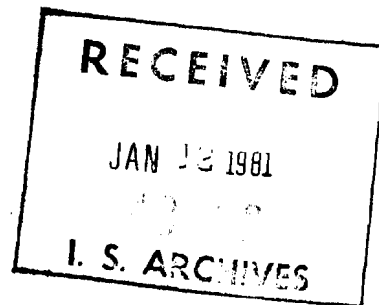


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FINAL REPORT

Grant No. 3-P-75-0022



CEPIS INFORMATION SYSTEM DESIGN

Prepared by the

Pan American Center for Sanitary Engineering and Environmental Sciences
Pan American Health Organization
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Acknowledgements

Recognition is given here to the fundamental role played, in whatever the accomplishments of the project, by the IDRC's generous financial support and the technical cooperation offered by its professional staff. This represents another valuable effort by that Centre to promote and assist in the Latin American and Caribbean Region in the establishment of the information and documentation systems needed for accelerating social and economic development.

Our deep appreciation is also expressed to other international and regional information systems such as INFOTERRA, AGRINTER, DOCPAL, SISTCLADES and POETRI, among others, for their most valuable and enthusiastic technical cooperation in the REPIDISCA network design.

To the AIDIS regional committee, and to the subregional and national chapters, a special acknowledgement is expressed for sharing with us the network users' point of view and for their continuous support and promotion of the REPIDISCA concept.

The generous institutional collaboration of many national sanitation or information agencies in the Region, too numerous to name, is also acknowledged. Among them they offered technical cooperation, reference materials and the participation of their professional staff in the REPIDISCA design work. The early implementation of several national cooperating centers has breathed life into the network's development plan.

Finally, a special note of gratitude is given to the PAHO central office, its Division of Environmental Health Protection and other field units, and to the CEPIS professional and clerical staff members and outside consultants who

unstintingly devoted their efforts to this project and ultimately are responsible for its success.

The Director of CEPIS

(DRAFT)

FINAL REPORT

CEPIS INFORMATION SYSTEM DESIGN

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1. INTRODUCTION

PAHO and CEPIS have long recognized the pressing need which exists for technical information by those who work in national water supply and sanitation programs. The timely exchange of information is a prerequisite for decision-making and for the development and transfer of the technologies needed to achieve the goals of the U.N. Water Decade. At present, information flow in this sector is a major constraint for technology transfer.

In response to this need for improved information services, CEPIS, in 1973, elaborated a plan for the development of a regional information network to complement its existing services³, and began providing ad hoc assistance to several countries for the formation of national information centers.

In early 1976 a consultant was hired to make a situational survey and draw up guidelines for expanding the Center's program of information activities, with a view toward promoting and consolidating the establishment of the regional network. The proposed program was discussed at a preliminary Consultation Meeting on Technical Information⁹ held in CEPIS (4-6 February, 1976) with representatives from PAHO, WHO/IRC, CETESB, and the IDRC. This resulted in the preparation of a proposal¹³ to the IDRC and the initiation of in-house studies on several of the technical aspects of the system.

The project was eventually approved by the IDRC, with a grant of Can. Dollars 128,900, and was formalized by means of a Memorandum of Grant Conditions (File No. 3-P-75-0022) dated 28 March, 1977 and signed by the Director of PAHO on 29 April of that year.

This Final Report summarizes the objectives, work accomplished, findings, results, and recommendations of the project in a descriptive fashion. For additional details, the reader is referred to the reports and technical documents which were prepared during the course of the project (Appendix 1).

2. PROJECT OBJECTIVES

The Memorandum of Grant Conditions established the following objectives of the project:

"The main objective of this project is to enable the Pan American Center for Sanitary Engineering and Environmental Sciences (CEPIS) in accordance with its proposal, to design a master plan for a regional information system on sanitary engineering and environmental sciences, with special emphasis on rural potable water and sanitation and specifically:

- a) to host a meeting with other institutions in the region about the formation of a cooperative network, its scope and method of functioning and to seek their participation in its design;
- b) to prepare a precise definition of the subject scope of such a network;
- c) to prepare a comprehensive, fully-documented design description for a regional information system on community water supplies and sanitary engineering, based on the cooperation of the network of appropriate government, academic and professional institutions;
- d) to produce and test the basic tools and mechanisms required for the operation of a system, especially a thesaurus and the other tools that would be needed for uniform bibliographic and subject description of documents; and
- e) to evaluate sources of information on community water supplies and sanitary engineering in the region and compile inventories of such sources and users."

