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PROGRAM DEVELOPMENT AT THE CENTER  
FOR HUMAN ECOLOGY AND HEALTH

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## PROGRAM DEVELOPMENT AT THE CENTER FOR HUMAN ECOLOGY AND HEALTH\*

## Introduction

Human ecology is an integrative science which is concerned with all the elements of man's activities and environment, their interactions and their impact on man's health and well-being.

The unique responsibility within PAHO of the Pan American Center for Human Ecology and Health (ECO) is to create a core team of professional ecologists and health workers who can develop and apply a holistic ecological approach to problems concerning the impact of environmental change on health. The Center's staff will be confronted with a wide variety of problems and will need broad methodological skills which can be applied generally. The staff of the Center must have both the capacity to view health broadly and the skills to analyze the complex interactions within the environment which will have an impact on health.

The Center faces the problem of limiting the definition of health and human ecology for operational purposes. A human ecologist is concerned with all the interactions between man's biomedical, socio-cultural and productive activities. The environmental health problems facing Latin America range from occupational and community hazards of new industries and development projects to the health effects of the reuse of treated sewage water. Also the Center must confront the reality of operating on limited resources. Therefore, we are proposing

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a strategy for the Center's development which will allow us to concentrate our resources where the problems seem most urgent and yet maintain a flexibility which will allow the Center to respond effectively to unforeseen or uncommon problems.

Premise:

Development and economic growth is one basic goal of all of the member states of PAHO. During the next few decades, billions of dollars will be invested in social, industrial and resource utilization projects. All the nations of the hemisphere are under intense pressure to exploit energy sources and develop industries. Primary raw material vendors will increasingly refine, process and utilize their own domestic resources. The recognition that social, educational, and health programs must accompany industrialization is an increasingly accepted concept.

The experiences and mistakes of the highly industrialized nations point to the need for rapidly developing nations to protect their societies from the preventable unwanted side effects that industrialization can bring.

Large scale development projects will have a profound impact on health and human ecology. They may well be the most important planned discrete events that will affect the environment and health. Other major trends such as urbanization are amorphous processes usually unplanned and much more difficult to control. Planning to minimize adverse health effects of development projects may be possible and certainly seems to be the approach that the Human Ecology Center can take that is most likely to produce beneficial results.

Many individuals and representatives of governments have

stated that their countries need technical assistance in formulating and implementing environmental and health impact assessments of development projects. Most international and bilateral financing agencies are actively engaged in environmental assessments. However, in our experience, Ministries of Health generally state that they have relatively limited capacity to conduct the extensive investigations required and international technical assistance tends to focus on general environmental issues rather than health specifically.

The priority needs stated to us by representatives of the health sector fall into six categories:

1. How should the environmental and health problems be defined and what information needs to be collected (initially, periodically, continually) in order to assess the environmental and health impact of development projects. How is the information to be integrated into a holistic plan? What are the least costly and most efficient ways of collecting such information?
2. How can one develop strategies to minimize adverse effects, including both the development of integrated plans and the acquisition of technologies which can limit damage?
3. How should control and regulatory strategies be developed? What are the relationships between environmental health standards and health effects? Which indexes of health can be best used to measure changes in health or effective-

ness of control programs?

4. What are the most effective and appropriate implementation mechanisms regarding the administrative control and executive authority to enforce an environmental and health protective program?
5. What kind of training should be provided to professionals working in this area, and where will they get it?
6. If expert technical assistance is needed, what kinds of experts should be obtained and how can they be identified?

This list of national concerns may be considered a confirmation of the original objectives as stated in the Report of the Advisors Committee which met in Mexico City.\* Those objectives have been modified somewhat by experience but are certainly consistent with the concerns expressed above. The objectives may be further limited in the light of resources actually made available and the priorities indicated to us by member governments.

\* The objectives stated in the report are found in Appendix 1

### The Strategy for the Development of ECO

The new Center is starting from a small base and entering into a relatively new and not rigorously defined area. There are no clear guidelines or established precedents to follow. A cautious step-by-step development seems advisable. The Center must not overcommit itself and spread its resources too thin. For the period 1976 to 1980 the prime task is to develop the technical and managerial capacity to deliver high quality assistance.

