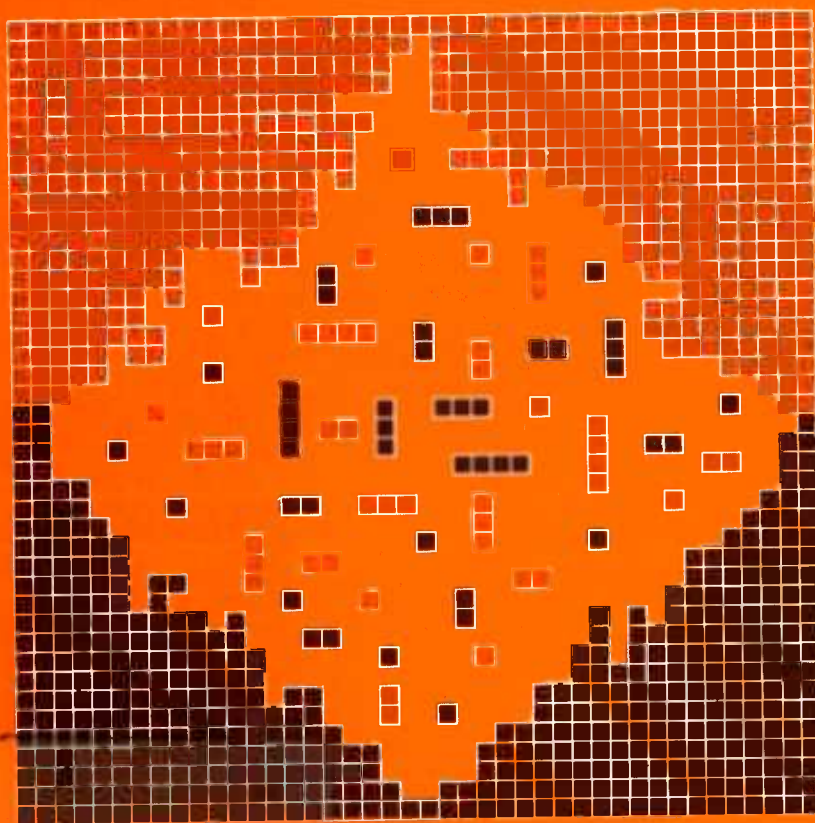


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# International Cooperative Information Systems

Proceedings of a seminar held in Vienna, Austria, 9-13 July 1979

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# **INFOTERRA: an International Information Network**

A. Khosla

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Information plays a crucial role in modern society. Sectorial activities such as industry, agriculture, transportation, and rural development require accurate and timely information for the achievement of their goals. Other activities such as those aimed at technical innovation (research and development), education, or government (planning and decision-making) cannot be carried out without relevant information.

No nation, however rich and determined, can seek all the requisite solutions to the complex scientific, technological, and social problems that are rapidly emerging and multiplying today. A global cooperative effort is the only logical response to the issues challenging humanity. It is for this reason that nations seek to share knowledge and experience pertaining to their common problems and their common goals.

Effective cooperation on international, regional, as well as national levels for development is based on information. The role of information in development was emphasized in the Seventh Special Session of the UN General Assembly by the unanimous adoption of resolution 3362 (S/VII): "Developed and developing countries should cooperate in the establishment, strengthening, and development of the scientific and technological infrastructures of developing countries." In ECOSOC resolution 9102 (LVII) developing countries are invited "to establish or strengthen their scientific and technological information systems" and the resolution further invites international financing organizations as well as developed countries to provide ways and means for supporting developing countries in establishing and strengthening centres and services for scientific and technological information and systems for information assessment and transfer.

## **Special role of information in environmentally sound development**

In the 1980s and beyond, development will increasingly be concerned with environmental factors. Various environmental problems are, and will be, of critical importance to all countries in their efforts to satisfy the basic requirements of their people, to use rationally and effectively their resource base, to develop and expand their economies, and to improve the quality of life of their people. Desertification; soil loss and degradation; deforestation, flooding, and siltation; pollution; resource depletion; noise and congestion; changes in climate; inadequate shelter and water supply; environment-related diseases are only some of the environmental problems already confronting the human race.

