there is a wide variety of rural development projects supported by a diversity of local and international donors and guided by a variety of objectives and strategies.

The concept of Third World rural development has a long history, over the course of which both its approach and means of application have altered often and in detail. Five phases (1) can be distinguished, as outlined below.

Community development (1951-63)

Community development was the precursor of rural development and efforts date back to the 1930s when it was used in municipal planning in the United States. Following the launching of a large American-supported community development project in India in 1952, the community development movement expanded rapidly during the 1950s with over sixty nations in Asia, Africa and Latin America implementing national or regional community development programmes. (2)

Community development projects have been criticized for failing to deal with agrarian issues and for not reforming the rural power structure. Today, most international organizations and national governments have written off community development as a lost cause, (3) although the concept continues to maintain a large literature base and a journal of its own.

Green Revolution (1963-73)

This approach sees the principal goal of rural development as the promotion of agricultural productivity through the delivery of modern, effective packages of inputs and services. The driving force of this strategy during the 1960s was the dissemination of high-yield varieties of food grains, the combined effects of which were thought to bring about a transformation of rural areas.

This period also witnessed the initiation of two macro-level approaches to rural development with strong elements of participation and self-reliance. The Ujaama Villages (Tanzania, 1967) and Saemaul Undong (South Korea, 1970) are worthy of mention for their attempts at mass mobilization as an integral part of the process of rural development.

The rise of rural development (1973-80)

The experience of the Green Revolution demonstrated the limitations of the 'top-down' approach to development with its focus on large farms, irrigated areas and superior cereals dependent on costly inputs. This realization led to serious questioning of the modernization paradigm and resulted in the emergence of a notion of rural development which would concern itself not only with production but also with the question of distribution.

About this time, the international agencies expressed considerable enthusiasm for what has become known as 'alleviation of poverty and basic needs' approaches to rural development as adopted by the World Bank (1975) and the International Labour Organization (ILO) (1976). With this shift, two important ideas on rural development strategy emerged: first, the idea that there was a target group—the 'rural poor'—on whom rural development should focus; and secondly, the acknowledgment that poverty results from a series of causes, thereby necessitating that rural development involve the interaction of a large number of interrelated activities—that is, that rural development itself must be integrated. The concept of integrated rural development thus began to emerge as an extension of the alleviation of poverty and basic needs approaches to the problem.

The historical prototype of the concept of integrated rural development was the Comilla Project (1959) in Bangladesh. The International Symposium of Agricultural Institutions for Integrated Rural Development, organized by the Food and Agriculture Organization of the United Nations (FAO) in 1971, was also a landmark event which led to the founding, in 1975, of the United Nations Administrative Committee on Coordination (ACC) Task Force on Rural Development. (4) In July 1979, FAO organized the World Conference on Agrarian Reform and Rural Development (WCARRD). This contained the

Declaration of Principles and Programme of Action referred to as *The Peasants' Charter*.

Integrated rural development (1980-86)

This 'new style' approach to rural development still cast the rural poor in the role of recipients, rather than active participants, in the development process. At the same time, some disillusionment with the integrated approach to rural development began to emerge. It was realized that the success of many of the pilot projects had been due to the relative intensity of the use of human resources devoted to organization, management and technical assistance. Accordingly, more attention began to be given to the management and organization of rural development, so that goals no longer outstripped administrative capacities. Two notable works in this regard are by J.F. Moris (5) and by B.F. Johnston and W.C. Clark. (6)

1986 to date

Lipton suggests that the concept of rural development is in the process of being revived once again. He projects that the need is to integrate technology, management and institutions (embodying both real participation and organization), which in the past have exerted alternative, but separate influences on rural development thinking.

Caution should be the keyword in our understanding of current rural development processes. With three decades of rural development experience, a vast volume of literature, analysis, public debate and field experience, we are closer to understanding what are the main problems of rural areas. From the information scientist's point of view, however, we are still inexperienced in coping with the information needs of rural populations.

THE INFORMATION PROBLEM

The broad subject scope of rural development means that satisfying users' information needs is very difficult. No one system, service or network can hope to cover every need. The parameters therefore need to be clearly stated. At the International Development Research Centre (IDRC), a number of information activities have, over the years, dealt with rural development issues, yet it has not been possible to approach rural development as a programme area.

The main focus of IDRC's programme is on developing country populations. The majority of these people are poor and live in rural areas. Indeed, it is said that over 700 million rural people are living in poverty in the absolute sense, that is to say they simply do not get sufficient to eat or live adequately. These are the landless labourers, share-croppers, nomads and small-scale farmers. The process of rural development as defined by the Information Sciences Division of IDRC, is concerned with improving the quality of life of rural folk by providing greater access to the information needed to affect their development. That is to say, information projects in the broad area of rural development are projects which can be expected to impact directly on rural populations and which, through participation, seek to improve the quality of life. Such projects include systems, services and networks for policy makers, practitioners, community and village groups which can facilitate access to relevant information aimed at providing indigenously determined solutions to development.

The ultimate beneficiaries of all IDRC projects are the rural poor, though in practice the relationship with the beneficiaries tends to be through remote, action-orientated programmes in information which are usually supported at the levels of decision-makers, researchers and practitioners. The information these groups need to provide services to the ultimate beneficiaries will need to be well-targeted and usable. If such information is to be of optimum use to the users it is essential that it should be location-specific and impact-bearing. The following criteria, therefore, are deemed useful to consider:

(a) careful examination of user requirements as expressed by the perceived needs of institutions versus the basic needs of the ultimate beneficiaries;
(b) focused subject scope;
(c) the information should reflect local conditions;
(d) it should be based on demand rather than supply; and
(e) the service should be grassroots-based

THE KNOWLEDGE BASE

A needs-based approach to information services at the grassroots level emphasizes the role of local or indigenous knowledge in solving development problems. Indigenous knowledge will always have practical advantages over foreign or outside sources of information. It makes sense to view the rural population as both generators and users of information, and in doing so it should be possible to design services which reflect locally-accessible and exchangeable knowledge. Such services would, therefore, identify the person rather than the text holding the knowledge and should incorporate the feedback principle based on a dialogue between rural communities and suppliers of knowledge.

Information projects that reinforce the feedback loop ensure that local people have more of a say in matters that affect them. This means designing information packages that digest locally-adaptable research results and communicating them back to the

base level where data were first collected. The collection and analysis of data gathered at the grassroots level can be unreliable and spasmodic and needs to be systematized. However, any systems and methods applied have to take into account local needs and capabilities. Projects are aimed at the poor, but who are they? Where are they? What do they need? Well-focused projects will know the answers to such questions.

