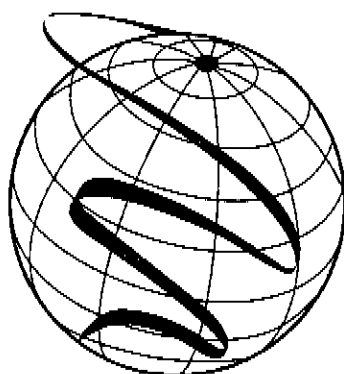


**ENVIRONMENTAL
OCCUPATIONAL
EPIDEMIOLOGY
SERIES**

**WHO/EHG/94.8
DISTR: LIMITED
ORIGINAL: ENGLISH**



PROGRESS REPORT

1993



WHO
World Health Organization
Geneva, 1994

This document is not issued to the general public, and all rights are reserved by the World Health Organization (WHO). The document may not be reviewed, abstracted, quoted, reproduced or translated, in part or in whole, without the prior written permission of WHO. No part of this document may be stored in a retrieval system or transmitted in any form or by any means - electronic, mechanical or other - without the prior written permission of WHO.

The views expressed in documents by named authors are solely the responsibility of those authors.

Ce document n'est pas destiné à être distribué au grand public et tous les droits y afférents sont réservés par l'Organisation mondiale de la Santé (OMS). Il ne peut être commenté, résumé, cité, reproduit ou traduit, partiellement ou en totalité, sans une autorisation préalable écrite de l'OMS. Aucune partie ne doit être chargée dans un système de recherche documentaire ou diffusée sous quelque forme ou par quelque moyen que ce soit - électronique, mécanique, ou autre - sans une autorisation préalable écrite de l'OMS.

Les opinions exprimées dans les documents par des auteurs cités nommément n'engagent que lesdits auteurs.



WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE DE LA SANTE

46984
WHO/EHG/94.8
DISTR.: LIMITED
ENGLISH ONLY

GEENET PROGRESS REPORT, 1993

**ACTIVITIES AND PLANS FOR THE GLOBAL ENVIRONMENTAL
EPIDEMIOLOGY NETWORK ("GEENET PROJECT")**

WORLD HEALTH ORGANIZATION, GENEVA

MARCH, 1994

PREFACE

The major WHO initiative "Global Networks to Strengthen Education, Training and Research in Environmental Health" involves the development of global networks of individuals and institutions representing key professional groups in the environmental health field. The funds available to date from UNEP, Sweden, Norway, the US Environmental Protection Agency (US EPA), the Commission of the European Communities (CEC) and the WHO regular budget have been used to develop the Environmental Epidemiology (GEENET) and Environmental Technology (GETNET) components of the Global Networks initiative and this report will deal with the Environmental Epidemiology component only. A separate report has been prepared on the development of the Technology network. This project is being carried out in collaboration with other international agencies including UNEP, ILO, UNESCO and the World Bank.

Environmental epidemiology is the part of Environmental Health Science and Management that specifically deals with the occurrence of health impacts of the environment (description), the links between exposures and health effects (analysis of causation), and the links between interventions and reduced or avoided effects (evaluative interventions). This is usually carried out by people with a medical or health science background and specific training in epidemiology. **Environmental technology** is the part of Environmental Health Science and Management that specifically deals with technologies to avoid health hazards occurring in industrial or agricultural production systems (cleaner production) and technologies to reduce emissions of health hazards into the environment (pollution control). This is usually carried out by people with an engineering or general science background with special training in control technology.

The purpose of this report is to present a comprehensive description of the achievements of the GEENET Project, originally funded by SIDA (Sweden) and WHO under the project title "Global Networks to Strengthen Education, Training and Research in Environmental Health". Increasingly, funding for GEENET activities is coming from other sources. This report includes all relevant GEENET activities coordinated by WHO's Headquarters or Regional offices, regardless of funding source. The report includes proposals for future work and the structure is the one used for WHO programs supported through extrabudgetary funding proposals.

A. TITLE

The Global Environmental Epidemiology Network (GEENET)

B. DURATION

The global project infrastructure will continue to be developed. In 1994-1997 the country-based project activities are being further extended, so that by the end of 1997 environmental epidemiology capacity has been established and strengthened in most developing countries.

C. BACKGROUND AND JUSTIFICATION

In 1987 a strategy for WHO's technical cooperation with Member States on the control of Environmental Health Hazards was developed. Infrastructure development, including training and applied research, was a major feature of this strategy. In order to facilitate such development WHO established a global network of institutions and individuals involved in training and research on the health effects of environmental hazards. This network is called the Global Environmental Epidemiology Network (GEENET).

In 1989 several new initiatives for the WHO Environmental Health programme were launched. One of these initiatives was the development of "Global Networks to Strengthen Education, Training and

Research in Environmental Health". The background, objectives, approaches and plans for this initiative are described in the WHO document PEP/90.17 ("Global networks to strengthen education, training and research. A long-term initiative in support of sustainable development"). The Global Environmental Epidemiology Network (GEENET) is the first of the "Global Networks", and the second network, GETNET (the Global Environmental Technology Network) was launched in 1990.

In 1992 the report of the WHO Commission on Health and Environment (*Our Planet, Our Health*) was published, including conclusions and recommendations concerning priority issues in environmental epidemiology. The report was the main input from WHO into the United Nations Conference on Environment and Development (UNCED) which in Agenda 21 also produced a series of recommendations related to the health impacts of environment. Based on these and the cumulated experience of WHO, a "WHO Global Strategy for Health and Environment" was developed (World Health Assembly document A46/11, 1993). Education, training and research have a major role in this strategy. In late 1993, an Action Plan to implement that strategy was prepared and the GEENET project is a key component of this Action Plan within the component that addresses "Human Resources for Health Effects and Exposure Assessment".

D. OBJECTIVES

The overall development objective of the GEENET project is to strengthen education, training and applied research in developing countries on health problems caused by environmental hazards, and in this way support sustainable development.