The above objectives at the same time served to determine the main project components, which are briefly referred to as follows: 1) First Consultation Meeting; 2) Master Plan; 3) Subject Scope and Microthesaurus; 4) Technical Processing Manuals; and 5) Survey of Regional Information Sources and Users. As the project developed, the need for a Second Consultation Meeting was observed, and the IDRC agreed to its inclusion as a sixth and final project component..

3. PROJECT DEVELOPMENT

The principle activities and findings of each of the project's components are briefly described in the following sections.

3.1 First Consultation Meeting

The first Meeting of the Consultation Group took place at CEPIS during 14-16 November 1977, with the participation of delegates from 21 national institutions in Latin America as well as representatives from WHO/PAHO, UNEP, BID, CLADES, AIDIS and the IDRC. In addition to IDRC and PAHO funds, UNEP also helped finance the travel of several participants to the Meeting.

The main objectives of the Meeting were to discuss with the consultation group the preliminary design of the master plan and to seek an institutional consensus on the main features of the cooperative network, coordination with existing information systems, a precise definition of the network's thematic scope, and mechanisms for the collaborative development and updating of a multilingual thesaurus and system tools.

Three working papers were prepared by the project staff prior to the meeting, dealing with the following topics:

- 1) Suggested bases for the establishment of a Pan American Network for Information and Documentation in Sanitary Engineering and Environmental Sciences.¹⁴
- 2) Suggested bases for the creation of a microthesaurus of descriptors on sanitary engineering and environmental sciences (MISCA).¹⁵
- 3) Inventory of sources and users of information on sanitary engineering and environmental sciences: suggestions for its design and implementation.¹⁶

These working documents were presented at the meeting and discussed in detail, as were other aspects of the network's development and the services to be provided through it. In addition to the discussion generated in the plenary sessions, two working groups were established to study specific topics in greater detail.

As a result of these deliberations, the participants put forward a set of three general conclusions and 35 specific recommendations related to the overall objectives of the meeting. These are presented in their entirety in the final report of the meeting, together with the highlights of the debates and discussions.¹⁸ These have also served as guidelines for the development of the remaining project components.

This First Consultation Meeting demonstrated the enthusiasm existing on the part of the national institutions for the creation of the network, and the great majority of the recommendations emanating from it have faithfully been incorporated into the Master Plan and technical manuals.

3.2 Master Plan

The conceptual design for REPIDISCA has evolved and been refined over a long period of time. It was originally conceived of as a cooperative network of national reference centers in sanitary engineering and environmental sciences, with central coordination and standardization for information exchange being

provided by CEPIS.³ This raw idea was soon expanded through a series of studies which identified those aspects which would have to be researched and decided upon before such a system could be effectively created;^{5,10,12} these studies eventually lead to the presentation of a proposal¹³ to the IDRC for funding this project. The proposal also took into account the basic concepts espoused in the information program anticipated by the Ad Hoc Working Group on Rural Water Supply and Sanitation.

One of the initial project activities was the preparation of a working document for the First Consultation Meeting which suggested alternatives for the regional network design.¹⁴ This document was amply discussed and debated by the meeting participants, and as a result a series of decisions regarding the design were recommended.¹⁸ Among the most pertinent contributions were those on subject scope and carrier language, establishment and development of national centers, functions of the central unit, and financial considerations.

Concurrently, a number of important contacts were made with other international and regional information systems, and studies of their organizational structures and operational methods were made. Based on a comparative analysis the most promising design features of each were identified and the feasibility of applying them to REPIDISCA was investigated.

Of particular relevance for the conceptualization of REPIDISCA at this stage was the preliminary design study of DEVSIS, which was based largely on the experiences of INIS and AGRIS. This in-depth study provided a model and methodology for the REPIDISCA design team to follow. From it were taken basic concepts on cooperative, mission-oriented information systems, the use of the "territorial formula" for decentralized inputs, and the adoption of international standards recommended by UNISIST, ISO and FID so as to assure compatibility with other systems.

As the other project components were simultaneously developed, a clearer picture emerged of how many of the fundamental concepts — sound as they were from a theoretical viewpoint — could be adapted in practical terms to the realities of regional and national conditions. The major design concepts were continually tested through in-house studies, via travel missions, conferences and seminars, and with the aid of specialists contracted for this task.