As rural development needs increase, giving a more prominent role to knowledge utilization, information science will be increasingly called upon to design and apply structures to solve problems and provide answers. In many developing countries, however, structural problems exist that preclude satisfactory answers. One therefore has to be careful of pushing infrastructural support too far, too fast, to create systems and services that cannot be sustained without donor support. Clearly, we face a situation where self-sustaining local village and community-based information services lack the ability to meet start-up costs and need help in creating the means for sustaining operating costs. In consideration of these factors, support for information services in developing countries should plan ahead and not focus on the present situation. Working with the poor and resourceless will not always show results.

IDRC's comparative advantage lies in its work with institutions sensitive to the needs of individual users.

THE IDRC APPROACH

Because the information needs of rural development are diverse, the Information Sciences Division of IDRC has adopted a multidisciplinary approach to ensure that existing systems and services collaborate to support the whole 'development' process. In order to achieve this goal, a Rural Development Committee was convened with the task of defining a coordinated strategy for support to information systems working in the broad area of rural development. This Committee set out to define different categories of user and their information needs. It also reviewed current technical traditional systems and approaches for serving the needs of target groups as well as attempting to identify constraints, gaps in knowledge, emerging issues and opportunities for action that could be supported by the Division.

IDRC Information Sciences Division has had a wealth of past experience to draw on, therefore by reviewing this record it is hoped to see what lessons can be learned and applied to current developments. A complementary task of the Committee was to look at what other donors were supporting in this field in order to avoid any overlap, verify approaches taken and problems encountered, and look for opportunities for cooperation and mutual sharing of results. The role of human resources was also considered important in delivering information to rural areas. A major constraint of the development of services is the need for human resource development. It is recognized that an increase in the human component is even more necessary than an increase in the quantity of capital. If overall rural development comprises growth plus change, the process of development cannot be self-sustaining, hence substantial attention to the needs of training and extension are required and one needs to understand the socio-cultural values placed on information. The committee was therefore specifically charged with the task of examining the roles of information personnel involved in rural development and the socio-cultural dimensions of their training as well as their technical skills.

THE SCOPE OF PROJECTS

The specific scope of projects supported by the Information Sciences Division will be varied and will not be focused on a separate rural development programme *per se*. Because agriculture, health, education and rural industries are major factors in the development process, projects focus on the pervasive nature of information needs across basic social, economic and scientific issues as determined by local needs. IDRC responses have been as varied as the scope and have dealt with special topics as well as novel methods.

Information projects are one of the most used ways for purposive, planned intervention for accelerating the dissemination of national research results. The question that most often confronts IDRC is, how effective is the project framework for advancing usable knowledge? For this purpose, intensive studies have begun to investigate the extent to which IDRC-supported activities meet the needs of beneficiaries. This entails examination of related issues such as experience in identifying user needs, provision of appropriate information within the subject scope, selection of channels for communicating the information and some assessment of the impact of information services.

What are the most effective entry points for increasing information in the broad area of rural development? The assumption is that the usual methods used for other information systems and services will not be appropriate or convenient for grassroots levels and that the single most important contribution that can be made by information scientists will be the design and implementation of effective delivery mechanisms.

The project planning cycle (7) comprises the stages of identification, preparation and analysis, appraisal, implementation and evaluation. Information projects in rural development follow this pattern and dovetail quite neatly as the **preliminary phase**, which is the formative stage enabling the project to lay down the basic service, conduct surveys, test

Information projects in rural development

Examples of some of the information and communication projects supported by IDRC in the general area of rural development are outlined below.

Delivery methods

Cassettes

Rural development efforts in many Latin American countries are hindered by poor social communications. The use of effective and low-cost communication technologies such as cassette forums was recognized as one way of bridging the physical distance among peasant farmers. To facilitate social cohesion and economic integration, the Cassette Forum was used as a system of small group communication, combining audio tape cassettes with community listening and discussion groups guided by trained volunteers.

Question and answer service

Those involved in development work at the rural community level often lack access to sources of information useful for solving basic problems. The African Institute for Economic and Social Development (INADES) operated a question-and-answer service for rural people. Emphasis was placed on user input to strengthen its library and staff. This enabled the circulation of relevant information kits on rural development topics.

Instructional techniques

INADES is also involved in developing a variety of instructional techniques and media to reach different language groups and populations in different agro-climatic zones. Particularly important is INADES' effort to increase production of written materials for extension work in Cameroon and to upgrade the skills of training personnel with respect to the design and use of audiovisual tools.

Indigenous knowledge

Scientist practitioners

The need for farmers to receive timely and relevant research on crops has long been recognized. The importance of feedback on information has also been stressed, so that scientists understand difficulties in the application of research. The Tea Research Institute in China responded positively to these principles by stationing 'scientists-turned-practitioners' in rural tea-producing areas to give day-to-day advice and receive feedback from the peasants. Special attention was given to providing information in locally-acceptable formats.

Integrated information

The Bharatiya Agro-Industries Foundation (BAIF) is an innovative and effective rural development organization in India which is building a rural research base to support development decision-making. It includes activities in four main areas: information sciences, health sciences, agricultural sciences and post-production systems. BAIF considers it very important to involve local users at all stages in the research and development process. Information and documentation work is therefore given a major role to play in its programmes of integrated research.

Communication

Strategies

The International Institute for Rural Reconstruction (IIRR) in the Philippines is testing a set of strategies which employ participatory approaches to rural development in order to identify needs-based information and appropriate communication channels. IDRC is supporting a project that will actively involve remote communities in verifying the relevance of information obtained through various channels.

Expert systems

A proposal being considered by the Information Sciences Division of IDRC involves a strategy to expedite communication between scientists and farmers in the diagnosis of plant diseases. It will employ the use of experts at both the scientific and farm levels, and will seek modes of linking communication between the two by making comparisons and endeavouring to establish a common language. The expert system is also a delivery method as it can deliver 'expert' advice and knowledge to users in a form they can understand.

methodologies and set up longterm goals and objectives; the **development phase**, which represents the main programme objectives where methodologies are supplied and the programme is

tested, linkages are perfected and a plan of action is made; and the **implementation phase**, which is the operational stage with concentration on outputs, services and results. Major funding for this phase should be characterized by a growing recipient contribution and undertakings for an ongoing programme if all component parts work well and user satisfaction is maintained. The **final phase** will be significant in that it represents a disengagement period for the donor, who should be able at this time to limit its role to troubleshooting, evaluating and husbanding local financial independence.