The specific objectives are:

- (i) create and maintain a Global Environmental Epidemiology Network of people in government institutes, universities, industry and non-governmental organizations, who are involved in teaching and supervision of applied research (field studies of exposed humans) on the health effects of environmental hazards. The development of National Networks on a broader basis will also be encouraged and facilitated;
- (ii) identify and support in each Member State, one or several (in selected major cities) main libraries, willing to establish Environmental Health Reference Collections with "essential information" on environmental health hazards and their control;
- (iii) establish and strengthen, at the local level, education and training on environmental health hazards and their control; this will include the strengthening of programmes and courses in universities, short training workshops for public health staff and seminars on specific problems. WHO will provide standard "training kits", support for national workshops to test and demonstrate training materials and approaches, and opportunities for "training of trainers" in order to make the new local activities sustainable;
- (iv) encourage and facilitate new and improved applied research using epidemiology to study and resolve local environmental health problems; this will include provision of advice and information on methodology, funding, similar studies elsewhere and research recommendations; establishment of cooperative projects and promotion of environmental health hazard research to funding agencies.

E. PROJECT DEVELOPMENT 1987 - 1992

(Major country-specific activities are indicated in bold)

1987

The first plans for GEENET were developed including membership invitations and application forms. These were initially distributed through WHO Regional Offices and later invitations were sent to a variety of environmental and public health agencies and institutions.

1988

In 1988, targeted distribution of priority information materials to GEENET members was started and a standard format for a national training workshop on Environmental Epidemiology was developed. In addition, an inventory of existing basic training materials was prepared and the preparation of new training materials was initiated. A regional workshop using these materials was held in Kuala Lumpur for countries in the **Western Pacific Region** and a national workshop was held in **Cuba**. By the end of 1988 GEENET had about 500 members.

With limited resources available from WHO's regular budget and extrabudgetary funds from the International Programme on Chemical Safety (IPCS), the activities were developed at a slow pace. In response to the renewed interest in Environment and Health stimulated by the report *Our Common Future* from the World Commission on Environment and Development (published in 1987), we developed a more ambitious, long-term project proposal for extrabudgetary funding which was submitted to the Swedish International Development Authority (SIDA) and the Swedish Agency for Research Cooperation with Developing Countries (SAREC) in 1988.

1989

This proposal received joint funding from SIDA and SAREC in 1989. In addition, IPCS provided funds to carry out training workshops and prepare training materials and CEC provided funds to prepare an inventory of training courses and human resources in the field of environmental epidemiology. WHO regular budget resources (a major input of staff time and a limited input of funds) were also available. With these resources the activities could be considerably extended. A more complete plan was prepared for the use of the network infrastructure for development of environmental health education, training and research. This was adopted as one of the major, new initiatives in the WHO Environmental Health programme (see document PEP/90.17).

The progress was reported in October 1989 (WHO document PEP/89.24). The membership of GEENET had then grown to 800 and a list of the members and their interests and experience had been distributed. Microcomputer procedures for the management of GEENET were established in 1989 and a manual for the standard software used in GEENET was prepared and printed. National training workshops were held in **Chile** and the **People's Republic of China** and the standard workshop curriculum and training materials were translated to Spanish. A training text on Basic Epidemiology was drafted and preparations for testing the text were made. A number of information materials on specific environmental hazards were distributed to GEENET members in accordance with their interests. This included relevant materials from Member States, and non-governmental organizations.

1990

For 1990 a project proposal (WHO document PEP/89.26) was submitted to SIDA and SAREC for the environmental epidemiology component of the networks project. Funds were provided as a part of the ongoing collaboration in Primary Health Care between WHO and SIDA/SAREC. Additional funds were made available from the Swedish Ministry of Foreign Affairs multi-lateral technical cooperation programme. WHO regular budget funds and the IPCS made up the difference so that for 1990 all funds requested for GEENET were received.

The Global Environmental Technology Network (GETNET) received support from the Government of Norway for 1990 and 1991. Additional funds for GETNET were later sought from the Government of the Netherlands, the Government of Norway, and the US EPA.

The details of the GEENET activities completed until October 1990 were given in a progress report (WHO document PEP/90.16). The number of GEENET members increased to about 1300 at the end of 1990. Network membership lists and microcomputer diskettes were distributed to members. The microcomputer procedures were further developed. Plans for development of "Environmental Health Reference Collections" (EHRCs) were consolidated in discussions with librarians and public health staff in Chile, Argentina, Brazil, Kenya, Mauritius, Malaysia and Viet Nam. Agreements were reached with UNEP, ILO and some other international agencies concerning provision of free materials for the reference collections. WHO environmental and occupational health materials were provided to key libraries in Viet Nam. Information materials were also sent to individual GEENET members on request. An inventory of audiovisual materials was prepared and distributed to all members.

A number of training activities were completed. The standard workshop curriculum was updated and a number of teaching examples were developed. National one-week training workshops were held in Argentina, Brazil, India, Kenya and Viet Nam, using the standard format. Selected training examples were translated to Chinese, Spanish and Vietnamese. A collection of environmental epidemiology reviews on key teaching topics were published in the World Health Statistics Quarterly (Vol. 43, No. 3). The training text Basic Epidemiology was tested in a number of countries and updated. Offers of translations to 12 languages were received. For research promotion, an inventory of ongoing environmental and occupational epidemiology research projects was prepared and in conjunction with country missions to Argentina, Brazil, Chile, Kenya, Mexico, and Viet Nam, priority research areas for each country were reviewed.

1991

For 1991, a continued project proposal was supported by SIDA. Three staff and some additional funds were provided for this project from the WHO regular budget. In support of closely associated environmental epidemiology activities, funds were provided via the IPCS and the US EPA (to be managed by our American Regional Office and to support the first stage of a research promotion activity in Latin America).

By August 1991 GEENET had grown to 1500 members, a membership list was printed and distributed and the other information supply to members continued. The EPIINFO epidemiological software was promoted and supplied (on request) to members. Libraries were provided with a printed listing of the "Environmental Health Reference Collection". An inventory of newsletters was prepared and existing inventories were updated and reprinted. A special newsletter for GEENET members was prepared. National training workshops were held in 1991 in Bolivia, the Gambia, Indonesia, Mexico, Peru, Poland and Portugal. Several training materials were prepared and a consultation on environmental epidemiology

training was held in Geneva (WHO document PEP/91.30). For research promotion, a consultation on "Epidemiological, social and technical aspects of indoor air pollution from biomass fuels" was held (WHO document WHO/PEP/92.3-A and -B). In collaboration with US EPA a review of the potential for environmental epidemiology in Asia was carried out and a similar more detailed review in Latin America was started. Further details are given in the progress report of September, 1991 (WHO document PEP/92.3).

