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## INFOTERRA: The International Environmental Information System

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### ABSTRACT

INFOTERRA was conceived, designed and established as a mechanism through which any nation may have access to environmental information, including marine environmental information, from any other nation which participates in the system. It is a decentralized system whose operation relies on four international networks: the networks of the INFOTERRA National Focal Points (NFPs), of the INFOTERRA sources of information, of the special sectoral sources, and of the regional service centres. The four networks are coordinated by the INFOTERRA Programme Activity Centre. The NFPs are offices designated by the participating governments to coordinate all INFOTERRA activities in respective countries. They conduct national surveys of environmental expertise in various fields, register the sources of information, maintain a query-response service in the country and carry out promotional activities. There are 134 NFPs at the moment that cover more than 98% of the world population.

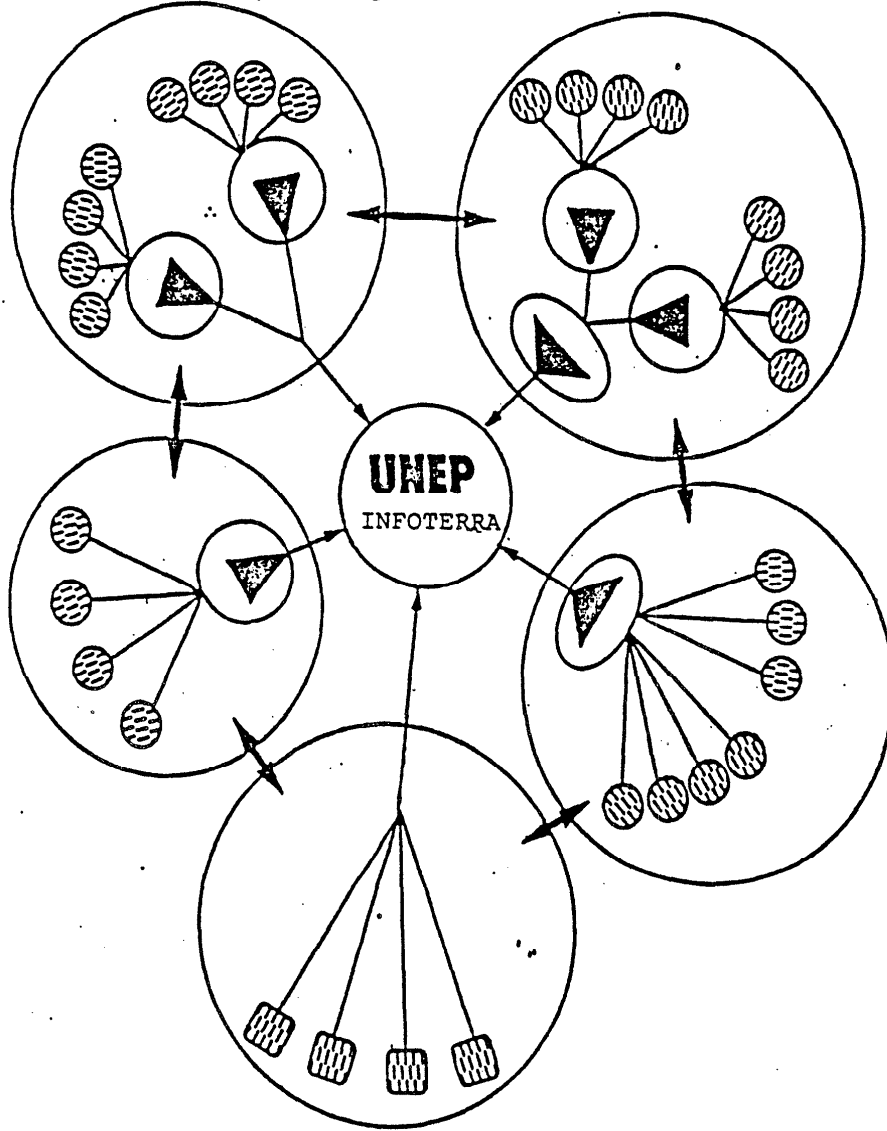
The sources of information are institutions or individuals who have information on specific environmental topics and are able and willing to provide it on request through INFOTERRA. In the INFOTERRA database, there are at the moment some 210 sources from 40 countries specialized on marine ecosystems, 104 sources from 34 countries on marine living resources, 72 sources from 27 countries on marine monitoring, and 229 sources from 43 countries on marine pollution. In addition, some 280 sources are experts on environmental management and planning, 250 on environmental monitoring and assessment. Special sectoral sources are internationally recognized centres of excellence in specific environmental subject areas which assist INFOTERRA in the provision of substantive information to users, and regional services centres are institutions designated to act as service centers for INFOTERRA users within a region. Coordinated by the Programme Activity Centre, the INFOTERRA system has been providing some 14000 query-response services per year in recent years, leading to better decision-making and to actual enhancement of the environment in many cases, including the improvement of the marine environment in many parts of the world.





