

Over the past decade, the important role of information in the development process has been gaining recognition. Certainly, researchers know that it is crucial to their work. The concept of information as a resource has also been rapidly expanding into other sectors including government, policy-making, management, and industrial development.

Developing countries see the advantages and necessity of an adequate information base for their development. In fact, some of these countries are hoping that, in at least some sectors, they can skip the industrialization stage and go directly to information-based industries.

New technologies and the tools they engender have facilitated and popularized all aspects of the information cycle. The tools — software, for example — are a necessary response to the information explosion that has threatened to overwhelm potential information users, at the same time as it has held forth the promise of answering so many questions. In the decades to come, computer and telecommunications services and their associated tools will appear as commonplace as writing "technology" and books do today.

APPROPRIATE OR NOT?

Whenever a specific information tool is introduced in the Third World, a fundamental question must be asked: Is the tool "appropriate" for developing countries? The danger here is that an industrialized country or agency involved in technology transfer may unwittingly prejudge a particular technology or tool as "inappropriate" and reject it. There is thus a need for informed choices, based on research, experimentation, and analysis by the recipient countries themselves.

By the late 1970s it was clear that telecommunications would have an increasingly important role to play in information systems. But was this relevant to developing countries that lacked ade-

quate infrastructure? It was not even clear how some of the new tools might be used in industrialized countries.

IDRC decided to explore specific new telecommunications tools as a way to provide an adequate base of experience for answering such questions.

A few case studies will illustrate the ef-

tions of making telephone connections disappear. The information communicated is also more accurate since the participants remain close to their own information sources.

IDRC became concerned that, with the spread of these new techniques in the industrialized world, Third World institutions would be left out of the picture when it came to the design, implementation, and use of rapidly expanding networks. In order to explore the state of the

COMPUTER COMMUNICATIONS FOR DEVELOPING COUNTRIES

By ROBERT VALANTIN and DAVID BALSON

forts of IDRC's Telecommunications Program to ensure that technologies have a chance to be tested and used before they are either selected or rejected.

COMPUTER-BASED CONFERENCING

One of the most promising telecommunications tools to appear at the beginning of this decade was computer-based messaging. This is similar to telex but much less expensive, and provides additional features such as upper and lower case characters, individualized formats, and message forwarding.

Systems designers have extended the concept into what are now called computer-based conferencing systems. These allow groups of people scattered around the world to discuss, over a period of days, weeks, or months, topics of common interest such as scientific issues.

Each message is transmitted to the host computer and stored in memory. The originator has the choice of addressing one, several, or all participants; the addressees can read any messages at their convenience. The software of certain teleconferencing systems even ensures that authorship of papers is duly recognized or permits participants to vote on issues or reach a consensus.

The asynchronous nature of these systems provides certain advantages over other methods of communication.

For example, problems of communicating across time zones and the frustra-

art and seek advice on any potential role for donor agencies, IDRC convened a week-long workshop in October 1981. Entitled "Computer-Based Conferencing Systems for Developing Countries", the workshop brought together experts from Brazil, India, and international organizations involved in informatics. (A report entitled *Computer-based Conferencing Systems for Developing Countries*, IDRC-190e, presents the workshop's conclusions.)

The telecommunications infrastructure and technology needed for computer conferencing are developing in many parts of the world. Even for relatively inaccessible regions, there exist technical solutions to communications problems. Even in 1981, experts at the workshop unanimously agreed that the greatest impediments to international computer conferencing would be legal and regulatory rather than technical. In some instances, national communications authorities do not look kindly on inexpensive digital communications techniques competing with the lucrative traditional communications monopolies they now manage. In others, the authorities simply do not have the cost/revenue information necessary to make decisions on the introduction of international data services.

Computer conferencing systems will be an integral part of the available communications options in the coming years, the workshop concluded. And unless the developing nations can participate in this electronic community of science and technology, they will suffer yet another

er kind of disenfranchisement. This may take the form of a lack of access to the resources of the industrialized nations or even the inability to gain timely access to scientific results and techniques found in the developing countries themselves.

AN INTERNATIONAL EXPERIMENT

The workshop recommended that IDRC support a pilot computer conferencing project involving both developed and developing nations. A suggested topic was the bioconversion of lignocellulosics (the conversion of waste products into energy sources and nutrients), an appropriate area for international cooperative research given the developing countries' pressing need for fuel and food.

Subsequently, IDRC organized an open computer conference, which ran from May to December 1983. Over 100 researchers from many countries participated, with the majority, as expected,

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based in industrialized countries. Off-line participation modes were provided for those unable to obtain on-line access. The conference ran on two host computers: one in Newark, USA, and one in Stockholm, Sweden. After the conference, evaluations were carried out. The results of these have been published by IDRC (*International Computer-Based Conference on Biotechnology*, IDRC-241e).