Particular attention was given to the question of how best to process the central bibliographic file. It was determined that computer processing would be required, and after a preliminary screening of alternatives, a computer systems analysis consultant was hired to carry out a comparative feasibility study of the most promising alternatives.²⁶ As a result of that study, the decision was made to use the ISIS system available in Lima through PETROPERU from UNESCO. Subsequently, ISIS norms were followed in preparing the final versions of the document, input work sheet and technical manuals.

Two other consultants were retained to review the proposed system design, concentrating on aspects of policy, organizational structure, finance, functions of the central and national centers and services to be provided.^{24,25}

Finally, all of the design elements were brought together in a comprehensive Master Plan which was published in its preliminary version in May of 1979 both in English and Spanish.^{29,30} This document was presented to the II Consultation Meeting on REPIDISCA, and was discussed and approved by the Consultative Group. The Master Plan, in its final form, places emphasis on:

- developing and strengthening information facilities in national institutions;
- establishing a collaborating network consisting of these national institutions and a regional coordinating center (CEPIS).

The network will ensure that, through an appropriate division of work between the collaborating institutions in the Region and consolidation at a central service agency, regional literature and a selection of relevant literature produced outside the Region will be available to users through their appropriate national (or sub-national) service center. REPIDISCA will initially concentrate on literature on water supply and sanitation, will adopt Spanish as the carrier language, and will provide to its users two types of services: bibliographic and document delivery.

In addition to the detailed Master Plan report, two summary documents have been prepared to facilitate the dissemination of information about the network.^{33,34}

3.3 Subject Scope and Microthesaurus

The subject scope definition for any information system is an extremely difficult design task, particularly when dealing with a complex multidisciplinary mission-oriented system such as REPIDISCA. Therefore, it was decided early in project to make a practical definition in terms of the main subject fields to be covered and the sectorial areas within them. This approach had the added advantage of providing a framework for the development of the microthesaurus on sanitary engineering and environmental sciences (MISCA).

A pilot study was carried out restricting the conceptual universe to the core subjects of water supply and sanitation, with the purpose of experimenting with methodologies for building a compact thesaurus of some 1,500 descriptors. Concepts and methods were tested on some 700 selected documents, and the results reported in a working document for the First Consultation Meeting.¹⁵

As an outcome of that meeting and discussions with the IDRC Program Officer, it was decided to attempt a compatibilization of the microthesaurus with the OECD Macrothesaurus via an in-depth development of the most pertinent semantic fields

of the latter. This was the first such attempt, to our knowledge, ever made. A computer-processed microthesaurus with some 6,000 terms (of which 2,300 were from the Macrothesaurus) and hierarchically-ordered semantic codes was developed. Although theoretically sound, it resulted in an instrument which might be overly elaborate and complex for practical use by a large group of relatively untrained documentalists. Therefore, it was restructured according to a more elemental thesaurus scheme. For this phase the project team had the valuable cooperation of an IDRC thesaurus specialist.

The definitive scheme divides environmental health concepts into ten major fields, each of which is in turn divided into ten sub-fields. This thematic structure, when augmented with the corresponding thesaurus descriptors, serves as a precise subject scope definition.

The microthesaurus contains 3,418 descriptors — 2,178 of which are precoordinated — and 475 non-descriptor terms. The descriptors are ordered alphabetically with the following semantic relationships shown: USE, UF (use for), BT (broader term), NT (narrower term), RT (related term), and SN (scope note). In addition, the descriptors can be sorted and listed by major and minor thematic fields. Finally, auxiliary lists of geographical indicators and institutional identifiers have been compiled as annexes to the microthesaurus.

The alphabetical list of descriptors with semantic relationships has been published,³¹ and was approved in general during the II Consultation Meeting. Mechanisms for updating and revising the thesaurus have been developed and are included in a corresponding thesaurus use manual.³² Also, arrangements have already been made with CETESB to produce a Portuguese version, while an English version will be prepared in-house. Currently, a final test is being made in CEPIS of the thesaurus before it is tried on a regional basis.

The preparation of the MISCA thesaurus has been an arduous task and has only been possible because of the generous cooperation of numerous professionals and institutions outside of CEPIS, and the intensive participation of the Center's subject specialists during all phases of this activity.

3.4 Technical Manuals

This components of the project has an immediate and a long-term objective: the first is to produce tools for bibliographic description and processing and test them in-house; the latter is to test them in the national centers so as to perfect them for continuous use in the network.