### INTRODUCTION

INFOTERRA is an international system operated by the United Nations Environmental Program (UNEP) designed to facilitate the flow of environmental information, including marine environmental information, within and between countries, and was established in response to a recommendation of the United Nations Conference on the Human Environment (Stockholm, June 1972). The INFOTERRA concept was developed during 1973-1976, and the system became fully operational in January 1977 with the participation of a dozen countries. At present, 134 countries have designated national focal points, (NFPs) which cover over 98% of the world population; over 6,100 sources are listed in the INFOTERRA Directory (which links a quarter of a million experts to the network); and a cumulative total of over 84,000 queries have been processed for users in 114 countries in the last 11 years.

Figure 1

Conceptual Diagram of the INFOTERRA NETWORK



-  REGIONAL SERVICE CENTRE
-  NATIONAL FOCAL POINT
-  NATIONAL SOURCE
-  SPECIAL SECTORAL SOURCE

INFOTERRA was designed as a decentralized system, based on and operating through government-designated NFPs. This decentralized structure proves to be the least costly means of facilitating information exchange, as well as the most effective in catalyzing the upgrading of national information systems by governments, or their creation where none existed. The fundamental aspects of INFOTERRA have been defined as decentralization, provision of information to decision-makers through the sources registered in the INFOTERRA Directory (national or international), facilitation of exchange of environmental information through the access of environmental databases, promotion of awareness of the role and importance of information in environmental decision-making, and the stimulation of development of national environmental information systems. An independent evaluation carried out in 1980 concluded that the original mandate had been fulfilled and the services provided to users were excellent or very good (69% of users surveyed indicated their satisfaction).

## THE INFORMATION SYSTEM

The INFOTERRA information system consists of five components: NFPs, sources of information, special sectoral sources (SSS), regional service centres and the INFOTERRA Programme Activity Centre (PAC). Figure 1 illustrates this network.

### 1. National Focal Points (NFPs)

The INFOTERRA NFPs are the key elements in the network, as they provide the input for the International Directory, which is one of the main tools, and are the first points of contact with the users. Many of them, especially in developed countries, consider the informal and relatively easy dialogue and access to national environmental information systems resulting from the network of INFOTERRA NFPs to be one of the greatest benefits they derive from their participation in INFOTERRA. Others, especially those in developing countries, consider their participation in the INFOTERRA system the least costly and rather effective way of gaining access to modern science and technology to solve their environmental problems. After receiving training on INFOTERRA concept and procedures, the NFPs are expected to perform a number of functions including registration of sources, processing of queries, promotion of the system, and serve as the INFOTERRA linkage in the country. Most of the NFPs are located at the information branch of the central environmental department, whom people naturally turn to when they have an environmental query in hand.