Each phase requires a substantially different contribution from both donor and recipient, but control over this work cycle will always be in the hands of planners, politicians and administrators who have to decide whether or not the financial resources are available to maintain what it is they are seeking to do as a result of rural development. It must be borne in mind that in many developing countries, the low level of savings and the inability to mobilize sufficient human capital and other capital inputs is a severe constraint on development planning. The information input, therefore, is determined by good timing as much as by implicit needs at the grassroots level. A long period of adjustment and consolidation of information services should be foreseen. A minimum of ten years is most usual. Traditionally, the main entry point for information intermediaries has been when there is a need to disseminate specific research results. The Information Services Division now tends to look more and more at a 'bottom-up' approach that will provide services responsive to users' needs.

The information intermediary is required to ensure that action programmes are properly implemented, that feedback is obtained, and that the correct information flows to and from the rural areas. Such programmes tend to include the following characteristic components: allocation of resources for future needs; infrastructure building; strengthening rural institutions; support for the agricultural and industrial sectors; and the dissemination of the results of agricultural research, health and education which may be grouped under the broad heading of 'socio-economic transformation of the countryside'. Many countries, for example, China, India and Bangladesh, have developed major programmes in areas with differing degrees of success and failure. The role of information, however, has not always been fully systematized and, as a result, success may not have been as great as could be expected. Currently, information is playing a more strategic role. Farming systems research is often seen as a good base from which to start, rather than at the governmental, institutional or research level; and the 'bottom-up' approach requires that special consideration be given to information use and handling, taking into account the special needs of small-scale farmers, entrepreneurs and rural groups.

The most effective means by which the Information Sciences Division of IDRC can contribute to the final development process will be to strengthen local information systems and coordinate them nationally and regionally to optimize the use of relevant information sources. This means complying with user priorities through the collection, organization, repackaging and dissemination of information generated locally. Some methods that have been considered include:

(a) directories and inventories among user groups for resource provision;
(b) exchanges through institutional levels of national and local government;
(c) indigenous publication projects;
(d) information workshops;
(e) non-bibliographic focus, especially compilation and analysis of economic indicators;
(f) information on different methods of handling information, including the oral tradition;
(g) use of local languages; and
(h) village reading rooms.

A distinction is made between information services that serve the broad mass of rural populations in developing countries and those that serve planners and decision-makers. In practice, IDRC supports both. The need to link and facilitate information exchange between both is considered critical. However, it is also recognized that the human resources capable of operating such systems are in short supply. The Information Sciences Division's main objective will always be to assist weak infrastructures to create viable and sustainable information-handling capabilities in developing countries.

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Abstract

The sixth in a series of articles on the activities of the Information Sciences Division (ISD) of the International development Research Centre (IDRC). Discusses an information strategy for the rural sector in developing countries. Traces the broad concept of rural development over five phases and examines the difficulty in providing rural populations with greater access to information aimed at improving their lives. Consideration of user needs is critical since information must be focused, generated by demand, grassroots-based, reflective of local conditions and based on indigenous knowledge. ISD's rural development approach is multidisciplinary. Projects focus on information requirements across basic social, economic and scientific issues. Rural information projects also require effective information flows at each phase to ensure that knowledge is actually being used. Recommends the strengthening and coordination of local information systems to better support rural populations as well as decision-makers.

K.P. Broadbent is an Associate Director in the Information Sciences Division of IDRC.

Implementing an information strategy for sub-Saharan Africa: the first stages

Alioune Badara Camara

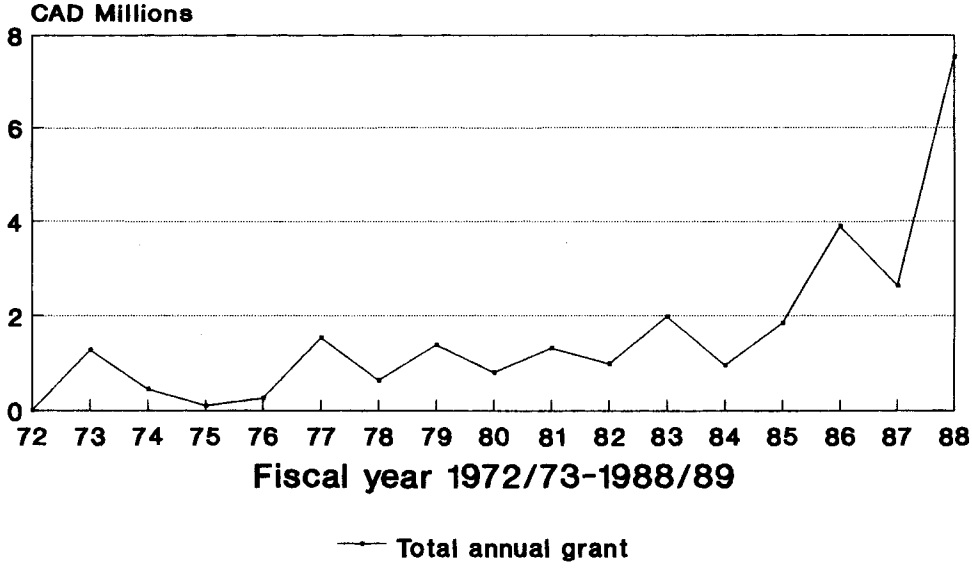
INTRODUCTION

The response of many sub-Saharan African countries to the economic problems of the 1970s has often been to disengage the state from strategic sectors and to implement structural adjustment programmes whose negative effects have been most harshly felt by the poorer segments of society. The failure of these policies and of many aid programmes highlights the need to attack the root problems of the crisis with coherent long-term strategies, which must be evolved by Africans themselves in cooperation with their partners in the international community.

Whilst one of the main characteristics of today's changing world is the emergence and expansion of what is commonly known as the 'information society', disparities between North and South with respect to access to information, the recognition of its role and the use of new information technologies, remain vast.

Among the recommendations of the Organization of African Unity's African Priority Programme for Economic Recovery (APPER), adopted in July 1985, is that greater emphasis should be placed on the use of information in economic and resource management, and on the promotion of science and technology. This has not always been the case in the past, and information has traditionally been granted very low priority by most governments in the region. The information sector in Africa generally suffers from insufficient financial resources and qualified personnel, and a lack of national policy regulating its role and activities. It is also characterized by widely scattered documentary resources and considerable duplication of effort due to poor coordination among existing systems and services. Many important accomplishments have

Fig. 1 Growth of ISD Grants in Africa



As of March 31, 1989

been achieved with external assistance, which will not last forever.