Extensive research was carried out on manuals and other normative materials used in existing national, regional and international information systems. Particular attention was given to recommendations sponsored by UNISIST, ISO, FID, AGRIS, ILO, IDRC, etc. Comparisons of international standards with those most widely used in the Region were made, and with the help of library science and documentation consultants decisions were reached on the appropriate standards for use in REPIDISCA. These were incorporated into a set of five technical manuals aimed at orienting the technical processing activities of the national centers. Testing of most of the individual components of these manuals has been carried out during the different stages of their development.

These manuals were integrated into a single REPIDISCA Reference Manual,³² which has been printed and distributed for review. An in-depth, comprehensive test of them still remains to be carried out at CEPIS before they are used for generating input at the national level.

Briefly, the manuals and their objectives are as follows:

- 1) Library In-Service Training Manual: a guide to the technical processing standards being employed at CEPIS' library, to orient in-service training at the Center and to provide a complete collection of bibliographic description and cataloguing standards to be used in the network.
- 2) Bibliographic Description Manual: (included as a separate chapter in the Library Manual) to serve as a guide to filling-in the bibliographic description fields of the REPIDISCA input sheet, indicating the standards to be followed in each case.
- 3) Indexing and Abstracting Manual: to serve as a guide to indexing and abstracting tasks associated with the use of the REPIDISCA input sheet, indicating methodologies and emphasizing quality control. Although abstracts are not mandatory in REPIDISCA now, it is hoped that this manual will encourage their preparation and inclusion.
- 4) Basic Notions on Information Storage and Retrieval: to familiarize librarians with basic concepts of non-conventional systems for information processing, storage and retrieval. Manual methods which could be useful for incipient national centers are included.
- 5) MISCA User Manual: to offer basic concepts on the use of descriptors and thesauri and to train users (librarians, documentalists, subject specialists) in correct and effective usage of the MISCA microthesaurus.

These manuals have been edited in a manner that will facilitate their periodic updating as experience is gained in their use.

3.5 Survey of Information Sources and Users

A survey of environmental engineering institutions in the Region was planned to produce data of the following nature:

- type of institution, objectives, functions, staffing patterns and basic infrastructure;
- information needed by the institution and its staff;
- information produced by the institution;
- information services offered by the institution to internal and external users.

Preliminary activities included the preparation of country profiles and lists of national institutions. Some 422 institutions to be surveyed were identified in 26 countries of the Region. Two pilot studies were made in Peru to test out the survey questionnaire, and evaluate alternative distribution and response mechanisms. The first consisted of personal interviews carried out by a temporary consultant and resulted in a 90% response rate and a consistent interpretation of and response to the survey questions. The second pilot experience was based on mail survey methods and, as expected, resulted in lower response standards.

As a result of these tests, the survey was to be based on the personal interview method, coordinated by a short-term consultant and with the cooperation of the PAHO country engineers and national AIDIS chapter representatives. Unfortunately, this plan suffered an early prolonged set-back when the responsible consultant took ill and died several months later. Because of this delay it was decided to fall back on mail survey methods.

To date some 135 of the 422 candidate institutions have responded to the survey. That such a high rate (32%) has been achieved in a relatively short period is due to the active cooperation of the PAHO Country Offices in providing

follow-up. A preliminary analysis has been made of the survey responses.²⁷ However, since a substantial number of additional responses can be expected, a complete, in-depth analysis has been postponed until the last quarter of this year.

Complementary studies have been made to estimate literature production in the Region within the scope of REPIDISCA. Through an analysis of books, periodicals, publications of international organizations and other sources, estimates were made of usable conventional literature being produced. Non-conventional document production has been estimated from an analysis of CEPIS' library holdings since it is perhaps the best specialized collection in the Region, from the detailed study made of Peruvian institutions, and from the preliminary survey findings. From this it was determined that REPIDISCA could reasonably expect to process some 4,000 documents per year during the first years of operation, and the Master Plan was dimensioned on that basis.

3.6 Second Consultation Meeting

The advances made in the previous project components indicated the need for a Second Consultation Meeting for a mid-course evaluation. This was proposed to the IDRC and accepted within the terms of this project. Additional funds for the meeting were provided by PAHO and UNEP.

The II Meeting was held in CEPIS during 11-13 July 1979, with the participation of delegates of 18 national institutions in the Region as well as representatives from WHO/IRC, UNEP, EPA, IICA, AIDIS, UNDP and the IDRC.

The main objectives of the II Meeting were to present the Master Plan and system tools to the Consultative Group, to seek a professional and institutional consensus on the system design and Master Plan, and to obtain pledges of institutional participation in the implementation phase of the network.

