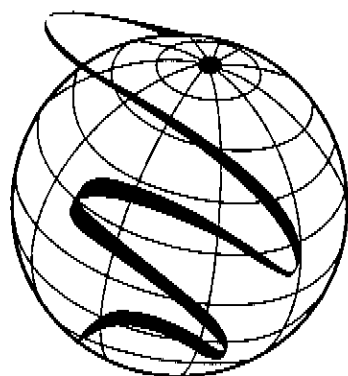


**ENVIRONMENTAL  
OCCUPATIONAL  
EPIDEMIOLOGY  
SERIES**

**WHO/EHG/94.6  
DISTR: LIMITED  
ORIGINAL: ENGLISH**



**GEENET REVIEW  
AND MEMBER  
SURVEY  
1992-93**



**WHO  
World Health Organization  
Geneva, 1994**

**In support of the International Programme on Chemical Safety**



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WHO/EHG/94.6  
DISTR: LIMITED  
ORIGINAL: ENGLISH

**Global Environmental Epidemiology Network (GEENET)  
REVIEW AND MEMBER SURVEY  
1992-93**

This report summarizes the results of the 1992-93 survey of GEENET members' use and assessment of GEENET materials. It also provides an overall evaluation of GEENET activities to date and is therefore being used in the planning of future GEENET activities.

**APRIL 1994**

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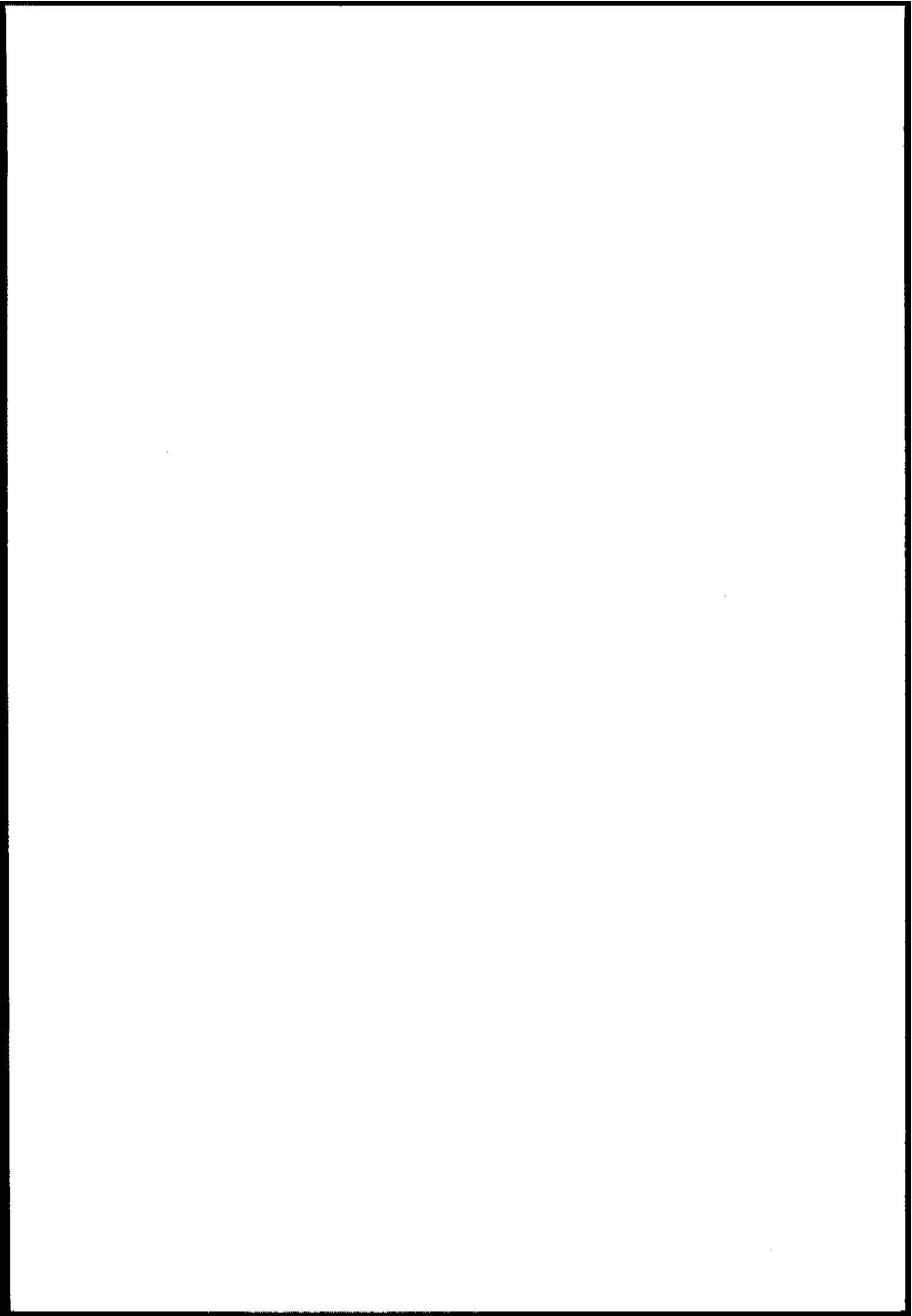
## **Preface**

This report summarizes the results of the 1992–93 survey of GEENET members' use and assessment of GEENET materials, and provides an overall evaluation of GEENET activities to date. It is therefore being used in the planning of future GEENET activities—comments and comments would be welcome.