Our problem is to transform the general objectives of the Center into a specific program consistent with the resources available. The first step is to describe what needs to be done and the second is to develop a critical mass of professional and supporting staff to execute the plan of action.

The General program of the Center will consist of:

1. A selected series of consultations on environmental impact of development projects to both "learn by doing" and to provide immediate direct technical assistance. First we plan to participate in some assessments. Second, to organize, manage and conduct several assessments including evaluating the results. Third, to learn how to advise a member state on what is needed to develop their own capacity for assessments.

2. A continuing review of existing health and environmental impact assessment methods concentrating on direct health effects, indirect health effects brought about by environmental change and social effects which have an impact on health. The review will include the collection and evaluation of health criteria documents.

3. The development of a set of assessment methodology manuals which can serve as guidelines for the Center's team or can be made available for others to use. Some examples are:

a. Multipurpose dams in

- tropical ecosystems
- subtropical ecosystems
- temperate ecosystems

b. Geothermal power plants

c. Integrated extractive - processing industries

- copper
- petroleum and petrochemical
- aluminum
- steel



d. Nuclear power plants

4. Study the relationship between ecologically based health plans and governmental structures which are responsible for executing the plans. The intent is to learn how to incorporate knowledge of the capacity of responsible agencies into appropriate control strategies.

5. The development of an information system to support the above activities.

6. Institutional development to encourage human ecology training programs.

7. A research program will be proposed after sufficient experience has been obtained for PAHO to determine priorities and capacities.

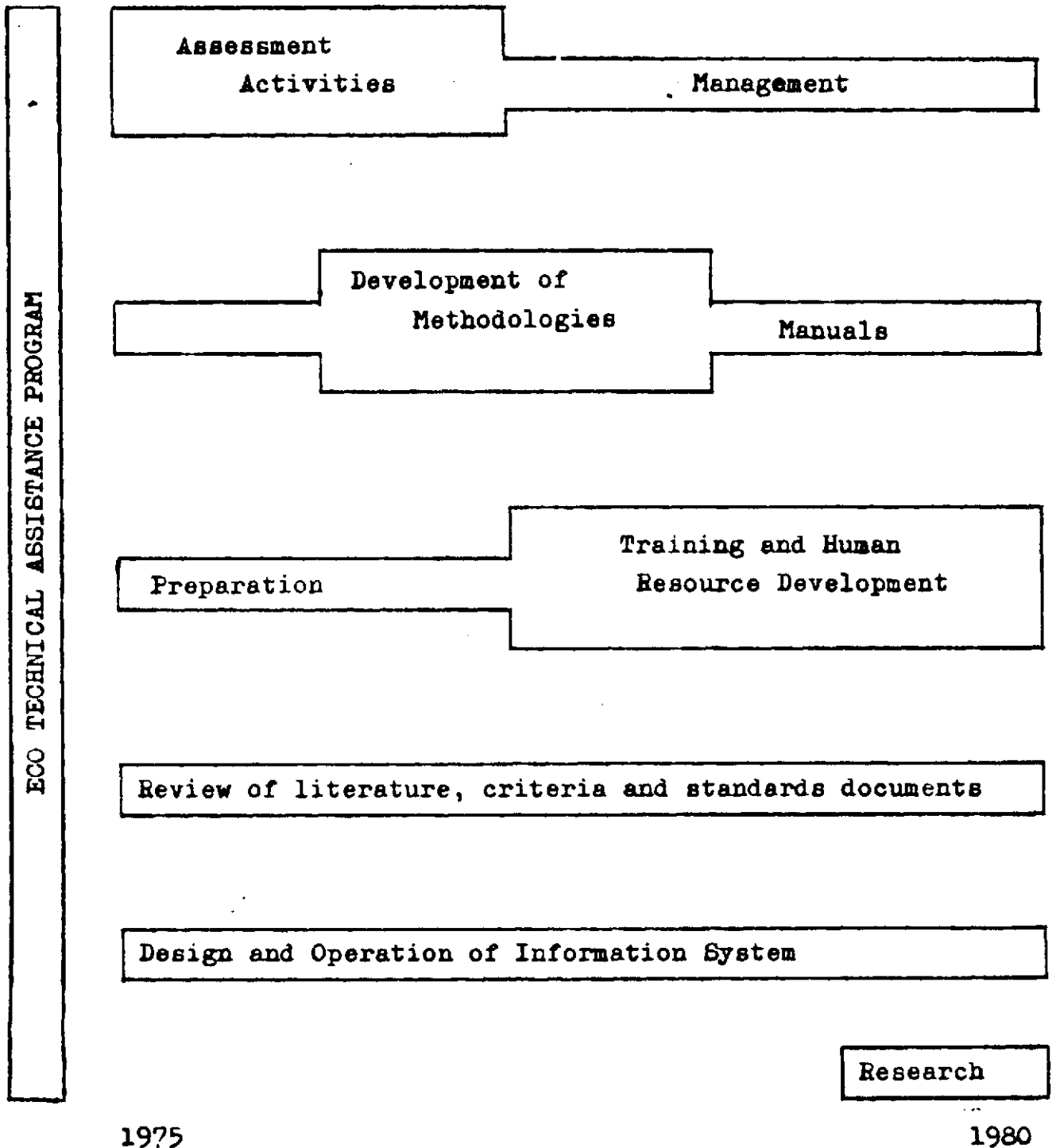
The general strategy of development is shown in Figure 1. The intention is to show where emphasis will be placed as the Center matures, not to describe absolute boundaries between activities or stages.