It is in this context and on the basis of almost two decades of experience in the region that the Information Sciences Division of the International Development Research Centre (IDRC) undertook in 1987 the development and gradual implementation of a strategy intended to provide more effective support to information systems, networks and services, in order to meet the most pressing development needs of sub-Saharan Africa. (1)

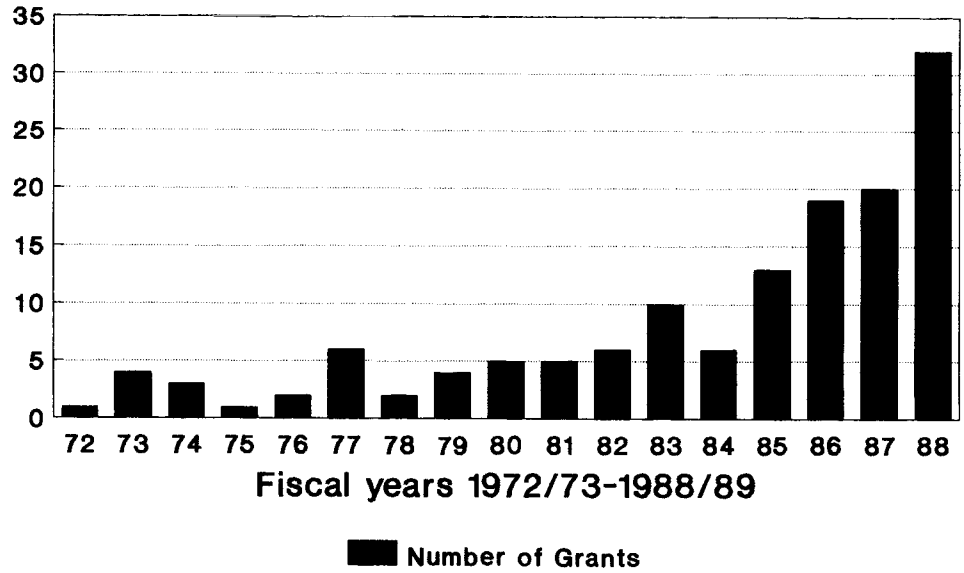
THE INFORMATION SCIENCES DIVISION AND AFRICA

Since its creation in 1970, IDRC has had a programme devoted exclusively to supporting information activities in developing countries. The projects supported by the Information Sciences Division in Africa have ranged from the establishment of basic information services in a specific sector such as agriculture, health or education to the creation of regional multidisciplinary systems. Between 1972 and 1988 the Division financed over 100 projects in sub-Saharan Africa, totalling more than Can$ 28 million. A rapid analysis of assistance provided by the Division since 1972 (Figures 1 to 3) shows a constant increase in funds for Africa, contributing to the establishment of operational information systems, some of which are now of world class status.

In the early years of its activities, the Information Sciences Division focused its energies on supporting global and regional cooperative information systems to serve the needs of the region in such key areas as agriculture, population, health and development planning. These systems were coordinated by United Nations bodies such as the Food and Agriculture Organization (FAO) and the Economic Commission for Africa (ECA), or by regional intergovernmental organizations such as the Sahel Institute in Mali, the International Livestock Centre for Africa (ILCA) in Ethiopia and the African Regional Centre for Technology (CRAT) in Senegal. Throughout the 1980s, the Division also assisted national activities whose purpose was to establish links with regional and international systems in order to improve services at home and promote wider dissemination of national information via these cooperative systems. During this period, some regional and national nongovernmental organizations such as the African Institute for Economic and Social Development (INADES) and the Pan-African Institute for Development (PAID) also carried out projects with support from the Division. In all cases, efforts were made to ensure that projects reflected the priorities and needs of the countries and institutions in question.

Over the years, the majority of IDRC-funded information projects in Africa have been bibliographic and documentary in nature, and their outputs were

Fig. 2 Growth in Number of ISD Grants in Africa

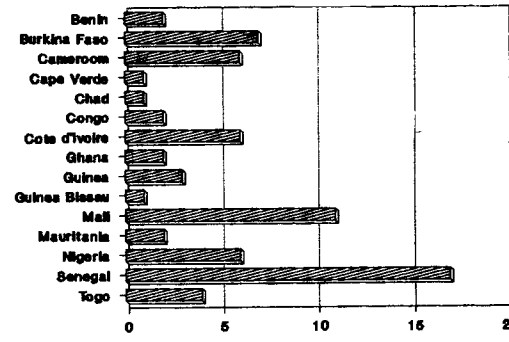


As of March 31, 1989

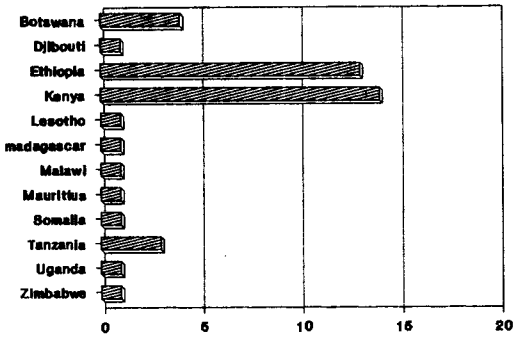
Fig. 3
Number of ISD recipients in Africa (by region)

As of March 31, 1989

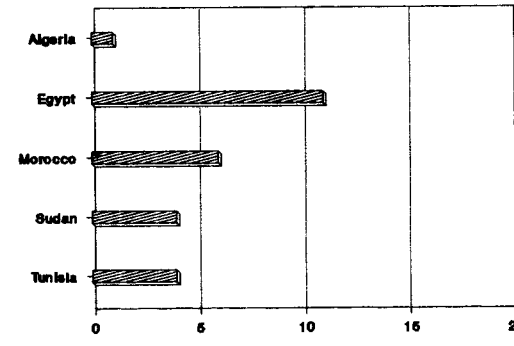
Central/West Africa



Eastern & Southern Africa



North Africa



primarily databases which, in turn, resulted in printed products such as bibliographies and catalogues. Other projects involve the collection of non-bibliographic data and the creation and maintenance of textual or numerical databases. Specific examples of experimental projects in the area of new software applications are described by Browne and Gavin in another article in this issue. (2)

The users and beneficiaries of the services offered by the projects range from researchers, planners and decision-makers to extension workers and intermediate-level technical personnel. It has not been easy to design and implement programmes and services that adequately meet the needs of the ultimate beneficiaries whom IDRC tries to reach, namely, the rural and urban poor, and this is one of the challenges that the Division has set for itself in the next decade.