The final drafting was carried out by Tord Kjellström and Martina Smedberg. Data assembly and analysis were carried out by Marie-Christine Chung, Laurence Pollier, Jacqueline Sawyer, Eugene Schwartz and Alistair Woodward. The results have already been used to set priorities for future work, and specific suggestions from individual respondents have been taken into account to the extent possible.

We acknowledge with gratitude the input from all those who participated in the survey.

The GEENET project is funded by SIDA (Swedish International Development Authority) and SAREC (Swedish Agency for Research in Developing Countries) and the World Health Organization.



## 1. Summary

The Global Environmental Epidemiology Network (GEENET) was created by the Division of Environmental Health of the World Health Organization in 1987. The Network aims to assist professionals involved in environmental health work by strengthening education, training and applied research. In 1992 a questionnaire was sent to all 1650 GEENET members to evaluate the use and value of the Network. Replies were received from 494 members in 75 countries. This was less than one-third of all members, but is likely to represent a high proportion of those who are very active in the field.

The majority of survey participants are involved in teaching and research in environmental health and related areas. About 44% of the participants had used the Network to contact other members; 61% of these contacts were initiated by members in developing countries. The main reasons for contacting other members included development of joint research activities, sharing of information on research methods, and exchange of documents.

About 14% of the participants had attended training workshops in environmental epidemiology, organized by GEENET. They considered that their research and training capabilities had improved considerably as a result. GEENET members have received a number of documents, including teaching materials. More than 80% of the survey participants found the teaching materials distributed by GEENET to be "Useful" or "Very useful".

Several participants reported that they had modified existing training and research activities or started new ones as a result of their membership of GEENET. Those most frequently mentioned were:

- adapting course content to GEENET materials
- arranging new training courses
- extending training through field activities
- initiating research collaboration with other GEENET members
- commenting on research proposals, and,
- sharing of information concerning research methods.

Regarding future GEENET activities, more than half of the participants are willing to assist with new activities, such as pilot testing of new training materials and computer software; helping other members by reading and commenting on research proposals; and preparing bibliographies and summary reviews. Several suggestions for future GEENET activities were



made, such as: improving Network communication by developing access to electronic mail; developing and distributing an inventory of sources of research funding; and producing additional training materials and teachers guides.

## 2. Introduction

The development of national programmes for the prevention and control of environmental hazards has not in general kept pace with the increase in environmental health problems brought about by rapid industrialization and urbanization. In addition, the introduction of new technology and the increasing use of potentially hazardous technologies, such as agrochemicals, create conflict between desired technological or economic developments, and the preservation of environmental quality.

In order to break this pattern, national programmes for the prevention and control of environmental health hazards must be strengthened. This capacity-building should be concerned with improvements in information exchange and methodology, promotion of policy formulation, improvements in national institutional capacities, and training at all levels. Effective activity in these areas will depend on environmental epidemiology as a means of securing the necessary information concerning environmental and human health.

In addition, joint research activities in the field of environmental health, within the framework of technical cooperation, are required to encourage the sharing and exchange of skills, experience and resources. This will in turn increase the use of up-to-date technology and methods in studies carried out in developing countries.

In 1987 WHO prepared a strategy for technical cooperation with Member States on the control of environmental hazards. GEENET was created by WHO's Division of Environmental Health to implement this strategy.

GEENET aims to assist professionals involved in the prevention and control of health problems arising from environmental hazards, by strengthening education, training and applied research in environmental epidemiology. The Network's objectives are to:

- create and maintain a network of people in government institutes, universities, industry, and non-governmental organizations who are involved in teaching and supervision of applied research on the health effects of environmental hazards
- identify and support in each Member State, one or several main libraries, willing to establish reference collections on environmental health hazards and their control
- establish and strengthen education and training at local level, and,
- encourage and facilitate the use of new and improved applied epidemiological research to study and resolve local environmental health problems.

In 1989 a broader strategy for the whole WHO Environmental Health Programme was drafted. The network approach was expanded to become a major component of the WHO effort to support sustainable development. The Network activities implement several of the recommendations made by the United Nations Conference on Environment and Development (UNCED) and are also contributing in an important way to the UN *Capacity 21* programme.

In 1992 the report of the WHO Commission on Health and Environment (*Our Planet, Our Health*) was published. This report was WHO's main contribution to UNCED and includes conclusions and recommendations concerning priority issues in environmental epidemiology. *Agenda 21*—the main report from UNCED—also includes a series of recommendations related to environmental health. Based upon these recommendations and the accumulated experience of WHO, a *WHO Global Strategy for Health and Environment* was developed. Training, education and research have a major role in this strategy, and the GEENET project is a key component of the implementation of the *WHO Global Strategy*.