The lignocellulosics conference was a useful exercise. As was anticipated, however, the central technical problem proved to be the lack of reliable access to the international data networks by participants in developing countries. Despite the problems, these researchers felt that computer conferencing made sense, especially in light of high travel costs, the scarcity of foreign currency, and the future expansion of the international data transmission web. On the scientific side, they had the benefit of being able to update their knowledge of research activities and to confirm that their own work was on track.

To ensure greater participation of developing country researchers in the future, it will be necessary to improve local telecommunications infrastructures

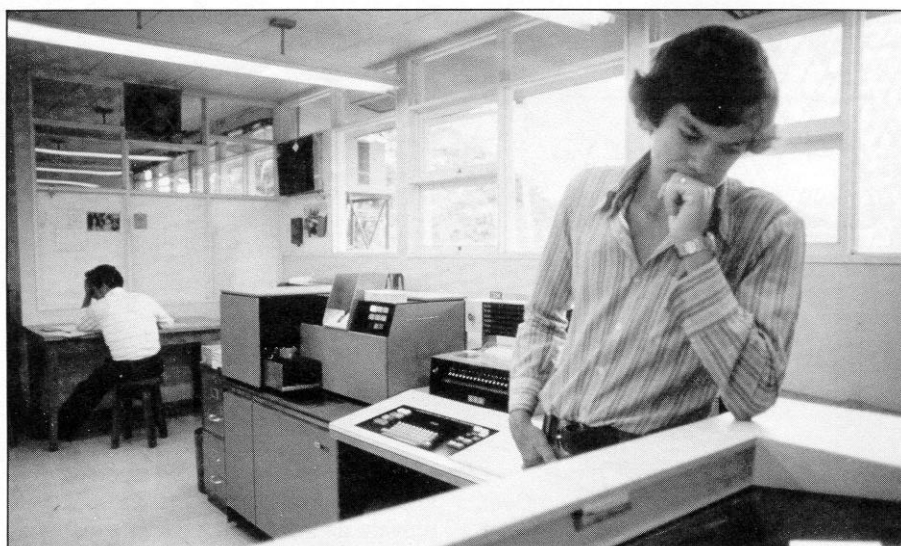


Photo: Ron Poling

Computers at research centres in the Third World, such as this one in Costa Rica, are now exchanging information via international communications networks.

and expand international data transmission networks. Although the computer conference was not a complete success, it did open a window on a new technology for a large group within the biotechnology community.

AGRICULTURAL RESEARCHERS LINKED UP

It is worth mentioning two other IDRC-supported applications of computer-based technologies aimed at improving the flow of technical information between developing countries. The first involves the setting up of a data transfer and messaging network to link the 13 international agricultural research institutions supported by the Consultative Group on International Agricultural Research (CGIAR), an international consortium of research institutions, governments, and donors.

This IDRC-funded project was completed in 1984. It resulted in an operational network, CGNET, linking 8 of the 13 major research sites along with some of the remote sites and many other groups with which the research institutions conduct business. A commercial US-based messaging/conferencing computer acts as the host system for the network.

As CGNET matures, user groups will expand, new applications will be tried (including computer conferencing, bulletin boards, telex-refiling, database access, and data transfer), and new locations will be added to the network.

Another initiative, one in which IDRC's role has been constant but modest, is the development of a worldwide "electronic mailbox" using a low-orbiting communications satellite. The proposed "PACSAT" system is to be based on low-cost packet-radio technology, which should improve the quality and speed of technical information transfer to and from developing countries. The PACSAT

satellite will cover every point on the globe at least twice daily. Messages will be sent and received by ground stations which operate on portable, inexpensive equipment.

As part of the research effort to develop the system, IDRC funded a Canadian nongovernment organization, Inter Pares, to manage a communications experiment using a scaled-down version of PACSAT's "brains" and a satellite built by Britain's University of Surrey. The "field test" took place in January 1985. Despite a number of technical difficulties, the effort paid off: messages were successfully transmitted to and received from the satellite.

The launch of an experimental PACSAT was originally planned for the spring of 1987 during a NASA space shuttle flight, but the tragic destruction of the shuttle Challenger on January 28 has brought that program to a halt. The Radio Amateur Satellite Corporation (AMSAT) is responsible for the technical design, construction, testing, and launch of this satellite. Volunteers in Technical Assistance, Inc. (VITA) is managing the funding and administrative side of the project.

The lignocellulosics computer conference, CGNET, and PACSAT are examples of the application of new information technologies at relatively early stages of development. The evidence provided by these experiments does not conclusively demonstrate either the ultimate utility of these technologies or their appropriateness for developing countries. And although the work was carried out with the needs of these countries in mind, further testing in Third World environments is required. This is clearly the next step. □

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