DEVELOPING AN INFORMATION STRATEGY FOR AFRICA

The search for an integrated and realistic information strategy for sub-Saharan Africa involved a judicious mix of analysis of past experience within the Division and consultation with African professionals. To this end, a Divisional Working Group, including the Deputy Director, the Associate Directors responsible for the main sectoral programmes of the Division and the Program Officers based in IDRC's regional offices in Dakar and Nairobi, was established in 1987. The participation of Africans in the process was accomplished by conducting surveys of individuals and organizations involved in information activities, as well as by organizing two conferences in March 1987—one in Nairobi and one in Dakar—that brought together Information Sciences Division staff and African experts.

The participation of African specialists in the process was extremely important and helped, in particular, to determine needs and priorities, obtain an overview of the concerns expressed, and establish a detailed list of the problems identified and the corresponding solutions proposed. (3) The information gathered in this process was translated by the Working Group into a strategical framework for the definition of future plans in the region. (1)

Main thrusts of the strategy

The adoption of the strategy does not constitute a radical departure from the Division's previous activities in Africa. Rather, it represents an effort to focus objectives on the priority needs of the region. The interpretation of these needs led the Working Group to identify ten objectives which should help direct assistance to information activities in Africa. These are listed in Box 1.

Several of the African strategy's objectives are consistent with the principles which guided the

Box 1

Objectives of the Information Science Division's strategy for Africa

To improve the effective utilization and sharing of existing knowledge and resources in Africa at the local, national and regional levels.

To design and implement information systems and services that are relevant to the local environment and that address specific needs and problems.

To improve information sharing and data transfer at the national and regional levels by promoting standards, compatibility and use of methodologies, technologies and tools adapted to the African environment.

To improve the indigenous capacity to plan, develop and implement national and regional information policy.

To secure long-term commitment for sustainable information programmes.

To stimulate greater use of local technical expertise in information handling by promoting South-South cooperation in Africa.

To build human resources in information sciences through needs-based training at all levels, and particularly, training of managers and trainers to strengthen the multiplier effect.

To improve the capacity of people involved in the provision of information to act as agents of change

To promote a two-way flow of communication so that rural (and urban) poor people participate in an interactive dialogue on issues affecting them

To improve the capacity of local scientists and technologists to obtain relevant information and bring about a more effective transfer of technology at the grass-roots level (4)

Division's activities over the past few years; for example, resource sharing, the development of human and institutional capabilities to conduct and support research, long-term sustainability and the promotion of cooperative information networks in the region. But participants at the strategy meetings also advocated placing more emphasis on the needs of all types of users, and especially on those of the urban and rural poor. In addition to the traditional target groups of researchers and decision-makers, the strategy should emphasize serving groups needing information to effect changes within the context of local development initiatives, namely, extension workers, farmers, community groups and so on. The importance of indigenous knowledge to the development process, and of introducing appropriate feedback mechanisms, was also stressed.

As regards the best means of communicating information, the African participants, whilst recognizing the usefulness of sophisticated technologies and the inevitable introduction of those technologies into their environment, emphasized the need for training at all levels in the use of these technologies, and their combination with other, simpler techniques better suited to the needs of the recipient communities.

These concerns are generally consistent with IDRC's mission to contribute, through research and information activities, to the improvement of economic and social conditions in Third World countries according to the priorities and modalities defined by their populations. Furthermore, by emphasizing the needs of the disadvantaged segments of society, the strategy respects three basic criteria of self-directed development: sustainable growth, equity and participation in decisions pertaining to development. (5)

Implementation of the African strategy

To put the strategy into practice, the Information Sciences Division has adopted mechanisms and procedures that will allow for the effective coordination and execution of its plans for the region. The measures taken concern both the internal structure of the Division (personnel, project administration, and so on) and methods for selecting, funding and implementing projects. In addition, a special effort is being made to ensure that about 50 percent of all Divisional project funds be allocated to African projects every year.

Strategy implementation has also made it necessary to conduct certain preliminary activities, the purpose of which was to give a more precise content to some of the proposals formulated during the two meetings held in March 1987.

In October-November of the same year, the Information Sciences Division funded a mission of representatives of the Arab League Documentation Centre (ALDOC) and the Pan-African Development Information System (PADIS) of the Economic Commission for Africa, to explore twinning possibilities between institutions in North and sub-Saharan Africa and to evaluate existing examples of South-South cooperation. Recommendations included the improvement of information exchange, resource sharing, promotion of common tools and standards, and cooperation in the area of professional training.

In June 1988, the Division helped to set up a meeting in Dakar on harmonizing methods for producing inventories of African research. The participants were able to exchange information, share

experiences and form a committee to develop a set of guidelines.

In November-December 1988, the Division supported a meeting of information professionals, policy-makers and outside observers to exchange information, experience and ideas on the establishment of national information and informatics policies in Eastern and Southern Africa. The consensus emerging from the meeting was in favour of national policies that were fairly broad in scope and which could integrate various sectoral policies. Development of human resources was also emphasized, not only for information professionals, but also for users of information systems.

A fourth activity consisted of an assessment of the management training needs of information specialists, with a view to studying the feasibility of establishing a programme for training managers. The resulting proposals will be incorporated into the human resources development programme now being developed by the Division.

One of the main concerns expressed by the Africans who participated in the African strategy meetings was the need for long-term support for information projects, especially in a context where public funds are insufficient because the benefits of investment in this sector are not always obvious to decision-makers. The Information Sciences Division has for a long time recognized that sustainability cannot be achieved quickly, and that information systems and networks often require up to ten years to become fully operational. Thus, a multi-phase approach has tended to become the rule, making it possible to avoid wasting resources on a multitude of projects whose long-term viability is not guaranteed, and to concentrate resources on information systems more likely to withstand the test of time. As well as multi-phase project support, the Division is now examining modalities not used in the past, such as programme and institutional support as distinct from support for individual projects.