In conducting field studies and surveys on environmental health problems requested by member countries, there are several objectives. These include: defining and quantitating the hazards and problems, considering alternative strategies for prevention and/or control with a minimum impairment of economic growth and development, preparation of recommendations, and assisting countries to develop their own resources. The assistance can combine transfer of technology with building

Figure 1

DEVELOPMENT PLAN FOR THE CENTER FOR HUMAN ECOLOGY AND HEALTH

Areas of Concentration During the Initial  
Five Years of Operation



general knowledge in the country and technical training of personnel. The goal is to conduct the studies on a joint basis with the appropriate specialists within the host country and PAHO. Our function is to provide specialized technical skills to countries coordinated through the Country Representative's office. A mutual feeling of accomplishment can be fostered by cooperative action and perhaps improve the opportunity for success in implementing the recommendations.

The Center, although in its infancy, is starting to receive requests for assistance from both governments and multinational financing agencies. We have responded to them within our capabilities and each has proved to have value to us as a testing ground for our approach and as a contribution to clarifying member countries needs. Some of the requests for assistance fit into a pattern which is consistent with the Center's plans for development.

In addition to planning to develop a capacity to respond to a variety of requests for assistance, an integrated set of specific project activities is being proposed as one part of the Center's program during 1976 and 1977. These projects will provide a variety of technical and administrative problems which are expected to contribute to our institutional development as well as being of direct value to the countries concerned. No firm commitments have been made as yet and difficulties may arise such that ECO's participation is no longer appropriate. The list does serve as a display of examples of the sort of projects ECO could be concerned with. The proposed projects are:

1. Cerro Colorado Copper Mine and Fortuna Dam - Chiriqui, Panama. A new copper mine and smelter are to be built in a relatively undeveloped area as well as a dam to supply power for the project. Both ECO and UNEP have made preliminary surveys and plan to combine resources to assist the Government of Panama in completing an

intensive environmental and health impact assessment which may be used in early project planning for determining optimum smelter site location, and other designs aimed at avoiding pollution and potential health hazards.

2. A survey of four dams in Mexico. In conjunction with the Center for Ecological Investigations of the South East, (CIES) located in San Cristobal de Las Casas, Chiapas, Mexico, we plan to study the ecological and health impact of four multipurpose dams that are of different ages. The Papaloapan project is more than 20 years old. The oldest dam of the three in Chiapas was filled in 1966, 10 years ago, the second in 1969, and another is under construction and will be filled next year. The purpose of studying this series of subtropical dams is to take advantage of the opportunity for retrospective analyses to see which aspects of an environmental and health assessment turn out in practice to be most critical. A general ecological and health impact study will be undertaken attempting to assess multiple aspects of the changes on the health and way of life of affected people. Particular emphasis will be placed on the health impact of relocation on people, and on nutritional effects following changes in agricultural practices. The (CIES) is engaged in studies of changes in vector habitat and other potential transmissible disease problems.