Environmentally sound development is needed so that the quality of the human environment is maintained and enhanced as a vital component of human health and well-being and, in general, of the quality of life; also, it is needed so that natural resources and the biosphere are rationally used and managed as a means of enhancing development at present, providing a base for a sustainable development in the future, and avoiding situations in which desirable development options are foreclosed.

The approaches to be developed, the types of solutions to be sought, and the kinds of techniques to be applied will, by definition, vary with time and from country to country. They will be influenced by societal goals and patterns of development, the ecological and physical context, the state of the environment, the means and resources available, etc., and they will depend, above all, on the quality and relevance of the information consulted.

The knowledge needed for achieving environmentally sound development is interdisciplinary and cross-sectorial. It is complex and wide-ranging in scope and rapidly evolving. Moreover, much of it already exists, often unknown to those who need it, accumulated in a vast store of development experience all over the world.

To facilitate rapid access to such information, the United Nations Environment Programme (UNEP) has established a network for the exchange of environmental information — INFOTERRA, the International Referral System for Sources of Environmental Information.

## **Systems concept and design**

INFOTERRA is a component of Earthwatch, UNEP's program for the critical assessment of the global environment. One of the first three program activity centres set up to implement Earthwatch, INFOTERRA was established to facilitate the exchange of environmental information within and between nations. The system was established in response to recommendation 101 of the United Nations Conference on the Human Environment (Stockholm 1972) and has been fully operational since January 1977.

INFOTERRA activities are financed at the global level by UNEP and at the national level by each partner country.

The mandate given to INFOTERRA is by intergovernmental decisions in the Governing Council of UNEP. The mandate places certain constraints on the system, which was designed and established initially to provide governmental decision-makers with information for environmental management. Although INFOTERRA is not restricted to this community of users — others, such as industries, NGOs, journalists, etc., having access to it, as for other UN systems — the primary audience has had an impact on design criteria. Governments indicated that they wished to maintain some degree of control over the flow of information; however, subsequently, the system has been opened to wider use.

INFOTERRA is a decentralized network of environmental information systems; its operation relies on a grid of focal points:

- National focal points designated by governments, coordinating INFOTERRA activities for a particular country;
- Regional focal points designated by intergovernmental agreement, co-ordinating some or all of the INFOTERRA activities within the group of countries concerned;

- Sectorial focal points designated by UNEP in cooperation with an appropriate international organization that has the infrastructure to operate an environmental information service in that sector; and

- The INFOTERRA Programme Activity Centre, which acts as a focal point for international agencies and government organizations not otherwise able to participate in INFOTERRA.

Thus, the INFOTERRA network structure corresponds to the "territorial formula." Indeed, it goes one step further and also has established a "sectorial formula." Whereas the overall network is decentralized, national governments are free to install highly centralized operations if they wish.