Box 2

The School of Information Sciences for Africa

The School of Information Sciences for Africa (SISA), to be launched in January 1990 at Addis Ababa University, Ethiopia, will offer a regional postgraduate programme leading to a Master of Science degree in Information Science. An annual intake of twenty students will be drawn from member countries of the Association of Eastern and Southern African Universities (AESAU): Botswana, Comoros, Djibouti, Ethiopia, Kenya, Lesotho, Malagasy, Malawi, Mauritius, Mozambique, Namibia, Seychelles, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. The programme will support human resources development for the management and operation of information systems and services in countries of the region. Graduates from the programmes will serve as professional information resource planners and managers of information systems, and as trainers and educators in the field. The normal duration of the master's degree programme will be two years (four semesters) involving both course work and a thesis. The project also provides for the staff development needed to establish a quality postgraduate programme in information sciences in the region. During the next five years of support from the Information Sciences Division of IDRC, local staff will assume fully the teaching and research responsibilities from the expatriate staff needed to initiate the programme.

Integrating strategy objectives into a coherent plan

The Working Group on Africa maintains regular contact through an electronic mail and computer conferencing link. This group is of prime importance in ensuring a coordinated approach to the implementation of the strategy throughout the different sectoral programmes of the Division, described in the article by McConnell in this issue. (6)

Guidelines for a plan of action for 1990 to 1992 are provided by the development priorities established by the regional offices for Africa and by the ten objectives contained in the Division's strategy for Africa. On the basis of these guidelines, the plan being developed identifies the various activities (studies, seminars, projects) which will be undertaken by the Division's programme group.

An examination of the contribution of the Information Sciences Division's sectoral programmes to this plan shows that the project and activity objectives are generally consistent with those of the African strategy. The objectives of several projects funded since 1988, and those contained in the project pipeline, are related to the development of information infrastructures adapted to local needs, the concern for sustainability, the use of local expertise (South-South cooperation), the use of information tools and methods adapted to a local context, and the development of human resources. Three projects illustrating some of these points, which have been approved in the past year are described in boxes 2 and 3.

One of the basic components of the Information Sciences Division's plan for Africa resides in projects and activities related to human resources development. As the lack of qualified professionals in the information sciences constitutes one of the factors limiting the development of this sector in Africa, the participants at the Dakar and Nairobi

Box 3

Other Information Sciences Division projects in Africa

Information provision for rural development

Rural communities have two information systems that have become uncoupled—systems of indigenous knowledge and systems of external knowledge. These systems need to be integrated and communities should be involved as decision-makers in the creation and maintenance of the information systems that meet their needs. This project will identify factors influencing information provision in six rural communities in Botswana, Malawi and Tanzania and design an information strategy to enhance the process of rural development. Project participants will identify information needs of different groups, the information-seeking behaviour of each group, the supply and demand situation of external development information, access to indigenous knowledge and key issues of rural development towards which a strategy could be oriented. The project will assist national libraries and extension services to examine the role and training of information intermediaries in rural development.

Packet-radio experiment

The lack of adequate communication services in the predominantly rural, mountainous country of Lesotho has a detrimental effect on development efforts. The purpose of this project, which began in January 1989, is to test a new technology, packet-radio, which could solve certain communication problems and help meet the gap between remote sites and existing telecommunications infrastructures (the 'last mile' problem). Packet-radio connects one computer to another using a radio transceiver for error-free transmission of text or data. Researchers will experiment with packet-radio and related techniques to meet rural information and communication needs and to evaluate their ability to meet these needs. The experiments will involve development applications in the agricultural and health fields. One potential user is the Lesotho Flying Doctor Service, which currently uses high frequency radio for voice communications with its rural clinics. The project will include an assessment of the possibility of an operational packet-radio communications system for Lesotho, including connections between such a system and the current telephone network, and the potential use of such a system in other countries.

workshops felt that human resources development had to be a strategic priority. This emphasis on training was reaffirmed by the study on South-South cooperation and the regional meeting on national information and informatics policies held at Addis Ababa.

In this area, the Division operates at various levels. Some projects are entirely devoted to professional training. Two recent examples are the creation of a regional School of Information Sciences for Africa (SISA) at Addis Ababa University (see box 2), and the development and testing of common tools and materials to be used in training professionals in computerized documentation and information management, involving the cooperation of three library schools in Dakar, Rabat and Montreal. Other projects include short-term training components directly linked to activities to be undertaken by the personnel.

Another undertaking that is very interesting with respect to training in new information technologies is the recently approved project for a MINISIS Resource Centre for Central and West Africa, based at the African Intellectual Property Organization (OAPI) in Yaoundé. This resource centre makes it possible to decentralize installation and promotional activities for MINISIS and train users located in the region. With this project, the Information Sciences Division is increasing the potential of an African institution and initiating a transfer of technical skills; this is facilitated by the secondment of the IDRC staff member responsible for MINISIS distribution and support in Africa.

Training of the types mentioned above will continue, but will be complemented by a programme of short-term courses and seminars supported jointly by the Information Sciences Division and IDRC's Fellowships and Awards Division. Areas of concentration will include management techniques, microcomputer-based database management systems, documentation methods and techniques and information marketing. This programme will be implemented in cooperation with African professional training institutions and will provide information personnel with the possibility of upgrading or updating their skills.

The recognition of the special needs of rural populations and, more generally, of communities with an essentially oral tradition, is discussed in other articles in this issue. (7,8) Such an orientation, which involves a redefinition of the profile and responsibilities of information professionals—who

must become true 'information brokers'—cannot be implemented without indepth studies and experiments on information communication methods geared to these populations. The Division's concerns in this area led to the creation, in 1987, of a Divisional Committee on Rural Development and to the commissioning of an indepth study on the concept of community information centres in West Africa by the non-governmental organization Environnement et Développement—Tiers Monde (ENDA),whose headquarters are in Dakar. (9)

CONCLUSION

Heavy investments of the 1970s and 1980s have not resulted in adequate information structures in most African states. Apart from internal factors related to insufficient human and financial resources and lack of appreciation of the role of information, the situation is also due in part to the way in which external assistance has been granted. (10) Insufficient interagency consultation or coordination has led at times to a form of competition among donors which reduced their effectiveness. In addition, short-term aid has put many African institutions in difficult financial positions before new systems and services had a chance to become fully operational and demonstrate their usefulness.

The lessons learned from these experiences indicate that a coordinated approach is essential, which integrates donor agency perspectives, recommendations of African information professionals, and the needs expressed by the various communities of users we are trying to serve. It is the hope of the Information Sciences Division that its African strategy constitutes a first step in this direction.

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Abstract

The seventh (final) in a series of articles on the activities of the Information Sciences Division (ISD) of the International Development Research Centre (IDRC). Describes the information strategy for sub-Saharan Africa evolved by the Division. On the basis of almost two decades of experience in the region, ISD is in the process of implementing this strategy to provide more effective support to information systems, networks and services in sub-Saharan Africa. Gives a brief overview of ISD experience in the region and discusses how the strategy was drawn up, its main features and the first stages of its implementation. Although the strategy's objectives do not represent a radical difference from the Division's past activities in Africa, it puts more emphasis on the information needs of the urban and rural poor and development practitioners. Also stressed are the importance of indigenous knowledge, appropriate feedback mechanisms and human resources development.