1992

By mid-1992 GEENET membership had reached nearly 1700, representing 110 countries. An information leaflet about the Network (written in English, French and Spanish) was distributed on request and at conferences, workshops, etc. to new potential members. Micro-computer diskettes with the GEENET files and the accompanying mini-manuals have been provided on request. A GEENET document collection, consisting of all network documents has been prepared, and provided to WHO Regional Offices, relevant WHO HQ programmes and other key institutions (eg. funding agencies).

The list of essential literature sources on environmental and occupational health titled "Reference Information for Environmental Health Training and Research" was sent to all GEENET members with an introductory letter to the librarian of their institutions. The members were encouraged to contact their library regarding the establishment of an "Environmental Health Reference Collection" (EHRC) which would give the GEENET members improved access to the reference materials from WHO, ILO, UNEP, UNESCO, etc. The librarians who responded that they were interested in establishing an EHRC were included in a new Global Environmental Library Network (GELNET). Table 2 lists the distribution by country of current GELNET members.

A regular report (newsletter) for network members (GEENET Update) was published and distributed in English, French and Spanish.

A series of problem-based training exercises for environmental epidemiology were published with separate versions for the tutors and the pupils. In addition, a training manual for environmental disease outbreak investigations has been published, and an anthology of training case studies of environmental disease episodes has also been published. A training kit for a one-day workshop on chemical hazards was also completed for printing.

Work started on a new specialized text on "Environmental Epidemiology" (a joint project with US EPA, funded separately), which will be used as the main teaching source in a new, more advanced workshop on environmental epidemiology research methods (a first meeting to discuss the text content was convened in August, 1992).

National training workshops were held in Costa Rica, Venezuela, Philippines, Latvia, and Colombia. Additional national or provincial workshops were held in the following countries, for which GEENET only provided copies of training materials: Argentina (2 workshops), Poland, Chile, Indonesia (2 workshops), and Viet Nam (3 workshops).

F. STAFF WORKING IN THE GEENET PROJECT, 1993

- WHO/HQ regular budget staff:

Tord Kjellström, Medical Officer (Epidemiologist, project supervisor)
Jacqueline Sims, Technical Officer (Anthropologist)
Guido Torelli, Secretary

● **Staff at WHO/HQ employed on the project funds:**

Laurence Pollier, Technical Assistant (computing)
Catherine Hidalgo, Secretary/Clerk
Eugene Schwartz, Environmental Epidemiologist (commenced 27 September 1993)
Colin Soskolne, Consultant (Epidemiology) (for 3 months)

● **Input from WHO Regional Offices:**

AMRO: a substantial input in specific field activities by Dr G. Corey at the Pan-American Centre for Human Ecology and Health (ECO/PAHO in Mexico), Environmental Epidemiologist (regular budget). Also regional funds input into training workshops and training materials.

EURO: a new WHO European Centre for Environmental Health (ECEH) was established. Two environmental epidemiologists (Dr M. Krzyzanowski and Dr R. Bertollini) have considerably increased the WHO activities in this field in the region, using regional funds.

EMRO: liaison with staff for future activities.

WPRO, AFRO and SEARO: staff support (no specialist in environmental epidemiology) and some regional funds input into training workshops. WPRO established a post for an environmental epidemiologist to be recruited during 1994.

G. COMPLETED AND ONGOING ACTIVITIES IN 1993

(Major country-specific activities are indicated in bold)

A continuation project proposal was submitted during 1993 (WHO document PEP/GEENET/93.13), and funded by SIDA. Additional funds (mainly for staff) were provided via the WHO regular budget. Several country activities continued to be funded partly or totally by regional office funds.

The implementation of the plans for 1993 as outlined in WHO document PEP/GEENET/93.13 was slowed down due to the difficulty of recruiting the long-term environmental epidemiologist included in the proposed project staff. The first advertisement attracted only one acceptable candidate. After a widely advertised and protracted search, a highly qualified candidate (Dr. Eugene Schwartz, a physician-engineer and epidemiologist) was successfully recruited and began work 27 September 1993.

Additional efforts were made in 1993 to compensate for the lack of staff in 1991-93. In addition to the project staff, consultants and collaborating centres were engaged to carry out the work. Close collaboration has also been established with regional office staff and they are increasingly carrying out work on country projects in the field of environmental epidemiology. As envisaged in the original plans, the materials and methods developed in the global project are increasingly being integrated into the training and research work

of country institutions. The ultimate aim is to make each country self-reliant for their core training and applied research in environmental epidemiology.

The following list gives the detail of the main achievements in the whole of 1993.

(a) Network management

- New GEENET members have been continuously added and the data in their "information sheets" is included in the master-file on microcomputer. By January, 1994 GEENET had more than 1800 members from 111 countries. Their distribution by country, WHO Region, and main interests is shown in Table 1.
- An updated list of GEENET members was published in May 1993 (WHO document PEP/GEENET/93.8).
- The information leaflet about the Network (in English, French, and Spanish) continued to be distributed on request and at conferences, workshops, etc. to new potential members.
- Microcomputer diskettes with the GEENET files and the accompanying mini-manuals have been provided on request to more than 100 members and interested institutions.
- A GEENET document collection consisting of an easily identifiable ring binder with a collection of all network documents has been prepared. It has been provided to WHO Regional Offices, relevant WHO HQ programmes and other key institutions (e.g., the funding agencies).
- An evaluation of the use of the Network by members has been carried out. It includes a questionnaire survey to members and more detailed reviews in conjunction with country visits by staff or consultants. By July, 1993, 494 replies to the questionnaire had been received representing 75 countries. A final report has been prepared (WHO/EHG 94.6). Most of the Network members reported that the training and information materials distributed for GEENET were useful for their work and many had used them to extend or improve their own teaching and research. As an example, 80% of survey participants found the teaching materials distributed by GEENET, to be "Useful" or "Very Useful". Numerous participants reported that they have started new activities in the area of training and research with the help of GEENET activities and materials. The most frequently mentioned activities were: adapting course content to GEENET materials; arranging new training courses; extending training through field experiences; establishing research collaboration with other GEENET members; commenting on research proposals; and information-sharing of research methods.
- Experimentation with the use of electronic mail and electronic file transfer to expedite information transfer both from WHO to members, but also from members to WHO. This resulted in the successful establishment of a GEENET directory in the WHO gopher accessible through the INTERNET. Free and unprotected access by all GEENET members with INTERNET capabilities currently allows electronic transfer of GEENET newsletters and membership information. A similar system is being used to transfer information world-wide among co-authors of the GEENET text in progress "Environmental Epidemiology". To a large extent, the exchange of manuscripts and review of chapters has been a paperless process through the use of a file transfer protocol (FTP). In addition, future use of this capability is being explored to establish an electronic bulletin board for exchange of

information regarding new research projects, methods and results among practicing environmental epidemiologists.