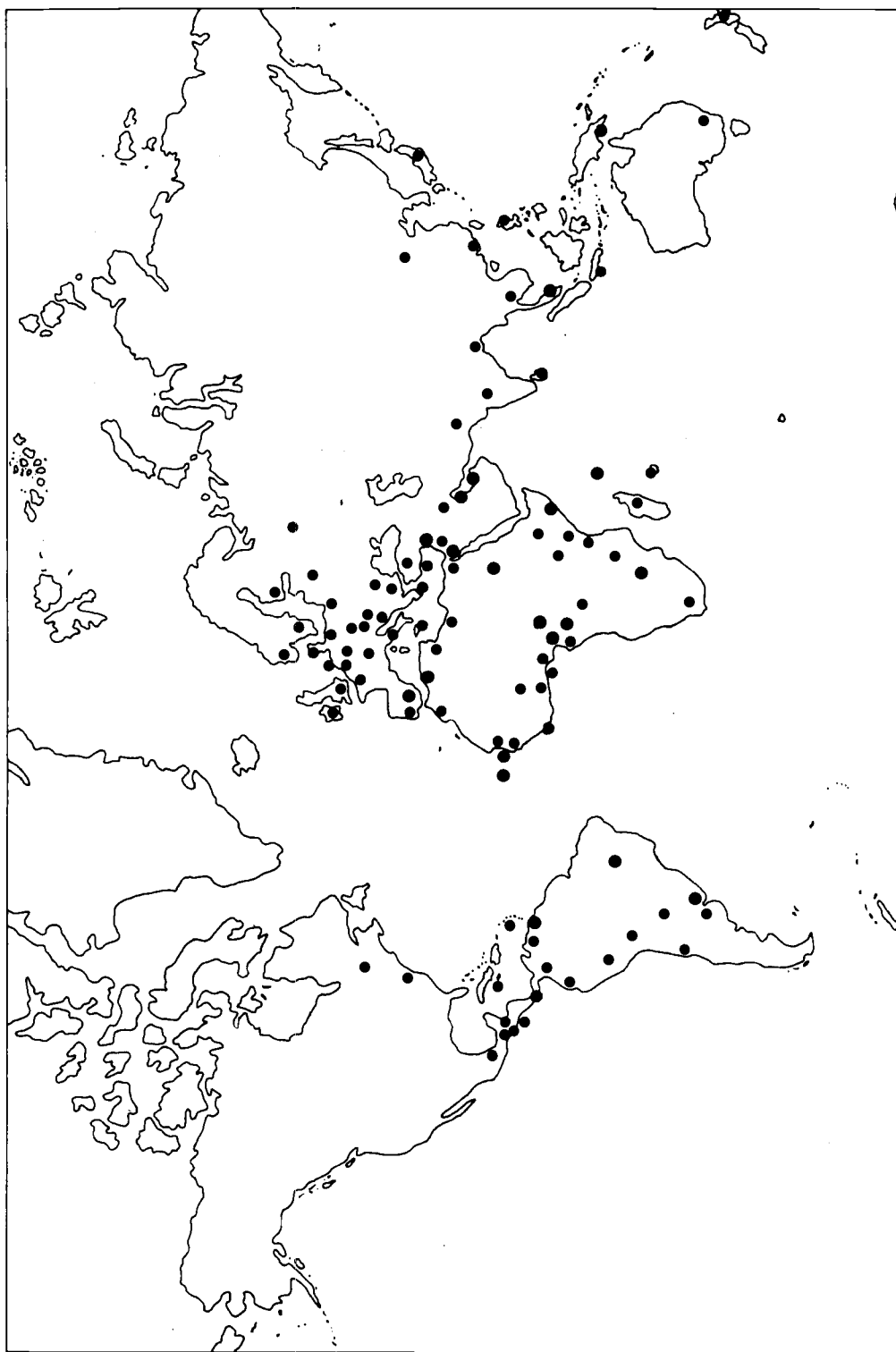
The decentralized structure of INFOTERRA (Fig. 1), one of its most important features, has been chosen for good reasons. It is the least costly way of gathering information on sources; it provides the speediest response by the widely dispersed community of sources; and it brings the information machinery as close as possible to the user. But perhaps the most important consequence of decentralization is the self-reliance it promotes. To participate actively, countries must develop their own internal information systems; a focal point cannot be very effective without a strong system of support within the country itself. It is recognized that the success of the system depends very much on the joint efforts of its partners. Therefore, as its most basic goal, INFOTERRA encourages and assists the development of national environmental information systems.

Decentralization also has certain weaknesses. Among these are that the performance of the system depends heavily on the performance of its national counterparts, over which INFOTERRA has little control and that the feedback of operational information is not as high as in a centralized system and the statistics produced are often quite inadequate for purposes of evaluation. In spite of these weaknesses, INFOTERRA is fully committed to decentralization, as described above. Indeed, even the Programme Activity Centre is not called the "Central Unit" and is operated as another focal point. Similarly, although regional cooperation is encouraged, regional machineries are specifically designed not to encroach on the development of the national machineries.