The project documents²⁹⁻³² were submitted to the participants well in advance of the meeting, and summary guidelines for session discussions were prepared by a consultant.³⁴ These documents were considered in detail by the Consultative Group in six plenary and working sessions.

The Meeting gave its overall approval to the Master Plan for REPIDISCA, considered that its timely implementation would be an effective mechanism for information transfer within the Region, and in particular agreed on 33 specific recommendations dealing principally with REPIDISCA objectives, structure and functions, system tools and standards, the central bibliographic file and outputs, document delivery services, financing, development plans, and training and technical cooperation programs. The Consultative Group called on PAHO and the IDRC to continue providing financial and technical support for the development of REPIDISCA.

The complete set of recommendations and a summary of the presentations, debates and discussions of the Meeting are presented in a final report.³⁵

The II Consultation Meeting marked the conclusion of this project. It was notable in that it gave its approval to the findings of the project and once again echoed the enthusiasm of the national institutions for the development of the network. As a result of the meeting there is a new mandate to go ahead with the proposed pilot implementation phase of REPIDISCA, and six countries have been identified which can potentially participate in the next phase. Follow-up activities are under way to confirm their inclusion.

4. EVALUATION OF ACTIVITIES AND FINDINGS

Overall, it is felt that the project objectives have been met, and that the results and findings are of a consistently high quality and do provide a solid basis for the implementation and operation of the REPIDISCA system.

A number of modifications were made in the original project schedule of activities and resources as the project developed, in response to changing circumstances or to improve the expected results. These are indicated below:

- The Memorandum of Grant Conditions was signed on 29 April 1977, but project activities actually began on 12 September 1977 to allow time for contracting the initial project consultants. The IDRC agreed to this and set the project deadline at 31 May 1979.
- A general problem which was faced throughout the project was that of opportunely identifying and contracting international consultants. This was resolved by the ample use of local-hire consultants and by the dedication of additional CEPIS manpower to the project. As a result there were considerable cost reductions in the IDRC budget item for staff, however, the utilization of CEPIS professionals in the project was more than double that anticipated.
- Since it was considered important to get the opinion and approval of the Consultative Group regarding the findings of the project, at CEPIS' request the IDRC approved the inclusion of the II Meeting. This was done within the IDRC project budget, by shifting the unused personnel funds.
- To allow for the II Meeting and for the prior printing and distribution of the project documents to the participants, the project deadline was extended from 31 May to 31 July 1979.
- A training program for CEPIS information personnel was included making use of project travel funds to cover trips and per diem. In-service training and observation for five staff members was provided at DOCPAL, CLADES, IICA/AGRINTER and the WRC. Also the UNESCO/CONACYT Indexing Seminar in Buenos Aires was attended by the CEPIS Librarian.

With respect to the application of project resources, these are described in detail in the final project financial statement to be submitted by PAHO's Finance Office. The project operated within the IDRC budget, but CEPIS counterpart contributions were greatly exceeded particularly in the area of professional staff (see Appendix 2).

Compliance with project objectives, which are listed in section 2 above, can be evaluated as follows:

- a) Institutional participation: this objective has been wholly met with the hosting of two Consultative Group meetings of participating institutions. The I Meeting provided guidelines for the development of the system design and tools, and the II Meeting evaluated and approved the products. Also, throughout the project individual national institutions have been consulted and have contributed to its development.
- b) Definition of subject scope: a precise definition of subject scope has been made by means of the thematic classification scheme applied to the microthesaurus. Coverage is further defined by additional document selection criteria indicated in the Master Plan and Reference Manual.
- c) System design: a comprehensive system design study was carried out, and the final design as described in the Master Plan is regarded as both theoretically sound and practical. It has been entirely accepted by the Consultative Group.
- d) Basic tools: the project has produced a microthesaurus and a set of technical processing manuals. These tools have been tested individually at different stages of their development. However, an in-depth test of their

use as an integrated set of tools and standards for document processing is still required. This is currently under way in CEPIS, but will also be needed at the regional level. The Consultative Group analyzed these documents and approved them in principle subject to trial usage and revision. It might be noted here that the preparation of the microthesaurus was a major undertaking and consumed a disproportionate amount of time and resources compared to the other project components.