3. Argentina and Uruguay are jointly developing a dam at Salto Grande and have established a binational "Comisión Técnica Mixta Argentina-Uruguay de Salto Grande". ECO has been requested to participate in an extensive impact assessment which is being undertaken by the Commission. Our contribution will be small in comparison to the binational effort but the cooperative studies provide an opportunity for both the Commission and ECO to develop improved assessment methodologies. The administrative and management aspects of international projects will be of particular importance to ECO's program.
4. We are in the early stages of developing a project which is basically aimed at learning more about implementing environmental and health control plans. The responsibility for the execution of holistic environmental control strategies is often found in different agencies or ministries, sometimes with overlapping responsibilities. Interagency conflict and competition is not an unknown phenomena. In other instances, gaps in responsibilities exist. Capacities to undertake or execute time-phased plans may differ from one agency to another. Our first attempt will be to observe and describe the governmental structure of one country as it relates to environmental and health management. Such data can be of great practical importance in designing plans, because with the knowledge, one can often

adapt the plans to an approach which is appropriate to the particular government concerned.

5. Some activities will take a long time to develop. One which we are exploring is the development of an approach to rural health based on viewing rural communities as semi-closed ecosystems. The premise is that a program of environmental and ecological improvement, largely accomplished by the community itself, could have widespread beneficial health effects. A combination of water and waste-water management, biological and environmental control of vectors and agents of disease, pest control and protection of food supplies by microhabitat manipulation, and improved food production through a variety of community based efforts may be a developmental and health strategy worth pursuing.

### The Critical Mass

To carry out the program outlined above the Center will need a mix of professional capacities and experiences. The multidisciplinary team should be selected so that each member's skills complement others, and the whole team's skills cover the spectrum of disciplines required for a comprehensive health and environmental impact assessment.

An environmental and health impact assessment of a development project consists of:

- 1) a description of the existing environment and health status, including historical trends and changes;
- 2) an analysis of the anticipated changes to the physical, biological, and social environment brought about by the project;
- 3) a calculation of the hazards and pollutants to be produced as a consequence of the project;
- 4) an estimation of the resulting economic, social and cultural benefits and dislocations both during and after project development;
- 5) the development of a plan for monitoring environmental conditions including proposed technologies for control, and;
- 6) an assessment of the impact on health of all the above factors under various control strategies.

The assessment is not the goal; an acceptable operating



control strategy which protects health and the environment is. Therefore, evaluation and follow-up capacity is an integral part of the Center's project and management team.

The following table shows the major activities of an ECO assessment team and the disciplines required:

<u>Activity</u>	<u>Staff and Disciplines</u>
Planning, management and evaluation	{ Director and staff
Environmental and health assessment	{ Ecologist Epidemiologist Behavioral scientist Environmental scientist
Calculation of hazards, pollutants, monitoring requirements, and technology of control	{ Environmental scientist Ecologist
Estimation of health effects	{ Epidemiologist
Plan or Report formulation, control program design, implementation strategy	{ Field team, center staff, and environmental system analyst

Without the entire set of disciplines, the team is likely to make serious errors of omission. The staff members will all need to be familiar with, and contribute to, a systems approach to development problems.

Specific skills, such as air or water pollution engineers can be obtained when appropriate. In addition the basic team

strength will be augmented by close working relationships, already established with the UNEP Latin American Regional office in Mexico City which has strengths in ecology, economics, and environmental law, with CEPIS in Lima which has specialized public health engineering skills, and CLAM in Buenos Aires which has personnel who can translate projected health needs into strategies for health service response and development.

Other skills and activities can be added to the original core staff as resources permit. An economist is perhaps first priority and a toxicologist second.