(b) **Microcomputer procedures**

- Mini-manuals for each of the CARDBOX files used for our information inventories are in preparation. The manual for the member list has been completed and has been distributed to interested parties.
- EPIINFO epidemiological software and diskette packages has been provided to GEENET members on request, and is provided to workshop participants as appropriate. Microcomputers are available to about 65% of members in developing countries and this proportion is increasing.

(c) **Support for libraries with Environmental Health Reference Collections**

- The list of essential information sources on environmental and occupational health titled *Reference information for environmental health training and research* is being up-dated and will be used to promote GELNET. More than 200 libraries have expressed an interest in joining this activity.

(d) **Information inventories**

- *GEENET worldwide inventory of courses* (up-date in progress)
- *Ongoing research in occupational health and environmental epidemiology in developing countries* (up-date survey distributed December 1993)
- An inventory of funding sources for environmental health research has been completed and is in press.
- An inventory of environmental health teaching curriculum is being compiled as a collaborative project with UNEP. Survey questionnaires were distributed to selected universities worldwide.
- All inventories are sent to all GEENET members (in the appropriate language: English, French or Spanish) and additional copies are sent to WHO Regional Offices and Environmental Health Centres in Regions.
- Contacts were made to assess the feasibility of institutions in India and the Philippines to develop information inventories. Final arrangements will depend on some support for local facilities and training of local staff.

(e) **Other information distribution**

- A number of materials on specific topics have been sent to GEENET members on request.
- Information about GEENET activities and other WHO environmental health activities has been provided in the quarterly newsletter from the WHO Division of Environmental Health, which is sent to a large number of medical and public health libraries in all regions.

- A regular report for network members ("GEENET Update") has been published and distributed to all 1800 members in either English, French and Spanish.
 - A newsletter on environmental and occupational health issues in Vietnamese distributed to 500 professionals in the field in Viet Nam has been sponsored via GEENET.
- (f) **Training materials**
- The training text *Basic Epidemiology* was completed by WHO Publications Division and was initially available as a WHO monograph at the end of May 1993. Comments have been most favorable by reviewers, teachers and students and sales have been brisk. Although recently available, the book is in its second printing and translations to more than 10 languages are in progress.
 - A series of 6 problem-based training exercises focused on the epidemiologic study of air pollution have been developed and are under-going review. These include an introduction to logistic regression techniques, and an example of a cross sectional, ecologic, case control and cohort design. In addition, a time series analysis is presented. This series supplements the existing series of 11 environmental epidemiology exercises which were published with separate versions for the tutors and the pupils (WHO document WHO/PEP/92.05-A, -B). The new set will be tested in a workshop in the **Philippines** in the fall of 1994.
 - An up-dated version of teacher's manual for the one week basic environmental epidemiology workshop has been circulated for review. The goal of the manual is to empower GEENET members who may be currently proficient in the areas of public health service and research to conduct training workshops in environmental epidemiology. The manual is expected to be completed early in 1994.
 - An anthology of 50 to 60 case studies regarding women, environment and health has been finalized. Topics include water, nutrition and agriculture, housing and shelter, fuel and indoor air pollution and occupational hazards.
 - Work continued on a new specialized text in "Environmental Epidemiology" (joint project with US EPA, funded separately), which will be used as the main teaching source in the new workshops on environmental epidemiology research methodology. A first authors group meeting was held in Stockholm, in August 1993. First drafts of the chapters have been submitted and are currently being reviewed. The review and editorial process is scheduled to be completed through 1994 with field testing of the book in the fall in a workshop in the **Philippines**.
 - Translations to French and Spanish of all available training materials is progressing (Table 3 gives a listing of all currently available GEENET materials). Translation to other languages is being encouraged. A meeting of French-speaking epidemiologists has generated new interest in the use of GEENET materials for convening workshops in French.
 - Work has begun on a GEENET series of texts in environmental epidemiology and associated issues. In addition to the current successful publication of *Basic Epidemiology*, and the draft of *Environmental Epidemiology*, work has begun on developing texts on *Basic Environmental Health*, *Human Exposure Assessment*, *Environmental Health Impact Assessment*, *Health Indicators for Environmental Health* and a text on methods to establish a link between health and routinely collected environmental data.

(g) **Training workshops and training planning**

- National training workshops "Introduction to environmental epidemiology" (most of them co-funded by Regional Offices and National Institutions) according to the standard one-week curriculum developed for this project were held in:

Gabon, October 1993

Venezuela, May 1993

Thailand, November 1993 (two workshops)

Nicaragua, July 1993

Ethiopia, January 1993

Russian Federation, December 1993

Hungary, May 1993

Czech Republic, October 1993

Advanced and more specialized workshops were held in Viet Nam, Malaysia and China (two workshops: Cadmium Epidemiology and Air Pollution Epidemiology)

- Additional regional, national or provincial workshops were held in the following countries (for these GEENET only provided copies of training materials):

Switzerland, (Basel) October 1993

WPRO Regional Workshop, May, July 1993 (EHIA)

Philippines, August 1993 (EHIA)

Vietnam, January 1994 (EHIA)

- Discussions with regional offices and national authorities for workshops in the following countries are continuing:

DPR Korea, India, Zimbabwe, South Africa, Philippines, Central African Republic, Jordan, Tunisia, Angola, Chile, Indonesia, Viet Nam and Ukraine

- In Concepción, Chile, a project was implemented to develop inter-sectoral plan and pilot implementation of environmental epidemiology in several faculties of the University was supported.
- A two day conference on teaching techniques was held in Geneva in August for 12 GEENET teachers. The purpose was to provide ideas about various teaching techniques to improve effectiveness in training.
- Considerable planning has taken place to conduct a two-week training of trainers workshop to be held May, 1994 in Mexico City. The purpose will be to empower epidemiologists in Latin and South America to become more proficient and effective teachers. The second week of the workshop will be used to apply the new techniques in two basic environmental epidemiology workshops held in the National School of Public Health.