Alioune Badara Camara is Regional Program Officer for the Information Systems Division of IDRC based in Dakar, Senegal.

FORTHCOMING EVENTS

IFIP MEETING, 1990

IFIP Technical Committee on the Relationship between Computers and Society (TC9). **Fourth Conference on Human Choice and Computers (HCC 4)**. 1990.

The main topic of this conference will be information technology assessment. The Forecasting and Assessment of Science and Technology (FAST) programme of the Commission of the European Communities will participate.

Further information from
IFIP Secretariat, 16 Place Longemalle, CH-1204 Geneva, Switzerland.

SCHOOL LIBRARY CONFERENCE, 1990

The nineteenth annual conference of the **International Association of School Librarianship** for 1990 will be held in Zagreb, Yugoslavia.

Further information from
Michael Cooke, President, International Association of School Librarianship, c/o College of Librarianship Wales, Llanbadarn Fawr, Aberystwyth, Dyfed SY23 3AS, Wales.

IEE CONFERENCES

Institution of Electrical Engineers; British Computer Society; Department of Trade and Industry; Science Engineering Research Council. **UK IT 1990 Conference**. University of Southampton, England, 19-22 March 1990.

The aim of this conference is to provide an annual, national, technical forum for the presentation of current work in the enabling techniques for information processing. It will cover: knowledge systems; speech, vision and natural language; distributed systems; human elements of systems; software engineering; VLSI; optoelectronics in computation; CAD; control and instrumentation measurement and control systems.

Institution of Electrical Engineers. **Eighth International Conference on Video, Audio and Data Recording.** University of Birmingham, England, 23-26 April 1990.

This conference aims to provide an international forum to consider recent advances in all aspects of recording technology. It will include a Tutorial Day on the latest recording techniques.
Further information on IEE conferences is available from
Conference Services Department, IEE, Savoy Place, London WC2R 0BL, England.

LONDON BOOK FAIR

London International Book Fair. Olympia 2, London, England, 26-28 March 1990.

Further information from
Kari Olsen, Fair Assistant, Reed Exhibition Companies, Oriel House, The Quadrant, Richmond, Surrey TW9 1DL, England.

BOLOGNA BOOK FAIR

27th Bologna International Childrens Book Fair. Bolgna, Italy, 5-8 April 1990.

The Fair is the major international children's publishing and communications media event. More than 1,200 publishers from 54 countries took part in the 1989 Fair, which attracted 19,000 visitors. Admittance is for professionals only.

Further information from
Fiero del Libro per Ragazzi, Piazza della Constituzione 6, 40128 Bologna, Italy. Tel. +39-51-282111. Tlx. 511248 FIER80 I. Fax. +39-51-282332.

SOFTWARE TOOLS '90

Blenhein Online Ltd. **Software Tools '90.** London, England, 12-14 June 1990.

Further information from
Blenheim Online Ltd., Blenheim House, Ash Hill Drive, Pinner, Middlesex HA5 2AE, England. Tel. +44-1-868-4466. Tlx. 923498 ONLINE G. Fax. +44-1-868-9933.

SCIENTIFIC COMPUTING CONFERENCE

2nd Scientific Computing and Automation (SCA) (Europe) Conference and Exhibition. Maastricht, Netherlands, 12-15 June 1990. Theme: Les sciences sans frontières.

Topics to be covered by this conference will include: chemical applications for supercomputers; sampling strategies and experimental design; online databases in chemistry; databases for spectroscopy; dynamic models for catalysis, processes and metabolism; expert systems and statistical tools for the interpretation of laboratory data; robotic and discrete automation in the laboratory; interfacing tools; chemical monitoring; LIMs and LAN strategies for the laboratory; workstations for the scientist; scientific applications for neural networks and fractals; software tool kits for exploratory data analysis and mathematics; computer graphics and image analysis; designing molecules by computer; and 'Europe 1992: implications for standarisation across borders'. A number of short courses will be held in association with the conference. The exhibition is organized by the publishers of *Nature*.

Further information from
SCA (Europe), c/o Reunion International, WG Plein 475, 1054 SH Amsterdam, Netherlands. Tel. +31-20-165151. Fax. +31-20-890981.

ELECTRONIC PUBLISHING '90

Blenheim Online Ltd. **Electronic Publishing '90.** London, England, 19-21 June 1990.

Further information from
Blenheim Online Ltd., Blenheim House, Ash Hill Drive, Pinner, Middlesex HA5 2AE, England. Tel. +44-1-868-4466. Tlx. 923498 ONLINE G. Fax. +44-1-868-9933.

CODATA '90

International Council of Scientific Unions. Committee on Data for Science and Technology (CODATA). **CODATA '90: 12th**

International CODATA Conference, 'Data for Discovery'. Columbus, Ohio, USA, 15-19 July 1990.

This conference will emphasize the importance of the collection, organization and analysis of large data sets, which can lead to new insights into scientific phenomena. The management aspects of the International Council of Scientific Unions' Global Change Programme will be highlighted, as will exploratory molecular manipulation. The discussions will focus on the following major themes: prediction of global change; spatial databases; materials data systems; expert systems and other knowledge tools; trends in the integration of information across biology; and the impact of new technology on data handling. There will be an exhibition and database demonstrations and a programme of social and cultural activities.

Further information from
12th International CODATA Conference, Applied Information Technologies Institute, 1880 Mackenzie Drive, Suite 111, Columbus, Ohio 43220, USA.

IFLA 1990

IFLA 56th Council and General Conference. Stockholm, Sweden, 18-24 August 1990. Theme: Libraries: information for knowledge.

Further information from
Association of 'IFLA in Sweden 1990', c/o SAB, Box 200, S-22100 Lund, Sweden.

FID CONGRESS, 1990

International Federation for Information and Documentation. **45th. Conference and Congress.** Havana, Cuba, 30 August-7 September 1990. Theme: Information: a resource for development.