### 2. Sources of Information

The community of sources listed in the International Directory may be considered as the main product of INFOTERRA and form the backbone of the INFOTERRA database. Judging from the feedback obtained from a routine users' satisfaction survey, the sources do in most cases provide very useful information. The 6100 institutes registered from 91 countries represent some 250,000 experts who are willing and able to share their expertise in over 1100 priority subject areas with whomever is in need of environmental experiences in these fields. Through this network, 2.5 million publications under various environmental subjects are made available to users, in most cases free of charge. Figure 2 illustrates the profiles of INFOTERRA users and information suppliers.

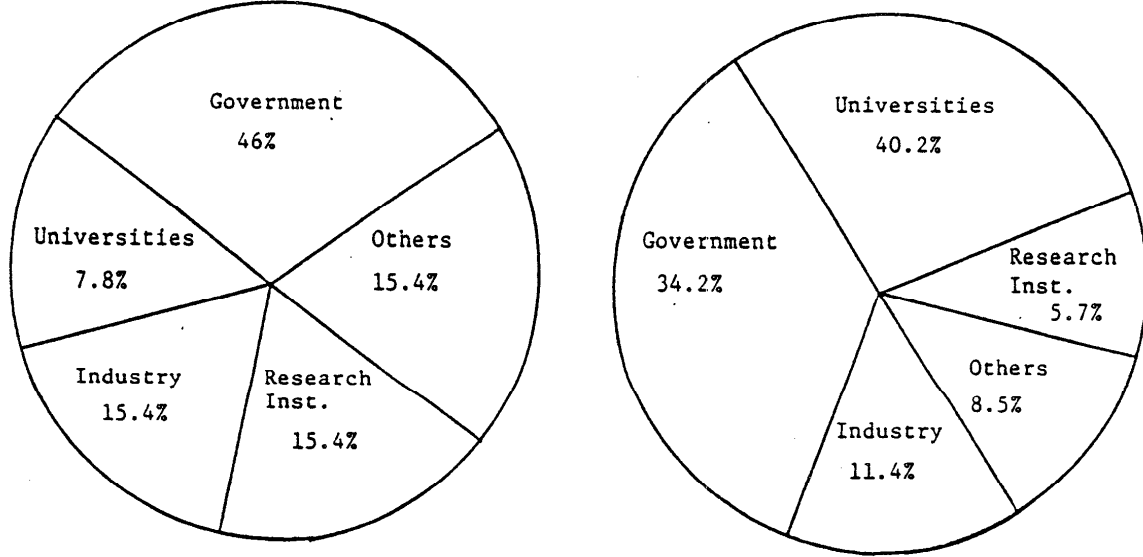
In the field of marine sciences, some 620 institutes from 40 countries are registered as sources of information (210 under the subject of marine ecosystems, 120 - marine living resources, 70 - marine monitoring, and 220 - marine pollution), which link some 25,000 experts in these fields and have provided some 8000 responses to queries from 28 countries during the last 11 years.

### 3. Special Sectoral Sources (SSS)

These are centres of excellence in selected environmental priority sectors. They are world-renowned organizations which can provide comprehensive, authoritative information in their own sectors. These organizations are contracted by UNEP to provide substantive information, at a nominal charge, to users anywhere in the world. The selection of queries to receive this additional help is based on the nature and the origin of the query with priority being given to users from governments of developing countries - policy makers, scientists, engineers, etc. In the marine sciences, the SSS are the Australian Institute for Marine Sciences (AIMS), and the International Centre for Living Aquatic Resource Management (ICLARM).