(h) Applied research promotion

- Based on the recommendations of the consultation and a mission to Nepal, 1991, a proposal for research/action projects on biomass with a focus on "Health and Household Energy" was implemented in Viet Nam. Educational materials and a video presentation on indoor air pollution were developed. A pilot project on the same topic was initiated in Tigray, Ethiopia.
- A study of the relationship between air pollutants (particulates) and mortality in Shenyang, China was sponsored by WHO/UNEP. Dr. Chen of WHO/IPCS and Dr. Xu were the principal investigators. The study results will be published as a GEENET document.
- A review report of critical environmental epidemiology issues for Latin America was completed by the WHO Technical Centre ECO (in Mexico) in collaboration with US EPA. The report "Environmental Epidemiology: A project for Latin America and the Caribbean" evaluates the impact and degree of environmental epidemiology development of air pollutants, heavy metals, pesticides and heavy metals in the region.
- GEENET hosted a meeting regarding studies of the possible link between air pollution and asthma through the steering committee of ISAAC (International study of Asthma and Allergies in Children). It was suggested that study areas be expanded to include developing countries with potential problems. Three researchers were invited, representing Chile, Brazil and Hong Kong to present data regarding the links between air pollution and asthma in their countries. It was proposed that GEENET could help link epidemiologists and clinicians in study areas. In addition, it was proposed that GEENET could be used to distribute information regarding the study and its results.
- A meeting was convened at the National Institute for Minamata Disease (Japan) to review a draft text "Practical guidelines for environmental epidemiology studies: methylmercury and other mercury compounds". The work focuses, in part, on water pollution and gold mining in Brazil.
- A collaborative effort, headed by Dr. Carlos Corvalan, together with Dr. Markku Nurminen and researchers at the London School of Hygiene and Tropical Medicine have been working on the devising and applying epidemiologic methods for the simple assessment of environmental exposures using routinely collected data. The project was prompted by the need to estimate the public health impact of environmental exposures in terms of morbidity and mortality to provide guidance to decision-makers and policy setters. The methods identified through the project termed HEDLAMP (Health and Environment Data Linkage and Monitoring Project) is expected to be applied in selected cities. Potential country candidates include: Brazil, Chile, Czech Republic, Finland, France, Ghana, India, Mexico, the Philippines and Poland. In addition, an effort is underway to identify suitable environmental health indicators that might provide simple yardsticks that represent the status of air or water quality.
- IDRC A grant proposal has been funded by the IDRC to develop national capacity in the area of applied environmental research. This will include developing training materials and testing them in 3 countries, including the Philippines, Chile and Ukraine. Dr. Harris Pastides has agreed to serve as the project coordinator beginning in mid June, 1994.

- GEENET has sponsored a survey of members to determine current practices and future directions in the area of ethics as it applies to environmental epidemiology. This covers a wide range of topics including confidentiality, communicating results, sharing of data with other researchers, revealing funding sources, among many others. The GEENET mailing list was used to distribute a questionnaire to members. Preliminary results of the survey are expected in the fall of 1994.
- (i) **Project development**
- The project has been promoted during visits to several developing and developed countries, also when participating in scientific conferences, and feedback for its further development has been received. Increasingly, governments and major institutions are asking for materials and about training activities.
 - Technical discussions have been held with representatives of SIDA, SAREC, IHCAR, IMM and other Swedish institutions concerning the future development of the project. Contacts have also been made with several other agencies to explore the potential for collaboration and co-funding of activities in association with this project. The US EPA is now providing funding for the development of environmental epidemiology research in Latin America and Eastern Europe, in conjunction with the Network project.

H. **PLANNED SPECIFIC ACTIVITIES, 1994**

(Major country-specific activities are indicated in bold)

(a) **Network management**

- ◆ Continuously update the list of members and information about the members and distribute an updated membership list (printed and on microcomputer diskettes).
- ◆ Continue to utilize electronic mail and electronic file transfer as a distribution method for membership lists and other GEENET information (an increasing number of GEENET members in developing countries have access to e-mail).
- ◆ Revise the information collected about members to better identify their expertise and to split them into "active members" and "observers".
- ◆ Update the information leaflets and other material explaining GEENET to new members and other interested people.
- ◆ Regularly update the "GEENET documents collection" consisting of an easily identifiable ring binder with a collection of all documents made for the network. This "packet" has been made available to WHO environmental health staff, donor agencies and institutions collaborating closely with the network project.
- ◆ Promote and facilitate the development of plans and funding proposals for National Environmental Health Networks in order to extend and maintain local and national environmental epidemiology activities initiated via the GEENET project. Initial efforts will be made in Viet Nam, Nicaragua, India and the **Philippines**. GEENET-Euro with funds from the European Union (EU) has established plans to play a key role in focusing training activities in **Eastern Europe** and the **Russian Federation**.

(b) Microcomputer procedures

- ◆ Supply the EPIINFO epidemiological software and the CARDBOX software to network members on request.
- ◆ Regularly up-date the preparation of mini-manuals for each of the network files and distribute them on request.
- ◆ Continue review of other software that could be of particular use in environmental epidemiology, and create opportunities for testing these software by GEENET members.
- ◆ Identify selected institutions in developing countries, that are able to assist in the microcomputer updating of GEENET inventories, and provide them with microcomputer training and advice, in order to transfer technology and decentralize this work. A pilot project with the Indian Council for Medical Research will that began 1993 will be continued in 1994 for this purpose. Unfortunately, progress has been slow with this activity. Efforts are continuing to determine specific needs to assure a successful outcome.