As of March 1994, GEENET had 1908 members, from over 100 countries. The growth in membership is shown Table 1.

**Table 1. Growth in GEENET membership**

January 1987	0 members
December 1988	500 members
May 1989	810 members
November 1990	1243 members
September 1991	1488 members
April 1992	1650 members
January 1993	1727 members
July 1993	1814 members
March 1994	1908 members

## GEENET activities to date

Since the Network was launched in 1987, a large number of activities have been carried out. Some of these—such as promotion of the Network, distribution of membership lists, training materials, research documents, and guidelines, and distribution of computer software—occur on a continuing basis. Others activities have included the development of a standard curriculum for a one-week training workshop, *Introduction to Environmental Epidemiology*, together with student textbooks, training and exercise materials. The GEENET project has also promoted a library service called the *Environmental Health Reference Collection*. (For more detail on GEENET activities, see annual Progress Reports WHO/PEP/88.12, WHO/PEP/89.18, WHO/PEP/90.16, WHO/PEP/91.28, WHO/PEP/92.16, WHO/PEP/93.13). A summary of some of the activities carried out to date is given below.

**1988:** In this first full year of GEENET activities, priority information materials were distributed, and a standard format for a national workshop on environmental epidemiology developed. An inventory of existing basic training materials was prepared and the preparation of new training materials 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.

**1989:** During this year GEENET membership reached 800 and the first list of members, their interests and experience was distributed. (This list is updated and distributed annually.) Microcomputer procedures for the management of GEENET were also established and a manual for the standard software used by GEENET prepared and printed. National workshops based on the standard one-week curriculum were held in Chile and the People's Republic of China. Additionally, the standard workshop curriculum and training materials were translated into Spanish. A training text in basic epidemiology was drafted. 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 nongovernmental organizations.

**1990:** The number of GEENET members had increased to over 1300 by the end of this year. The microcomputer procedures for managing GEENET were developed further. Plans for developing *Environmental Health Reference Collections* (EHRCs) were consolidated through discussions with librarians and public health staff in Argentina, Brazil, Chile, Kenya, Mauritius, Malaysia and Viet Nam. Agreements were reached with UNEP and various other international agencies concerning provision of free materials for the reference centres.

The standard workshop curriculum was updated, and a number of teaching examples developed and translated into Chinese, Spanish and Vietnamese. National one-week workshops were held in Argentina, Brazil, India, Kenya and Viet Nam. A collection of environmental epidemiology reviews on key teaching topics was published in the *World Health Statistics Quarterly*. An inventory of ongoing environmental and occupational epidemiology research projects was prepared. Priority research areas for each country were reviewed in conjunction with country missions to Argentina, Brazil, Chile, Kenya, Mexico and Viet Nam.

**1991:** During this year the number of members reached 1500. 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 updated and reprinted. A newsletter for GEENET members was prepared and distributed.

National training workshops were held in Bolivia, Gambia, Indonesia, Mexico, Peru, Poland and Portugal. Several training materials were prepared, and a consultation on environmental epidemiology training held at WHO. In terms of research promotion, a conference on the *Epidemiological, Social and Technical Aspects of Indoor Air Pollution from Biomass Fuels* was held and the proceedings distributed to members. In collaboration with the United States

Environmental Protection Agency (USEPA), a review of the potential for environmental epidemiology research in Asia was carried out and a similar more detailed review in Latin America initiated.

**1992:** By the end of this year GEENET had about 1700 members. An information leaflet about the Network (in English, French and Spanish) was distributed on request and at conferences, workshops, etc., to potential new members. Microcomputer diskettes with the GEENET files and the accompanying mini-manuals were provided on request. A GEENET document collection comprising all the Network documents that had so far been distributed was prepared and supplied to WHO Regional Offices, relevant WHO programmes at headquarters, and key institutions such as funding agencies.

The *Reference Information for Environmental Health Training and Research* (a list of essential sources on environmental and occupational health) was sent to all GEENET members, together with an introductory letter to the librarian of their institutions. Members were encouraged to contact their library regarding the establishment of an EHRC which would give GEENET members improved access to relevant reference materials from WHO, ILO, UNEP, UNESCO, etc.

A series of problem-based training exercises for environmental epidemiology was published (in two parts: teacher and student). In addition, a training manual for environmental disease outbreak investigations was published, and an anthology of training case studies of environmental disease published. A training kit for a one-day workshop on chemical hazards was also finalized for printing.

Work started on a new specialized environmental epidemiology text. (This is a joint project with USEPA which is funded separately from other GEENET activities). It is intended to be the main teaching resource of a new, more advanced workshop on environmental epidemiology research methodology. (A first authors group meeting was held in August 1993.)

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

A member survey was started. The aims of the survey were to: obtain information to enable WHO to improve and extend the services provided by the Network; to obtain information in order to update membership information, and to identify members who are able to make an active contribution to the Network. Questionnaires were posted to all members of the Network, requesting information about activities involving GEENET, the use made of GEENET materials and collaboration with other Network members, and requesting suggestions on how the Network could be improved.