INFOTERRA is based on the concept of referral. All INFOTERRA focal points are equipped to refer an inquirer to the sources best able to provide the information sought. In other words, they act as switchboards to connect users with appropriate sources of environmental information. The basic tools used are the national and international directories (containing detailed information on sources), standardized terminology, and the search procedures. Thus, INFOTERRA is not a substantive information system and cannot supply documents at the international level. It is complementary to and not a substitute for relevant documentation systems. At the country level, national focal points are encouraged to assist users in obtaining the information and if necessary to develop archival facilities to enable them to answer requests for information.

The process of referral has obvious limitations. However, experience with INFOTERRA and other information efforts shows that the development of source inventories and the provision of referral services are necessary first steps in the establishment of more elaborate information systems. Moreover, at the international level they are the most efficient ways of proceeding. Additional responsibilities would require a far larger infrastructure for the gathering, updating, and dissemination of information. At the same time, the design of INFOTERRA allows its components to undertake any desired level of information handling, including the delivery of substantive information. Thus, national,





*Fig. 1. Geographic distribution of INFOTERRA partners on 1 June 1979.*

regional, and sectorial focal points can choose, if their resources allow, to provide information directly to the user.

INFOTERRA has been designed to fulfill certain basic criteria. In particular, it is expected to:

- Strengthen national information flows, to provide the best support systems for environmental decision-making;
- Be flexible to allow the system to adapt to national requirements as well as to changes over time;
- Be simple, to permit the system to be brought as close as possible to the user (the software as well as training programs are designed to enable people who are not specialists in information systems to use the system effectively);
- Make maximum use of existing and planned information systems, to avoid unnecessary duplication and waste of resources and to permit the use of standardized approaches wherever possible;
- Operate with limited resources both at UNEP and at the national level;
- Be a catalyst, to sensitize people, who participate in and use INFOTERRA, to the role of information systems in decision-making and of environmental factors in development planning.

The subject coverage of INFOTERRA is very broad. As defined by governments, it covers all problems that they consider "environmental." Examples include resource questions, nature conservation, technology, desertification, human settlements, and pollution. The concept of environment is constantly evolving and varies from place to place, from time to time, and from culture to culture. INFOTERRA attempts to compile an inventory of information sources that gives adequate subject, geographic, and other coverage. Thus, it must maintain close links with other national and international information systems.

The terminology used by INFOTERRA for storage and retrieval of sources of information is, like the software, developed specifically for INFOTERRA, with specific uses in mind. The terminology is quite broad and describes environmental and developmental concerns in approximately 1000 attributes. Although INFOTERRA is a good source of basic information, it has not been designed to assist specialists, who usually have access to better channels of information.

The system has been designed to allow national focal points to consult the directory of sources using a wide spectrum of information-processing technologies, extending from paper-and-pencil to computers. With the exception of the equipment and hardware, all the prerequisites for using the system, including the standard methodologies, forms, questionnaires, directories, etc., are provided by the INFOTERRA Programme Activity Centre. If the national focal point has access to a computer, the software programs and directory are available on magnetic tape. The *International Directory* is updated and provided regularly four times a year to each focal point. The system procedures are described in detail in the *INFOTERRA Operations Manual* and are explained to focal-point personnel at training sessions. Regular bulletins and other communications keep focal points informed of developments in the system.

## Facts and figures

The INFOTERRA Programme Activity Centre (PAC) was established in May 1975 and became operational in January 1977. The number of partner

countries and national focal points (Table 1) increased from 66 in 1977 to 100 in June 1979; the number of countries providing registered sources increased from 19 to 65; the UN agencies having registered sources, from 5 to 13; and the sources of environmental information, from 2000 to 7100. To date, the Programme Activity Centre staff have trained 188 personnel for national focal points and have visited 78 UN member states. The number of regional and national seminars held is 12, and the number of environmental subject attributes (keywords) by which sources are categorized in the *International Directory* is 944.