(c) Support for libraries with Environmental Health Reference Collections

- ◆ Work continues to update and reprint the list of essential information sources, the "Environmental Health Reference Collection" (EHRC).
- ◆ Continue to send all GEENET and GETNET (the Global Environmental Technology Network) materials to the libraries in GELNET (Global Environmental Libraries Network).
- ◆ Continue to supply libraries that have decided to establish EHRCs with key reference and promotional materials
- ◆ Continue negotiations with other international agencies to add useful free material to the EHRC.
- ◆ Increase the number of libraries in GELNET by 100 through identification of additional suitable libraries in developing countries.

(d) Information inventories

- ◆ Print and distribute a new inventory of funding sources for environmental epidemiology research.
- ◆ Continue efforts to get selected developing countries to prepare and distribute inventories of research reports on health effects of environmental hazards, physiological and anatomical reference data for environmental health risk assessment, and environmental epidemiology research recommendations.
- ◆ Update other existing inventories continuously in preparation for future reprinting.

(e) Other information services

- ◆ Provide 3 issues of the newsletter "Environmental Health" and 3 issues of the newsletter "GEENET Update" to all GEENET members (in appropriate language, English, French or Spanish).

- ◆ Continue targeted distribution of materials on specific hazards.
- ◆ Support an advisory consultation in Viet Nam to establish an information service in environmental epidemiology by request of the Ministry of Health (April 1994)
- ◆ Provide advice and information materials on request from network members.

(f) **Training materials**

- ◆ Additional translations and local adaptation of all GEENET training materials to local languages will be encouraged.
- ◆ Print and distribute an anthology of examples of gender issues in environmental health (funded separately).
- ◆ Print and distribute the Teacher's Guide for one-week training workshop: Basic Environmental Epidemiology.
- ◆ A basic environmental health textbook is being developed through collaboration with UNESCO and UNEP. The book will be part of a series of texts including Basic Epidemiology, Environmental Epidemiology, Health and Environmental Exposure Data Linkage, Environmental Indicators, and others.
- ◆ Continue preparation of a new edition of the WHO text *Guidelines on studies in environmental epidemiology* (joint project with US EPA, funded mainly by US EPA). By the end of 1994, a first complete draft ready for test teaching should be available by September 1994. An editorial meeting on this project will be held in Mexico City in May, and an authors meeting to be held in North Carolina in September in conjunction with the conference of the International Society for Environmental Epidemiology. The draft text *Environmental Epidemiology* will be field tested for use as the core text for the workshops "Applied environmental epidemiology" in the fall of 1994 in the Philippines.
- ◆ Continue development of a two-week training course curriculum in "Applied Environmental Epidemiology" based on the above text.
- ◆ Continue links with other international and national agencies preparing training materials in order to include their relevant materials in the material offered to GEENET members (e.g., some of the CEC material on air pollution epidemiology will be used in China workshop and Australian environmental health impact assessment material will be used in WPRO and Viet Nam workshop).

(g) **Training workshops and training planning**

- ◆ Complete a training and capacity-building strategy for using the Network infrastructure in the follow-up to UNCED.
- ◆ National one-week training workshops "Introduction to environmental epidemiology" are planned for these countries:

AFRO	C. African Rep Zimbabwe	(November) (September)
AMRO	Mexico	(May)
EURO	Belarus Czech Republic Romania Ukraine	(May 1994) (July 1994) (July 1994) (November 1994)
	The EURO workshops are funded separately)	
SEARO	India DPR Korea Indonesia	(6 planned) (July) (October 1994)
EMRO	Jordan	(June 1994)

◆ Advanced or specialized workshops are planned for:

AMRO	Mexico	2-week training methods workshop for teachers of environmental epidemiology (May 1994)
SEARO	India	3-day workshop on environmental health training planning for leaders of key institutions (September)
WPRO	Philippines	2-week workshop on applied methods for environmental epidemiology (September)
	Viet Nam	1-week workshop on information systems for environmental health and epidemiology (June)

- ◆ Promote use of our training materials in local or national workshops funded locally. Such workshops are encouraged and materials are provided on request. Planned workshops that we are aware of will take place in Chile, Argentina and the Czech Republic.
- ◆ Finalize and print the *Guidelines on planning education and training for the control of environmental health hazards*. These will be used in train-the-trainers workshops, training planning workshops and other promotion of improved training in developing countries.

(h) Applied research

- ◆ Printing of an applied research strategy for the use of the network infrastructure to implement research recommendations from UNCED.
- ◆ Involvement of GEENET members in collaborative research projects developed jointly with UNEP, IARC, the World Bank and other agencies. These projects will be used as a field training opportunity

for local environmental health professionals. The countries mentioned are the proposed initial sites. The following topics are being considered:

- severe air pollution and mortality in China;
 - air pollution and asthma in Chile and Mexico;
 - water pollution and metal poisoning in Brazil and China;
 - Solar UV radiation and cataracts in India, Chile Saudi Arabia and selected other countries (jointly with the WHO Programme for the Prevention of Blindness).
- ◆ Country reviews of environmental health research activities in conjunction with visits for training workshops.
 - ◆ Printing and distribution of the up-dated *Inventory of ongoing research in environmental and occupational epidemiology*.
 - ◆ Distribution of material on priority research areas to network members in accordance with their interests.
 - ◆ Continue development of methodology and guidelines for Environmental and Public Health Impact assessments, based on linkage analysis of environmental and health monitoring data.
- (i) **Project development**
- ◆ Liaison with governments, network members and funding agencies.
 - ◆ Continued development of plans for activities in future years.
 - ◆ Preparation of an evaluation report of the achievements in the first four years of the project.
 - ◆ Development of proposals for diversified and "sustainable" funding for continued environmental epidemiology activities in countries including development of National Networks proposal.

I. GENERAL PROPOSALS FOR ACTIVITIES 1994-1995

Similar activities to those in 1991-1993 will be continued with an increased emphasis on logistic support for local activities in developing countries, including facilitation of fund-raising from other sources than WHO. One of the aims will be to make the local training and research activities "self-supporting" and sustainable to the extent possible. The following activities are foreseen if funding at a level similar to 1993 is maintained each year:

(a) Network management

- ◆ Continuously update the membership list and distribute an updated list each year (printed and on microcomputer diskettes).