Figure 2

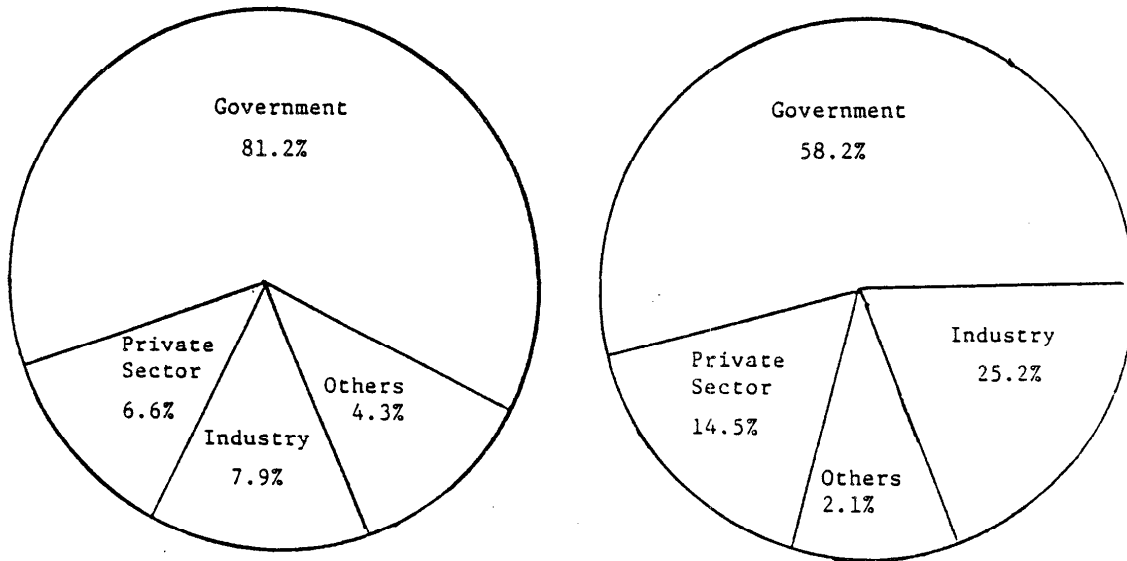
Profiles of INFOTERRA Users and Information Suppliers



INFOTERRA USERS

Developing Countries

Developed Countries



INFORMATION SUPPLIERS

#### 4. Regional Service Centres

Given the similarity in environmental problems in a region or sub-region, regional centres for environmental information have been appointed as Regional Service Centres. This permits services such as computer search facilities, training, promotion, and the provision of substantive information, to be provided more economically or in a more professional manner. So far, nine centres have been established to serve nine developing regions, including Southeastern Asia, Southern Asia, Northern Africa, Western Asia, Eastern Africa, Western Africa, Latin America, the Caribbean, and the Council for Mutual Economic Assistance (CMEA) countries.

#### 5. Programme Activity Centre (PAC)

The PAC was set up as an internal project of UNEP to coordinate the network. Its major tasks, in line with the catalytic and coordinating role of UNEP, have been to assist governments in establishing and developing INFOTERRA NFPs; to provide the necessary training to NFP staff, especially in developing countries; to provide system tools and improve system operations; to assist with directory searches; and to develop model publicity materials. The coordination has been accomplished through designing standardized operational procedures and terminology, and by publishing the INFOTERRA International Directory. Given the decentralized structure of the INFOTERRA network, however, INFOTERRA operations in individual participating countries depend almost entirely on the efforts of their NFPs and the government support they receive.

#### THE INFOTERRA SYSTEM TOOLS

INFOTERRA was conceived as a system of maximum simplicity. It was designed to give valid results with a minimum of professional information system expertise. The principal tool of INFOTERRA is the International Directory of sources. This has undergone a number of format changes, and many attempts have been made to reduce the volume of a very substantial publication. INFOTERRA developed its own software and procedures for the compilation of its database, and adopted the CDS/ISIS system for the micro-computer version of database.

Another tool used by the System is the terminology. The entire vocabulary contains some 1100 priority subject areas. INFOTERRA operational procedures are described in detail in an operations manual which is published in four languages and is made available to all NFPs.

An electronic mail system linking many of the INFOTERRA network partners will be initiated in November 1988. Together with other means of modern communications (e.g. tele-facsimile), the typical turnover time for a query-response has been reduced to days instead of weeks.

INFOTERRA has been engaged in on-line information search services to provide "delayed on-line search" for selected INFOTERRA users. Users forward their requests through the NFP to the PAC in the usual manner for specialized services, and the PAC then selects the more important queries and requests on-line services. The results are then returned direct to the user by appropriate means, e.g. mail, telex, tele-facsimile, etc., depending on costs and urgency. In this way, users from anywhere in the world have gained access to all existing major environmental databases through INFOTERRA.