- e) Evaluate information sources: an institutional inventory has been compiled for the Region, and evaluations made of sources of conventional literature. In-depth sample surveys were performed in Peru and in other selected national institutions, and provided the basis for original estimates of document production and use, and for the overall survey design. A global mail survey was made and a 32% response obtained to date for which only superficial analyses have been performed. A detailed report of results is still needed and will be made by CEPIS later this year.

On the balance, the major project objectives have been met. Conditions now exist which would permit implementation of the network on a pilot scale. An additional residual of the project is the strengthening of CEPIS' capacity to provide information services through the creation of new staff positions (3) and staff training.

5. CONCLUSIONS AND RECOMMENDATIONS

- 5.1 It is considered that the project has met its general and specific objectives, and that its products — the system design and tools — satisfy the purposes for which they were created.

5.2 It is recommended that this project be considered as an initial phase of major long-term effort to implement and operate a cooperative regional information service — REPIDISCA. A substantial investment has been made toward this end by CEPIS/PAHO, the IDRC, UNEP and a multitude of other national and international institutions. This effort should be extended so as to provide a firm financial and technical basis for the network.

5.3 The recommendations of the II Consultation Meeting on specific aspects of the network design and future operation will be incorporated into the next phase of REPIDISCA development so that the network truly responds to the perceived needs of the Member Countries.

5.4 The next step in consolidating the results of the project, as recommended by the II Meeting, will undoubtedly be to strengthen the capacity of the central coordinating unit so that it can perform its role of promoting and supporting the development of the national collaborating centers. Essentially, the effort is aimed at establishing effective information services at the national level.

5.5 A proposal for financing the next phase should be presented to the IDRC for their consideration. At the same time PAHO should decide on the ways and means at its disposal for assuring the continued development and operation of REPIDISCA.

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DEDICATION OF PROJECT STAFF AND CONSULTANTS

A. STAFF FUNDED BY THE IDRC

1. International Consultants

<u>Position</u>	<u>Name</u>	<u>Dates</u>	<u>Man-months</u>
Thesaurus specialist	Dr. Rafael Rodríguez Delgado	10/ 9/77-19/11/77	2.3
Documentalist	Ms. Ana Schleimer	12/ 9/77-31/ 3/78	6.6
Systems analyst	Mr. Carlos Mattos	1/10/78-21/10/78	.7
Thesaurus specialist	Dr. Donald Leatherdale	6/ 2/79-14/ 2/79	-
Information scientist	Mr. Peter Russell	24/ 2/79-11/ 3/79	.5
Information scientist	Mr. Harry East	31/ 1/79- 3/ 3/79	1.1
		29/ 6/79-22/ 7/79	.7
			<u>11.9</u>

2. Local Consultants

Information scientist	Dr. Daniel Arteaga	14/11/77-17/ 3/78	4.1
Subject specialist	Mr. Alejandro Vines	12/ 7/78- 1/ 8/78	.6
		13/11/78-29/ 6/79	7.6
Librarian	Prof. Nelly MacKee de Maurial	17/ 1/79-23/ 3/79	2.2
Systems analyst	Mr. Milton Rodríguez	22/ 2/79-22/ 3/79	1.0
			<u>15.5</u>

3. Local project staff

Documentalist		14.5
Assistant documentalist		20.3
Programmer-Operator		21.
Assistant librarian		13.3
Technical assistant		5.7
Secretary		22.
Keypunch operator		.7
		<u>97.5</u>

B. CEPIS COUNTERPART STAFF

1. International staff

<u>Position</u>	<u>Name</u>	<u>Man-months</u>
Management coordination	Mr. Odyer A. Sperandio	3.5
	Mr. Rafael Sandoval	
Information specialist	Dr. A. Héctor Sosa Padilla	16.
Systems analyst	Dr. Carl R. Bartone	5.
Subject specialists	Mr. Horacio A. Alvarez	3.5
	Mr. Walter Castagnino	
	Mr. Ricardo Haddad	
	Dr. Cliff J. Kirchmer	
	Mr. José Pérez	
	Mr. Rodolfo Sáenz	
	Dr. Fabián Yáñez	
Administrative officer	Ms. Norma Llorach	1.
Short-term consultants	Dr. A. Héctor Sosa Padilla	2.5
	Mr. Carlos Escobar	
		<u>31.5</u>

2. Local staff

Librarian	6.5
Assistant librarian	2.5
Documentalist	1.
Library clerk	6.5
Technical information assistant	4.5
Programmer-Operator	1.
Print shop staff	2.
Secretaries	22.
Student assistants	<u>8.4</u>
	54.4