- ◆ Keep the "GEENET documents collections" up-to-date with information about the network and with copies of documents produced for the network.
 - ◆ Evaluate the use of the network by members and the impact it has had on their work by making a survey of members every two years.
 - ◆ Organize one meeting of experts to advise on the specific components of the GEENET training and applied research activities.
- (b) **Microcomputer procedures**
- ◆ Continue to supply useful microcomputer software and information to network members (including CARBOX and EPIINFO).
 - ◆ Further development of procedures used for member list and inventories, including direct access via e-mail and a CD-ROM with environmental health information.
- (c) **Support for libraries with Environmental Health Reference Collections**
- ◆ Identify an additional 100 libraries per year for GELNET (a maximum of about 500 libraries is anticipated).
 - ◆ Provide GEENET and GETNET information to these libraries and assist them in establishing their Environmental Health Reference Collections.
 - ◆ Encourage local activities to foster collaboration between these libraries and GEENET members.
- (d) **Information inventories**
- ◆ Updating and reprinting (every two years) the previously prepared inventories.
 - ◆ Prepare one new inventory each year.
- (e) **Other information distribution**
- ◆ Supply newsletters and other regular reports to network members.
 - ◆ Continue distribution of information and advice on request.
- (f) **Training materials**
- ◆ Complete preparation of the series of "essential" training materials started in 1989-90: *Basic Epidemiology, Environmental Epidemiology* and other subsidiary materials
 - ◆ Prepare two new "training kits" for local training workshops on priority topics each year.
 - ◆ Translation and adaptation of GEENET training materials in countries.
 - ◆ Logistic support and facilitation of fund-raising for development of local training materials in these countries.

(g) **Training workshops**

- ◆ Six to eight national training workshops in environmental epidemiology or other more specific topics each year.
- ◆ Logistic support and facilitation of fund-raising for local short-term workshops using training kits developed for the project.
- ◆ One inter-regional consultation for key trainers each year to promote the local application of our materials and methods.

(h) **Applied research**

- ◆ Continue country reviews of environmental health research in countries.
- ◆ Update inventory of ongoing research in environmental and occupational epidemiology.
- ◆ One meeting per year to facilitate research collaboration on priority topics.
- ◆ Printing and distribution of report (one per year) on key research issues and future research needs on priority topics.
- ◆ Logistic support and facilitation of fund-raising for specific collaborative research activities on priority topics.
- ◆ Continue collaborative research promotion and coordination project with US EPA.

(i) **Project development**

- ◆ Continued liaison with governments, network members and funding agencies and continued development of plans and proposals.

K. ORGANIZATIONAL STRUCTURE

Interlinkage will be maintained with national and regional agencies involved in the same field and with the other international agencies specifically promoting environmental protection and sustainable development (UNEP, ILO, FAO, UNESCO, UNIDO, World Bank, etc.).

The inventories will be distributed to all network members and the training kits will be offered to them. The members will be invited to take initiatives for new training activities and to participate in the research cooperation with other members. Those network members, who take initiatives and show a willingness and ability to find local resources for at least a part of the total resources needed to start new training or research, will receive priority for WHO support. Many of the initiatives are likely to be totally funded by local sources.

WHO staff at Headquarters and Regional Offices, as well as staff in WHO Collaborating Centres will provide technical advice and administrative support. Consultants and temporary advisors will assist in preparation of materials and in the training workshops.

L. INPUTS

● Personnel and Consultants:

Staff on WHO regular budget:

- Medical Officer (P5) (10% of time)
- Secretary G4 (20%)
- Other staff at HQ and in regional offices
(equivalent to 1.5 full-time P5 and one full time P4)

Staff on external funding:

- Scientific Officer (epidemiology) (P4)
- Technical Officer (publications production) (P3, 50%)
- Secretary (G4)
- (plus Associate Professional Officers (P2) for country activities support)

Consultants/temporary advisers (part-time or short-term)

(Equivalent to nine person-months)

● Supplies and Equipment:

- computing costs for network and inventories
- printing costs for newsletter, inventories and training texts
- cost of buying certain reference materials, including audiovisuals
- distribution costs for the materials

● Training:

- travel costs to the training activities and national workshops where WHO staff or consultants participate
- support to local costs of selected local training initiatives
- support to cost of local adaptation and reproduction of training materials
- travel costs for some participants in editorial meeting

Each year extrabudgetary financing of about \$500 000 - 600 000 per year will be required.

M. PARTICIPATING INSTITUTIONS

The institutions included in the environmental epidemiology network (some of them are WHO Collaborating Centres) and key government agencies will participate. WHO will be the executing agency for the overall project, but the network member institutions that take advantage of the training kits and start

local activities will be responsible for the execution of their own activities. Liaison and collaboration with the relevant national authorities and the WHO Regional Offices will be maintained.

N. MONITORING AND EVALUATION

Network members will be asked regularly to provide information on their use of the WHO training kits and other materials in order to update the microcomputer-based network files. Those network members who have started new training or research activities will be asked to prepare a brief report on the outcome of their activity. Regular progress reports on this project will be prepared for donors and other interested parties.

The inventories of ongoing and completed research activities will also serve as an evaluation tool providing a picture of the type of local problems investigated and the findings. This project will link up with other WHO activities (e.g. the Global Environmental Monitoring System, GEMS) to provide time-series data on pollution levels and health effects. The ultimate indicator is of course the quality of the environment and the health status of the people in the countries.