**1993:** Electronic mail was tested as a distribution method for membership lists and other GEENET information. Information collected about members to better identify their expertise, and to separate them into "active members" and "observers", was revised. Plans and funding proposals for National Environmental Health Networks were developed. (The principal aim of these networks will be to maintain and support local and national environmental epidemiology activities initiated via the GEENET project.) Initial efforts were made in Nicaragua, India, the Philippines and Viet Nam to set up such networks.

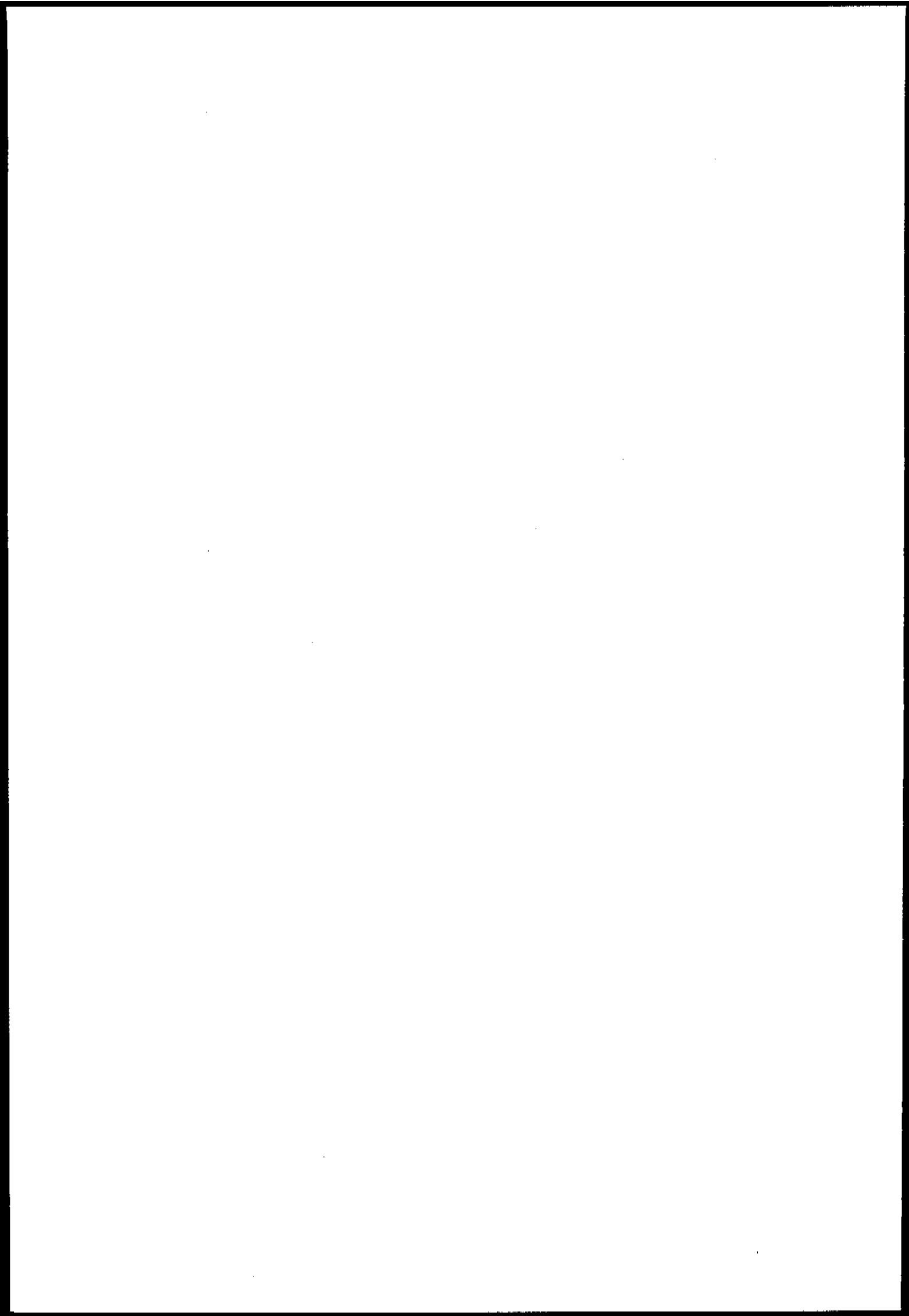
GEENET continued to supply libraries that had decided to establish EHRCs with key reference and promotional materials. Negotiations with other international agencies to add further useful free material to the EHRC were continued. Three issues of the *Environmental Health* newsletter and three issues of the *GEENET Update* newsletter were issued to members in the appropriate language (English, French or Spanish).

The final editing of the new training text *Basic Epidemiology* was completed and made available as a WHO monograph in May. A *Teacher's Guide to Basic Epidemiology*—including a "chart-book" with presentations in graph form of environmental health concepts and data for easy use as overhead transparencies in teaching—was also produced. National one-week training workshops were held in Ethiopia, Gabon, Venezuela, Nicaragua, and Thailand. Advanced and more specialized workshops were held in Viet Nam and Malaysia.