The proposed theme deals with the concept of information for development from the point of view of both developed and developing countries, and the sessions will cover: the role of information in socio-economic decision-making—information in industry, agriculture, public health and biomedicine; the information industry in today's world—information as part of the process of economic, scientific and technological integration; information and library services in various fields of science, technology and industry; new information technologies—transfer of technology and cooperation among countries at different levels of development; and national, regional and international information policies. The programme will include plenary sessions, committees, round tables, special sessions, poster sessions, professional visits, an international exhibition and post-conference tours. The official languages will be English and Spanish. The national organizer and host to the Congress is the Institute for Scientific and Technical Documentation and Information (IDICT).

Further information from
Organising Committee, 45th FID Conference and Congress, IDICT, Apartado postal 2019, La Habana 2, Cuba.

IBBY CONGRESS, 1990

International Board on Books for Young People. **22nd Congress**. Williamsburg, Virginia, USA, 2-7 September 1990. Theme: Literacy through literature: children's books make a difference.

This will be the first IBBY Congress to be held in North America. Each morning session will be devoted to one major address, together with country reports from IBBY National Sections. The afternoon sessions will be devoted to discussion groups on a variety of subjects. Topics currently under consideration include: literacy enhancement programmes; creating access to books; reading in teacher training; folklore, literature and literacy; literature in translation; poetry and literacy; reading in industrialized countries; reading in non-industrialized countries; psychology, literature and literacy; international publishing; minority languages in relation to dominant languages; literature and literacy—young people with special needs; illustrators, literature and literacy; and writers, literature and literacy. The Hans Christian Andersen Awards for writing and illustration will be presented during the Congress. A programme of post-conference tours to Boston, Charlottesville, Disney World, New York, Philadelphia and Washington, D.C. will be organized. The number of participants will be limited to 500, no more than 50 percent of whom will be accepted from the United States, 10 percent from Canada and 10 percent from Central America and the Caribbean. The registration fee is estimated to be about US$275.

Further information from
Alida Cutts, USBBY Secretariat, PO Box 8139, Newark, Delaware 19714-8139, USA.

INFORMATION '90

Association for Information Management (Aslib); Council of Polytechnic Librarians (COPOL); Institute of Information Scientists; Society of Archivists. **Information '90. 3rd. International Conference.** Bournemouth International Centre, England, 17-20 September 1990.

Topics to be covered in this conference will include: technology and the information world; ethical issues in the information world; cherishing your information assets; and skills, jobs and mobility. The final plenary session will deal with 'Information, scholarship and the future'. A major trade exhibition will accompany the conference.

Further information from
Information '90 Conference Office, c/o Concorde Services Ltd., 10 Wendell Road, London W12 9RT.

MEDICAL LIBRARY CONGRESS, 1990

Sixth International Congress on Medical Librarianship. Ashok Hotel, Chankyapuri, New Delhi, India, 24-28 September 1990. Theme: Key to resources in health sciences library and information services.

This meeting will be hosted by the Medical Library Association of India. Sub-themes are: keys to resources—the professional librarian's view; keys to access—the health professional's view; keys to information at the grassroots level—the layman's view.

Further information from
C. Dabral, Chairman, National Organizing Committee, 61CML, c/o National Medical Library, (DGHS), Ansari Nagar, Ring Road, New Delhi 110029, India.

TERMINOLOGY CONGRESS

Association for Terminology and Knowledge Transfer *and* International Information Centre for Terminology (Infoterm). **TKE '90. Second International Congress on Terminology and Knowledge Engineering.** Trier, Federal Republic of Germany, 2-4 October 1990.

The Congress will concentrate on the applications of the many new products and services in the field of terminology and knowledge engineering which have emerged during recent years or are under development. The event will be organized in nine sections, as follows: 1. Terminology and knowledge theory; knowledge engineering—new applications for terminology. 2. Knowledge-based systems. 3. Natural language processing and knowledge engineering. 4. Documentation languages and ordering of knowledge. 5. Electronic dictionaries. 6. Descriptive terminology—knowledge engineering in the social sciences and humanities. 7. Terminology and knowledge engineering: new professional profiles, teaching and training. 8. Computer support in technical communication. 9. Knowledge transfer tools.

Two workshops will be held in conjunction with the Congress: 1. Large terminological data banks—common problems and cooperation. 2. Problems of ethnicity in terminology. There will also be an exhibition. The working language of the Congress will be English.

A three-day **Preconference on Terminology and Knowledge Theory** will be held in Vienna in September 1990. The working languages will be Russian and German.

Further information on *both events from*
Infoterm, PO Box 130, A-1021 Vienna, Austria. Tel. +43-222-267535-309. Fax. +431-267552.

EUSIDIC 1990

EUSIDIC 1990 Annual Conference. Helsinki, Finland, 16-18 October 1990.

Further information from
EUSIDIC Secretariat, 9/9a High Street, Calne, Wiltshire SN11 0BS, England.

INTERNATIONAL INTERLENDING

2nd International Conference on Interlending and Document Supply. London, England, 19-21 November 1990.

Over twenty papers on all aspects of interlending and document supply worldwide will be presented at this conference.

Further information from
Graham Cornish, IFLA Office for International Lending, c/o British Library Document Supply Centre, Boston Spa, Wetherby, West Yorkshire, England. Tel. +44 937 546123. Tlx. 557381. Fax. +44 937 546333.

INFOTERM SYMPOSIUM 1991

International Information Centre for Terminology (Infoterm). **Third Infoterm Symposium: Terminology for Knowledge Transfer.** Vienna, Austria, 1991.

The Symposium will deal with international terminology planning for the preparation of high-quality multifunctional terminologies by subject specialists.

Further information from
Infoterm, PO Box 130, A-1021 Vienna, Austria. Tel. +43-222-267535-309. Fax. +431-267552.

IFLA AFTER 1990

IFLA 1991 Conference. Moscow, USSR, August 1991.

The Conference will be held in the last week of August to tie in with the International Book Fair, which is scheduled for the first week of September. Several post-conference tours will be organized and adequate interpretation services will be available for all participants to help them with the daily routine.

IFLA 1992 Conference. India, 1992.

Further information from
IFLA Secretariat, POB 95312, 2509 CH The Hague, Netherlands.

IFIP 1992

IFIP Congress '92—12th World Computer Congress. Madrid, Spain, 31 August-4 September 1992.

The IFIP Technical Committee on Information Systems (TC8) hopes to organize a **World Congress on Information Systems** in conjunction with the 12th World Computer Congress, and the Technical Committee on Data Communication (TC6) is considering holding a **World Congress on Data Communication** at the same time. The 12th World Computer Congress will be hosted by the Spanish Computer Society.

Further information from
IFIP Secretariat, 16 Place Longemalle, CH-1204 Geneva, Switzerland.