The necessary computer and communications facilities are now available in Nairobi, a direct on-line search services from Nairobi will be initiated very soon. Some more frequently used databases are maintained on the Nairobi computer.

## IMPACT OF INFOTERRA

### 1. Query-response Services

Through the query-response services of INFOTERRA, solutions to environmental problems and other substantive information have been provided to enquirers in 114 countries for over 84,000 queries in the last 11 years, and have led in many cases to actual improvement in environmental quality, and in others to better management decisions. The main subject areas of enquiry have been pollution control, waste treatment, chemical and biological agents, technology and industry, and management and planning. Queries related to marine sciences account for approximately 10% of the total.

During 1988, through these information services, several countries managed to resolve the problems associated with trans-boundary movements of hazardous wastes, established national legislation on various aspects of the environment, including marine environment, cleared accidental spillage of potentially toxic chemicals, managed to contain the invasion of a swarm of locusts, improved the efficiency of energy use and production, and advanced their skill on the treatment of industrial effluents and discharges. Some INFOTERRA successes are listed in Table 1 as examples.

### 2. Catalytic Role

In line with the catalytic role of UNEP, INFOTERRA has promoted the establishment of national environmental information systems, assisted in the setting up of international information systems of relevance to environment, raised the environmental awareness whenever appropriate, and advanced the participation of developing countries in the international exchange of environmental experiences. Notable examples of national environmental information systems are those in Colombia, Brazil, China and India, these and other countries are establishing comprehensive national environmental information systems as part of a broader national information effort, with the encouragement and support of INFOTERRA. For the majority of the INFOTERRA partner countries, national infrastructure for the handling of environmental information has been strengthened, as a result of their participation in the INFOTERRA activities. Table 2 summarizes the catalytic role played by INFOTERRA.

INFOTERRA assisted several international environmental information systems during their formative stages, notably the CLENR and ASFIS systems of FAO, MEDI of UNESCO/IOC, ELIS of IUCN and ICSTI for the CMEA countries. INFOTERRA has maintained very close links with all information systems within the United Nations.

INFOTERRA has organized its services in ways which are well adapted to the needs of developing countries, and has enjoyed a significant participation of developing countries, with the latter benefitting from this partnership. Table 3 summarizes this active participation.

**Table 1: Impact of INFOTERRA  
Some Success Stories**

<b>Country</b>	<b>Success Story</b>
Belize	Rejected the offer of a used-oil treatment factory from a multi-national company, based on environmental impact information received from INFOTERRA.
China	Developed national environmental monitoring network, reduced urban noise level, developed national safety colouring code, regained contact with world-wide learned societies, received a number of technological details in various fields.
Gambia	Improved large-scale rice plantation projects and prevented hippos from damaging the paddies.
Kuwait	Developed coastal areas based on environmental guidelines.
Malaysia	Rejected the offer of a TiO <sub>2</sub> manufacturing factory by a multi-national company, made better use of rice husks, improved the efficiency of spraying of 20 named pesticides.
Oman	Developed oil-spill contingency plan, appropriate method of disposal of solid municipal wastes, safety aspects of asbestos cement pipes, rectification of hydrogen sulfide contaminated monitoring wells.
Samoa	Rejected the offer of a used-oil treatment factory from a multi-national company.
Guinea	Successfully controlled the impact of the dumping of 15,000 tons of incinerator ashes and forced the importer to take the ashes back.