Collaborative research projects developed jointly by GEENET members with UNEP, IARC, the World Bank and other agencies were promoted. (Topics and countries covered included air pollution in China, air pollution and asthma in Chile and Mexico, water pollution and metal poisoning in Brazil and China, and solar UV radiation and cataracts in India). The WHO/USEPA project to review environmental epidemiology research needs and opportunities in Latin America was completed. The report highlights the need to study and remedy the effects of air pollution and contamination with metals, and basic sanitation deficiencies.

A new inventory on funding resources was initiated.

Returns were still coming in in response to the survey questionnaire sent out in 1992.



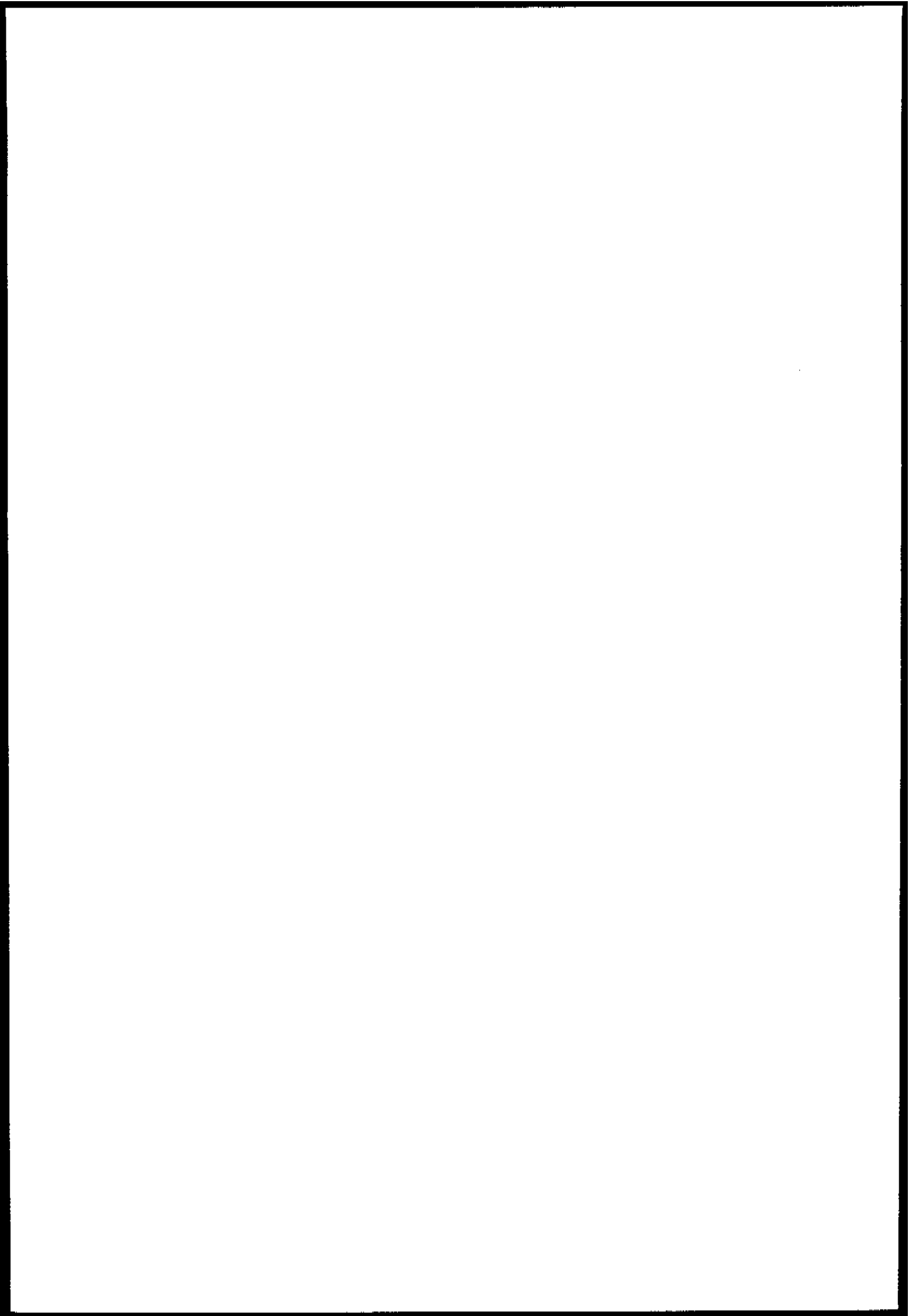
### **3. Methods of Member Survey**

Questionnaires were prepared in English, French and Spanish. (A copy of the English questionnaire is included as an Annex to this report). The GEENET mailing list was used to identify current addresses and preferred language for correspondence.

The questionnaires were mailed during July and August 1992 to all GEENET members (1650). They were asked to return their forms by 15 September 1992. As an incentive, members were offered copies of *Our Planet, Our Health* (the report of the WHO Commission on Health and Environment) if they completed and returned their questionnaires.

Replies were coded, entered and analysed using EPI-INFO, version 5 (ref).