Specific research and development projects and the staff to accomplish them can be added to the Center's core staff. The nature of the specific projects should be related to the objectives of the Center and not be a diversion.

In summary, the strategy is to use the limited resources available to build a multidisciplinary core staff which will be responsible for managing and conducting the program of the Center. Most of the resources will be used to provide the critical mass of professionals, together with the necessary technical infrastructure.

The Center will then be analogous to a low cost consulting service where only travel and local expenses need to be provided by the client. The major overhead costs will be borne by the organization.

Specific projects can be added at minimal expense, because

the basic professional and support infrastructure exists.  
Some of the early projects will be selected because of their  
relevance to the Center's development needs.

### The Information System

A critical resource needed by the core staff is an information system. The proposed system is being designed with the following ideas in mind:

1. A primary task of the Center's staff is to keep up to date on knowledge concerning environmental and health problems so that the Center can be a mechanism of technology transfer.

2. We should utilize all the available facilities in Mexico City thereby avoiding duplication and lowering costs.

3. The information system functions to serve project goals and is not an end in itself. However, the capacity may well prove useful to PAHO and other users, who may have to pay specific costs such as library or computer search fees, mail, etc. which are not part of the Center's routine work.

4. Special arrangements to systematically collect unpublished UN agency and other related reports are being developed with the UNEP.

5. The mere collection of reports and journal articles is only the start. Professional evaluation of the quality and applicability of the information is a prime task of the core team.

The information system has been designed using an approach (see Fig. 2) based on its performance requirements and resource constraints. On a functional basis three major sub-systems may be distinguished:

- the user
- information activities within ECO
- information sources

ECO's information functions are mutually dependent, they form a loop that starts from the user's statement of the problem. The problem is then defined in terms suitable to guide information collection, analysis and synthesis activities. Similarly the search for information will also help to redefine the problem in more precise terms and modify information collection. Activities aimed at generating useful information cannot be carried out unless guided by problem definitions which include the recognition of constraints.

Evaluation of the system's performance is a validation of the degree of effectiveness of the information given to the user in relation to the statement and definition of the problem. During the information processing cycle, feedbacks are required, as shown in figure 2, to improve and reevaluate the output.

Since the user is concerned with both timing and quality of the output, ECO's activities are oriented to the optimization of response time and professional evaluation of information. This in turn is dependent upon the speed of information retrieval from the various sources existing inside and outside of Mexico.

Because of the comprehensive approach of the Center to health problems, information from many disciplines is required. It would be tremendously expensive to concentrate the data in one



place; it would also duplicate much of the information already available in Mexico. A preliminary survey of 20 institutions, mostly libraries and documentation centers, which are the main sources of information in Mexico City, has been conducted to evaluate their size, composition of holdings, important subjects represented in the collections, geographic area covered and available services. An evaluation is being made on the time required to obtain documents from Mexico City libraries, and libraries in the United States of America.

An information sources reference file organized by subject (and coordinated with CEPIS and UNEP) is being compiled in ECO. As a by-product of information searches, annotated bibliographies on specific topics will be produced. The development of a collection of bibliographies may have many potential users, in addition to ECO.

Report of the Advisory Panel  
Held in Mexico City  
27-31 January 1975

Objectives of the Center

- Develop methodology to identify, define and monitor human health problems related to environmental change, and to establish mechanisms which would permit selecting those which should be given priority attention.
- Provide information for national and global assessment of health problems of environmental origin hopefully in advance of their becoming critical (early warning).
- Promote, advise, and alert governments to the need for programs and actions to be taken to prevent or minimize adverse human health effects resulting from environmental changes.
- Collaborate in the formulation and dissemination of environmental health criteria and guidelines to be used in preparing and applying realistic environmental health standards.
- Determine educational needs, and assist in developing education and training programs in human ecology relating to health.
- Conduct, support, and promote studies and research, including development of relevant indices and preventive measure and the use of ecological systems approach and modeling techniques.

In meeting these objectives, it is expected that the programs undertaken at the Center will complement and supplement ongoing activities at PAHO facilities, the other United Nations Agencies, and at the institutions, universities, research and information centers inside and outside the Region.