**Table 2: Impact of INFOTERRA**

<b>Catalytic Role</b>	
Promotion and Assistance in the Establishment of National Environmental Information Systems	India: ENVIS system China: Chinese Environmental Abstracts (CEA) Colombia: INDERENA system Brazil: SEMA system Ethiopia: National network
Cooperation and Assistance in the Establishment and Strengthening of International Environmental Information Systems	FAO: ASFIS and CLENR UNESCO/IOC: MEDI IUCN: ELIS CMEA: CSTI Special Sectoral Sources: 25 Regional Service Centres: 9
Training of National Focal Point Staff	31 INFOTERRA Training Courses held Total number of staff trained: 330
Raising Environmental Awareness	INFOTERRA national seminar held in 43 countries Total number of participants of seminar: 2,800
Strengthening National Infrastructure for Handling Environmental Information	91 countries organized their national INFOTERRA information source networks

**Table 3: Impact of INFOTERRA**

**Developing Country Participation**  
**(As percentage of total number of participating countries)**

	Designated national focal points	National focal points regist- ering sources	Number of sources submitted	Number of queries
December 1978	76%	54%	29%	40%
December 1979	78%	69%	28%	40%
December 1980	80%	75%	30%	50%
December 1986	81%	76%	31%	51%

## APPENDIX

## Sample Queries Processed by INFOTERRA PAC in the Field of Marine Science (1987- 1988)

User Origin	Query	Comment
Algeria	Standards of bathing water in Mediterranean basin	Standards sent
Bahrain	Red tide in sea water	Response from AIMS
Brazil	Management of marine mammals	Documentation sent
	Management of marine protected areas	Documentation sent
China	Analytic procedure for marine sediment including sample collection and conservation pertaining to PCB, DDT, heavy metals, etc.	Publications sent
	Assessment methods for marine environment	Publications sent
	Relative information on the investigation of the background level of marine environment in the Antarctic	Publications sent
	Survey and study on the Antarctic ecosystems	Documentation sent
Guinea	Environmental impacts of incinerator ashes containing heavy metals to marine environment and measures to control the impacts	Documents from UK/Netherlands sent
	Control of marine pollution, especially pollution by toxic chemicals	Documentation sent
Italy	Xenobiotic contamination of Antarctic ecosystems	INFOTERRA sources and references provided
Kenya	Environmental impact of use of explosives on fauna in water bodies (seas, rivers and lakes)	Documentation sent
	Management of mangroves	Documentation sent

## Sample Queries Processed by INFOTERRA PAC in the Field of Marine Science (1987- 1988) continued

User Origin	Query	Comment
Kuwait	Environmental criteria for choosing coastal site as recreational areas	Documentation provided
	Environmental impacts due to coastal development	Documentation sent
	Environmental impacts of marine development and operation	Documentation sent
Mexico	Environmental management of bay areas	Documentation from UK/Netherlands sent
Netherlands	Experts in dune research and/or coastal management in FRG, Denmark, Italy, Greece	List of experts provided
New Zealand	Ways and means of preventing oil pollution from reaching mangroves	Documentation sent
Samoa	Environmental impact of coastal reclamation on marine lagoon and coral reef ecosystems	Documentation sent
Saudi Arabia	Coastal zone management	Documentation sent
Tanzania	Information on management and utilization of seaweeds, seagrass and mangroves	Documentation sent
United Arab Emirates	Legislation on and procedures in the control of industrial discharges into marine environment	Documentation sent
United States of America	Use of kelp or any marine seaweed in agriculture, horticulture, etc.	Documentation sent
	Use of fish oil, fish waste, or any marine shells	Documentation sent
	Use of marine seaweed in fire retard- ing insulating and sound-proofing industries	Documentation sent

## Sample Queries Processed by INFOTERRA PAC in the Field of Marine Science (1987- 1988) continued

User Origin	Query	Comment
Union of Soviet Socialist Republics	Anti-dust protection during reloading of coal, measures against wind, erosion in sea ports	Documentation sent
	Utilization of solid waste in sea ports	Documentation sent
	Modern technologies to prevent air and water pollution from ship-building yards and ports	Documentation sent
	International legislation concerning Baltic Sea	Legislation sent
Venezuela	Oil spillage pollution in continental shelves areas	Documentation sent
Zimbabwe	The dead coral reefs on the Bay of Gunducia	Documentation sent