## 4. Findings of Member Survey

### Participation rate

As of 1 January 1993, 435 (26%) members had returned completed questionnaires. By 1 July 1993, a further 59 completed questionnaires had been received. A total of 494 members have therefore been covered by the survey. This number is likely to include those who are truly active in environmental health training and research. Approximately equal numbers of developed and developing country members returned completed questionnaires. Table 2 shows the distribution of returns by WHO Region, as a fraction of all Network members from the same region.

*Table 2. Participation in GEENET survey by WHO Region (as of August 1992)*

Africa	30/102	(29%)
Americas	192/666	(29%)
Eastern Mediterranean	18/98	(18%)
Europe	135/388	(35%)
South East Asia	29/108	(27%)
Western Pacific	90/247	(36%)

The survey would of course have been strengthened by a higher participation rate. However, members who are currently active in the field, and who received the questionnaires in time, did complete and return them. Moreover, a number of members are likely to use GEENET mainly as an information source, rather than as a networking tool.

It is not certain how many members received the questionnaires that were mailed to them. The survey results indicated that the membership list frequently included out-of-date information; 41% of participants reported that changes were required to their personal data. This refers only to GEENET members who received the questionnaire and answered it. Presumably, the proportion of out-of-date addresses may be even greater among those who did not respond. This sort of problem is typical of working lists of "official" addresses. The survey thus provided an opportunity to update the GEENET membership database.

Other factors that might have affected the participation rate include the fact that most GEENET members have more than one office address, that they are often on duty travel or conducting research away from their office base, and that the mail systems of some countries are unreliable. A member from India commented that the questionnaire had taken over two months to reach him, even though the address used was correct. It is possible too that many GEENET members—having received the questionnaire after the return-by date—decided not to complete and return it. Furthermore, political changes have rendered many addresses obsolete. And in some countries, government officials are very restricted in terms of the

correspondence they are allowed to send.

All of this points to the need for increased use of electronic mail, as suggested by several survey participants.

## Professional activities

The participants were asked about their professional activities. These are described by Table 3.

**Table 3. Professional activities**

% of participants who were involved in research projects during the previous 12 months	84
% of participants who were involved in teaching during the previous 12 months	80
% of those participants who were involved in teaching during the previous 12 months, who taught at least 30 days during the same period	36
% of participants who published at least one report/article relevant to occupational and environmental health during the previous 24 months	78

Approximately 84% of the participants reported that they had worked on one or more research projects during the previous 12 months, and 80% reported that they had been involved in teaching during the same period. Of those involved in teaching, about 36% teach for around 30 days a year.

During the previous two years, 78% of the participants had published one or more reports or articles relevant to occupational and environmental health.

## Receipt and use of GEENET documents

A number of information materials on specific environmental hazards have been distributed to GEENET members, as have various teaching materials (such as the *Basic Epidemiology* textbook, training exercises and teachers' guides), and newsletters. The members were asked if they had received these documents, and how useful they found them.

Table 4 lists a number of distributed GEENET documents, the percentage of participants who reported that they had received them, and the percentage who found these materials "Useful" or "Very useful" (i.e. who gave a score of 4 or 5 on a scale of 1 to 5). The far right column in Table 4 shows the percentages of participants from Developing countries (D1), and Developed countries (including East European countries) (D2), who found the documents "Useful" or "Very useful".

The pattern of answers shown in Table 4 altered very little when opinions on teaching and research-oriented materials were restricted to those participants who reported substantial involvement in teaching (>20 days in the past year) and research (>1 report or publication in the previous 12 months).

Each of the documents listed in Table 4 has been ranked as "Useful" or "Very useful" by most participants, with the exception of the *Inventory of Audiovisual Materials* (41%). The D1 column in Table 4 indicates that the documents were appreciated to an even greater extent by developing country participants.

Only half the participants reported that they had received the draft *Basic Epidemiology* text. However the textbook itself has already been used widely, 84% of those who received it ranking it as "Useful" or "Very useful". Several translations of the textbook have been made. For instance, it has been translated into Persian for teaching undergraduate medical and health students. It has also been translated into Hebrew, and the Ministry of Health in Hanoi has translated it into Vietnamese, and is using it for in-service training. It is also being used in a diploma course in occupational health nursing at the University of Bristol. Other GEENET training materials have been used for a course on environmental epidemiology for teachers of sanitarians at the University of Indonesia, and in classes on occupational health and prevention of risks to workers' health for postgraduate surgical student specialists at the University of Caracas.

Several participants mentioned that the materials distributed have enabled them to improve their teaching. It appears that GEENET materials are especially useful for teachers in those developing countries in which books, journals and other sources of information are difficult to obtain. A university lecturer from an African country reported:

*"The training activities I am involved in are those involving medical students. Prior to the receipt of the epidemiological reports and training materials, sources of material were virtually not existing except my journals which are outdated and could not be renewed due to the high cost of journals. Thus I have found the materials and the exercises in particular to be of tremendous help in my work."*

An East European member reported on the training materials as follows:

*"The training materials are now being widely used in our teaching. We have translated the training exercises for both undergraduate and graduate purposes. This is surely a major resource and a support, which would have been extremely difficult for us to have developed. With the help of the training exercises, the*

*students will also carry out community projects which will focus on environmental health and occupational issues."*