Table 1. Regional distribution of INFOTERRA national focal points.

| Participants        | Europe and N. America | West Asia | Asia and the Pacific | Latin America and the Caribbean | Africa |
|---------------------|-----------------------|-----------|----------------------|---------------------------------|--------|
| Number of countries | 35                    | 12        | 28                   | 26                              | 48     |
| Number of partners  | 31                    | 5         | 13                   | 19                              | 32     |

## Developing country participation in INFOTERRA

The participation of developing countries in INFOTERRA is significant (Table 2).

Table 2. Developing countries participating in INFOTERRA.<sup>a</sup>

| Date     | Designated INFOTERRA focal points (%) | Focal points providing sources for registration (%) | Number of sources submitted (%) | Number of inquiries (%) |
|----------|---------------------------------------|-----------------------------------------------------|---------------------------------|-------------------------|
| Mar 1977 | 63                                    | 39                                                  | 13                              | 40                      |
| Mar 1978 | 67                                    | 55                                                  | 20                              | 40                      |
| May 1979 | 69                                    | 64                                                  | 34                              | 42                      |

<sup>a</sup>Percentage is of total number of countries participating.

In line with the catalytic role of UNEP, INFOTERRA has promoted the establishment of national environmental information systems in developing countries such as Colombia, India, and Kenya. With encouragement and assistance from INFOTERRA, these and other countries are setting up comprehensive national environmental information systems and formulating broad information policies.

Technical assistance and training programs represent a vital activity of INFOTERRA and are geared toward special needs of individual countries participating in the system. In this work, INFOTERRA benefits from the cooperation of several national focal points in developing countries that act as INFOTERRA model focal points to assist with the demonstration of INFOTERRA operations and the training of focal-point staff from countries in their respective regions. So far, model focal points have been established in Bogota, Cairo, Dakar, and New Delhi.

## **INFOTERRA and other organizations**

INFOTERRA has, since its inception, developed productive relationships with the information systems of other organizations to promote better use of the information resources of the international community. In particular, INFOTERRA has established close ties with the General Information Programme of UNESCO within the conceptual framework set up by UNISIST for international cooperation in the field of information. The principles of UNISIST underlie the design and operation of INFOTERRA national focal points.

INFOTERRA organizes international, regional, and national seminars and training courses that include general scientific and technological information-handling techniques. INFOTERRA training programs benefit from the experience of UNESCO and other organizations that, in turn, can take advantage of the input of INFOTERRA in developing their own concepts and procedures.

Plans for collaboration with other organizations include evaluation of INFOTERRA and common inputs to the UN Conference on Science and Technology to ensure that deliberations adequately reflect the importance of scientific and technical information exchange in development decision-making. INFOTERRA also maintains close links with intergovernmental and non-governmental organizations and participates in the funding of a number of information systems within and outside the UN family such as AGRIS, INIS, and other specialized bibliographic systems.

A recent example of fruitful interorganization relationships was the close collaboration initiated by INFOTERRA with IDRC, UNISIST, and the Government of Pakistan in the Seminar on Scientific and Technological Information Systems held in Islamabad in 1978. This seminar contributed significantly to the development in Pakistan of a national information system incorporating an environmental information component.

## **The performance**

During the 3.5 years of existence of INFOTERRA and 2.5 years of providing information services to users, there has been a significant change in support and activities in the network linking developed and developing countries. The initial reaction to INFOTERRA at the time of the Stockholm Conference by developing countries was one of hostility. It was the U.K., U.S., Canada, France, and the FRG who took the initiatives and gave active support to the system. During subsequent years, particularly after the system went into operation, INFOTERRA has received increasing support from Colombia, Jamaica, India, Bangladesh, and other developing countries that are now in the majority in terms of countries contributing sources to the system.

The reasons for this shift are probably manifold. However, some are clearly important. INFOTERRA has been consciously designed to be mission-oriented, to be based on a territorial formula (extended to the sectorial formula), and to be global and decentralized. INFOTERRA has also defined its global objectives clearly and is designed to be highly purpose-oriented. Information systems are not ends in themselves. In addition to being a supplier of information, INFOTERRA has been seen by some participating countries to be a catalytic agent in promoting the establishment of information systems and infrastructures at the national and regional levels.