Table 1

GEENET, March 1994
Alphabetical list of countries and number of members

ALGERIA, 23	GUYANA, 2	PORTUGAL, 12
ARGENTINA, 88	HONDURAS, 3	REPUBLIC OF KOREA, 15
AUSTRALIA, 55	HONG KONG, 6	ROMANIA, 3
AUSTRIA, 4	HUNGARY, 13	RUSSIAN FEDERATION THE, 13
BARBADOS, 3	INDIA, 58	RWANDA, 2
BELARUS, 5	INDONESIA, 40	SAUDI ARABIA, 19
BELGIUM, 19	IRAN ISLAMIC REPUBLIC OF, 23	SENEGAL, 1
BELIZE, 1	IRELAND, 5	SINGAPORE, 6
BOLIVIA, 2	ISRAEL, 20	SLOVAKIA, 2
BOTSWANA, 2	ITALY, 31	SOUTH AFRICA, 13
BRAZIL, 78	JAMAICA, 3	SPAIN, 8
BULGARIA, 3	JAPAN, 28	SRI LANKA, 4
CAMEROON, 1	JORDAN, 5	ST LUCIA, 1
CANADA, 38	KENYA, 5	SUDAN, 4
CENTRAL AFRICAN REPUBLIC, 5	KUWAIT, 5	SURINAME, 3
CHILE, 51	LATVIA, 1	SWEDEN, 29
CHINA, 102	LIBYAN ARAB JAMAHIRIYA, 1	SWITZERLAND, 7
COLOMBIA, 39	LITHUANIA, 6	SYRIAN ARAB REPUBLIC, 2
COSTA RICA, 15	MALAYSIA, 6	TANZANIA, 4
CROATIA, 13	MALI, 2	THAILAND, 22
CUBA, 30	MAURITIUS, 1	TOGO, 1
CZECH REPUBLIC, 11	MEXICO, 55	TRINIDAD AND TOBAGO, 4
DENMARK, 9	MONTSERAT, 1	TUNISIA, 3
DOMINICAN REPUBLIC, 2	MOROCCO, 3	TURKEY, 12
ECUADOR, 6	MOZAMBIQUE, 1	UGANDA, 4
EGYPT, 26	NETHERLANDS, 21	UKRAINE, 3
EL SALVADOR, 11	NEW ZEALAND, 11	UNITED ARAB EMIRATES, 2
ETHIOPIA, 14	NICARAGUA, 7	UNITED KINGDOM, 70
FIJI, 2	NIGER, 1	URUGUAY, 2
FINLAND, 16	NIGERIA, 27	USA, 238
FRANCE, 42	NORWAY, 10	VENEZUELA, 17
GABON, 1	OMAN, 1	VIET NAM, 20
GAMBIA, 1	PAKISTAN, 9	YEMEN, 5
GERMANY, 35	PANAMA, 1	ZAIRE, 1
GHANA, 3	PAPUA NEW GUINEA, 5	ZAMBIA, 2
GREECE, 13	PARAGUAY, 1	ZIMBABWE, 4
GUAM WESTERN PACIFIC OCEAN, 1	PERU, 89	
GUATEMALA, 2	PHILIPPINES, 50	
	POLAND, 18	

Table 2

GELNET, January 1993
Alphabetical list of countries and number of members

ALGERIA,3	MALAYSIA,2
ARGENTINA,14	MAURITIUS,3
AUSTRALIA,5	MEXICO,5
BELGIUM,2	NEW CALEDONIA,1
BRAZIL,9	NEW ZEALAND,3
BULGARIA,2	NICARAGUA,2
BYELORUSSIA,1	NIGERIA,4
CANADA,3	PAPUA NEW GUINEA,1
CHILE,5	PERU,4
CHINA,7	PHILIPPINES,4
COLOMBIA,7	POLAND,2
COSTA RICA,4	PORTUGAL,1
CUBA,3	REPUBLIC OF CROATIA,3
ECUADOR,1	REPUBLIC OF KOREA,1
EGYPT,3	SAUDI ARABIA,5
EL SALVADOR,1	SOUTH AFRICA,2
ETHIOPIA,5	SPAIN,2
FINLAND,1	SRI LANKA,3
FRANCE,2	ST LUCIA,1
GERMANY,6	SWITZERLAND,3
GUATEMALA,2	SYRIAN ARAB REPUBLIC,1
HONG KONG,2	TAIWAN,1
HUNGARY,2	TANZANIA,1
INDIA,4	THAILAND,7
INDONESIA,6	THE NETHERLANDS,1
IRAN ISLAMIC REPUBLIC OF,6	TRINIDAD AND TOBAGO,1
ISRAEL,1	TURKEY,1
ITALY,6	UNITED ARAB EMIRATES,1
JAPAN,2	UNITED KINGDOM,11
JORDAN,1	USA,11
KENYA,2	VENEZUELA,2
KOREA,1	VIET NAM,1

Table 3

List of training and information materials for GEENET

A. Texts for students in specific training courses/workshops :

1. *Basic Epidemiology*
2. *Environmental Epidemiology* (revision of EHC 27; in preparation)
3. *Investigating Environmental Disease Outbreaks*
4. *A course in Microcomputer use for Epidemiologists and others who count things* (in press)

B. Tutor's guides for specific training courses/workshops :

5. *Basic Epidemiology* (20-hour course)
6. *Teacher's guide for one-week training workshop: basic environmental epidemiology*. (6-day course)
7. *Two-day Course in Microcomputer Uses in Epidemiology* (in press)

C. Teacher's resources :

8. *Problem-based Training Examples for Environmental Epidemiology*
9. *Chartbook of Environmental Health Information* (in preparation)
10. *Major Poisoning Episodes from Environmental Chemicals*

D. Reference materials :

11. *List of GEENET participants*
12. *Inventory of Audiovisuals*
13. *Inventory of Training Courses*
14. *Inventory of Basic Textbooks*
15. *Inventory of Ongoing Research*
16. *Inventory of Funding Sources* (in preparation)
17. *Assessment of Training Needs in Environmental and Occupational Health*
18. *Health Monitoring in the Prevention of Diseases Caused by Environmental Factors*
19. *Guidelines for National Training Plans for the Control of Occupational and Environmental Hazards* (draft available)
20. *Biological Monitoring of Metals* (in preparation)
21. *User's guide for the GEENET database*
22. *GEENET Review and Member Survey 1992-1993*

THE GLOBAL ENVIRONMENTAL EPIDEMIOLOGY NETWORK

G E E N E T



GEENET

The Network was established in 1987 as a means for the World Health Organization to strengthen education, training and research in institutions involved in epidemiological teaching and research on the health effects of environmental hazards, and other epidemiological applications in environmental and occupational health.

The Network aims at improved communication and collaboration between institutions in this field in developed and developing countries. A series of documents with information of value for training and research development is prepared for the Network and lists of Network members are distributed on a regular basis. Training and research promotion workshops are organized in collaboration with national and international agencies.

For further information write to:

**Environmental Epidemiology
Office of Global and
Integrated Environmental Health
World Health Organization
1211 Geneva 7
Switzerland**

**Telephone: (022) 791 37 60
Telefax: (022) 791 07 46**



WHO