**Table 4. Percentage of participants who received GEENET documents; percentage who found the documents "Useful" or "Very useful"; percentage from developing countries (D1), and developed countries (D2) (including east European countries) who found the documents "Useful" or "Very useful"**

GEENET document	% of members who received document	% of those who found the document "Useful" or "Very useful"		
		Total	D1	D2
<i>Inventory of Audiovisual Materials</i>	68 (n=294)	41	50	30
<i>Inventory of Basic Textbooks</i>	81 (n=359)	70	72	68
<i>Inventory of Training Courses</i>	86 (n=389)	61	72	50
<i>Inventory of Newsletters</i>	75 (n=322)	60	75	41
<i>Inventory of Ongoing Research</i>	78 (n=345)	69	80	56
<i>Reference Information for Environmental Health Training and Research</i>	73 (n=313)	68	76	60
<i>Health Monitoring in the Prevention of Diseases Caused by Environmental Factors</i>	38 (n=150)	81	90	75
<i>Investigating Environmental Disease Outbreaks</i>	68 (n=291)	86	93	80
<i>Problem-based Training Exercises for Environmental Epidemiology</i>	90 (n=416)	89	93	83
<i>Basic Epidemiology Textbook (draft*)</i>	50 (n=214)	84	86	82
<i>GEENET Update Newsletter</i>	67 (n=271)	72	82	61

\* Became official WHO publication in May 1993

GEENET documents other than the training materials distributed have also been used to promote research and support training. For instance, a member from the African region reported that he recently finished a research proposal on assessment of pesticides exposure. He had received considerable help from other researchers whom he had contacted through the *Inventory of Ongoing Research in Developing Countries*. And a Chinese member reported:

*"We are studying lead poisoning in pregnant women, and its effect on their babies. Your materials helped us in developing the study design and control measures".*

*Indoor Air Pollution from Biomass Fuel and Major Poisoning Episodes from Environmental Chemicals* were also referred to as particularly useful by respondents.

## Contact among GEENET members

Another important feature of the Network is the opportunities it provides for establishing new contacts. This is of particular interest to developing country members who often work in greater isolation than their developed country counterparts.

**Table 5. Contact among GEENET members**

% of participants who established contact with other GEENET members (n=219)	44
% of participants who established contact who are from developing countries	61
% of participants who established contact who contacted at least 3 other GEENET members	62
% of contacts which aimed at information exchange *	80
% of contacts which aimed at research *	25
% of contacts which aimed at training *	24

\* These participants reported several reasons for contacting other GEENET members

Table 5 shows that 219 of the participants used the Network to contact other members for joint activities and that the majority of contacts were made by participants from developing countries. Of those who established contact with other members, 62% had established contact with at least 3 other members, and some with more than 10.

The participants were asked about their principal reasons for contacting other members. The most common was information exchange (see Table 5), but others included seeking collaboration for research or training purposes and seeking input for research proposals and reports. About 90 specific projects were listed, most often involving collaboration between members in a developing country and another in a developed country. Other reasons mentioned for contacting GEENET members included organization of workshops; fundraising; student, teacher and personnel exchanges; recruitment; sabbatical opportunities; improvement of library services, and distribution and exchange of documents.

The survey responses contained a number of examples of how GEENET has been used in order to contact other members and the outcome of those contacts. A researcher in Latin America wrote:

*"I am contacting other researchers dealing with cadmium contamination and exposure. Some of my work hypotheses have changed after extensive contacts with Japanese researchers in this area, whom I have reached through the lists and inventories provided by GEENET".*

The contacts made are not always between countries. One member from Asia reported:

*"The Network has been very useful for our research purposes. My institute started collaborative research with other university institutions in-country. We have now finished three studies. We are now planning joint activities with some of the ministries".*

Similar experiences were reported by members from China. In addition, members from the USA reported joint research activities with research institutions in Latin America and in Africa, following contacts established through information provided by the *Inventory of Ongoing Research in Developing Countries*.

The survey also revealed that the GEENET participants list is being used in a number of ways to promote environmental health training and research. For example, the London School of Hygiene and Tropical Medicine used it to make contact with participants who could help promote its training fellowships for developing country students. And the GEENET mailing list will form the basis of a proposed study, covering the whole of North America, of researchers' attitudes towards and experience of environmental health ethics.

## **GEENET workshops**

At the start of this survey, 21 national training workshops (based on the one-week training course *Introduction to Environmental Epidemiology*) had already been held. GEENET workshops aim to strengthen capacity in environmental epidemiology by:

- reinforcing and increasing the participants' knowledge of basic epidemiological principles and methods
- reinforcing and increasing the participants' knowledge of environmental and occupational hazards and health effects, with emphasis on assessment, and prevention and control activities
- encouraging and facilitating future collaboration among participants in order to assess, prevent and control environmental and occupational health hazards in their countries, and,
- encouraging participants who have teaching responsibilities to apply the knowledge gained from workshops in local training activities.

Sixty-eight of the survey participants (14%) had taken part in national training workshops. Several of them considered that their technical skills in environmental health and epidemiology had improved as a result, that the workshop had offered a good opportunity for exchanging ideas and experiences in environmental health related areas, had stimulated the creation of contacts with other researchers and research institutions, and helped initiate collaboration on research projects. The workshops also helped many participants to improve their teaching skills.

In some countries, additional training in related areas has been organized. For example, in Indonesia, the GEENET training workshop led to two additional environmental epidemiology workshops, organized by GEENET members within Indonesia, and paid for entirely by the Indonesian government. Another example comes from Chile, where a model project to strengthen training in environmental health in all university faculties was started in 1992 by GEENET members in Concepcion. The results will be used to promote similar training in other Latin American countries.

Two Latin American members, who participated in a GEENET workshop, launched 2 courses in medical ecology and environmental health in their country. The courses were based on a curriculum similar to that used in the GEENET workshop, and used the training materials distributed during this workshop. The organizers reported that they were "overwhelmed by the great demand for training in environmental epidemiology in our country."

In addition, participants from two Latin American countries reported that workshop training had enabled them to establish the first national plan in environmental and occupational health in their respective countries.



## Libraries

As mentioned earlier, the Network's objectives include identification and strengthening of libraries in developing countries. This involves improving the holdings of environmental health literature, and ensuring that these are readily accessible to health professionals and students. This is being carried out through the creation of *Environmental Health Reference Collections*. GEENET members have been encouraged to contact their libraries to promote these ideas. The survey asked members whether they had contacted their libraries as suggested.

**Table 6. Libraries**

% of participants who had made contact with their libraries (n=243)	52
% of contacts aimed at developing an <i>Environmental Health Reference Collection</i>	71
% of contacts aimed at additional new collaborative activities with libraries	55

About half of the participants reported that they had contacted their library to promote the GEENET document *Reference Information for Environmental Training and Research*. Of those who had contacted their library, 71% reported that their library was planning to develop an EHRC. The collaboration with libraries has also resulted in other activities such as the creation of databanks or registers of available documents; translation of documents; creation of document centres within libraries; creation of epidemiological information centres; improved documentation distribution to environmental and occupational health professionals; and collaboration between libraries, research institutes and universities.

An example of new developments in this area came from Argentina, where a regional reference library of medical ecology and environmental health has been created with the collaboration of the central library of the Centro Medico de Mar Del Plata. Materials received from GEENET provided the stimulus for this collection, which is being used to support new training courses in environmental health and ecology for postgraduate students.

## New training activities

GEENET members were asked if GEENET materials and/or activities had encouraged them to start any new training activities; 41% of the survey participants reported that they had done so. (It was assumed that participants who did not answer these questions had not started new activities.)

Those who had started new training activities mentioned adapting course content, arranging new training courses, modifying training courses (in accordance with recommendations made in GEENET documents and by incorporating training exercises distributed by GEENET), and developing training through provision of field experience.

About 54% of the participants who had initiated new training activities, mentioned that they had used GEENET documents as training materials—in particular the training exercises, and the *Basic Epidemiology* textbook.

### **New research activities**

The participants were also asked whether they had initiated new research activities after having received GEENET documents; 18% of the participants reported that they had done so.

Those participants who answered that they had initiated new research activities, mentioned areas such as collaboration on research projects (establishing collaboration between researchers, research institutions and universities); sharing of information concerning research methods, results and documents; and exchanging and commenting on research proposals and documents.

### **Future activities**

The participants were asked to make suggestions for future GEENET activities that could strengthen and support members' work. The following subjects for future activities were listed in the questionnaire:

- topics/themes for information inventories
- training materials
- research methods materials, and,
- strengthening of specific research activities.

With respect to information inventories, the most common suggestion by far was for a GEENET inventory of funding resources for research. (This was mentioned by approximately 59% of participants.) No other suggestions appeared on more than 10 occasions, with the exception of an inventory of anatomical and physiological reference data. (This was proposed by approximately 2% of respondents.)

Nearly a quarter of the participants indicated that they would find it helpful if the Network produced research methods guidelines relating specifically to the epidemiology of pesticides.

The next most common suggestion was for guidelines for the interpretation of epidemiological data (12%).

### Willingness to contribute to future Network activities

The participants were asked whether they were interested in participating in certain activities, to be promoted by GEENET in the future. The following table shows the proportion of the participants who reported that they were interested in the activities proposed.

**Table 7. Willingness to assist with future Network activities**

% of participants who are willing to pilot test new training materials (n=343)	75
% of participants who are willing to pilot test microcomputer software (n=336)	75
% of participants who are willing to assist other members by reading and commenting upon research proposals and reports (n=363)	81
% of participants who are willing to prepare bibliographies and summary reviews (n=257) *	59

\* Referred mainly to subjects such as air pollution (mentioned most frequently); hazardous waste disposal; heavy metal pollution; industrial environmental hazards; occupational epidemiology; pesticide poisoning; and water pollution.

Approximately two-thirds of the participants indicated that they would be willing to pilot test new training materials, and microcomputer software; 81% of the participants are willing to assist other members by reading and commenting upon research proposals and reports, and 59% indicated that they would be willing to prepare bibliographies and summary reviews.

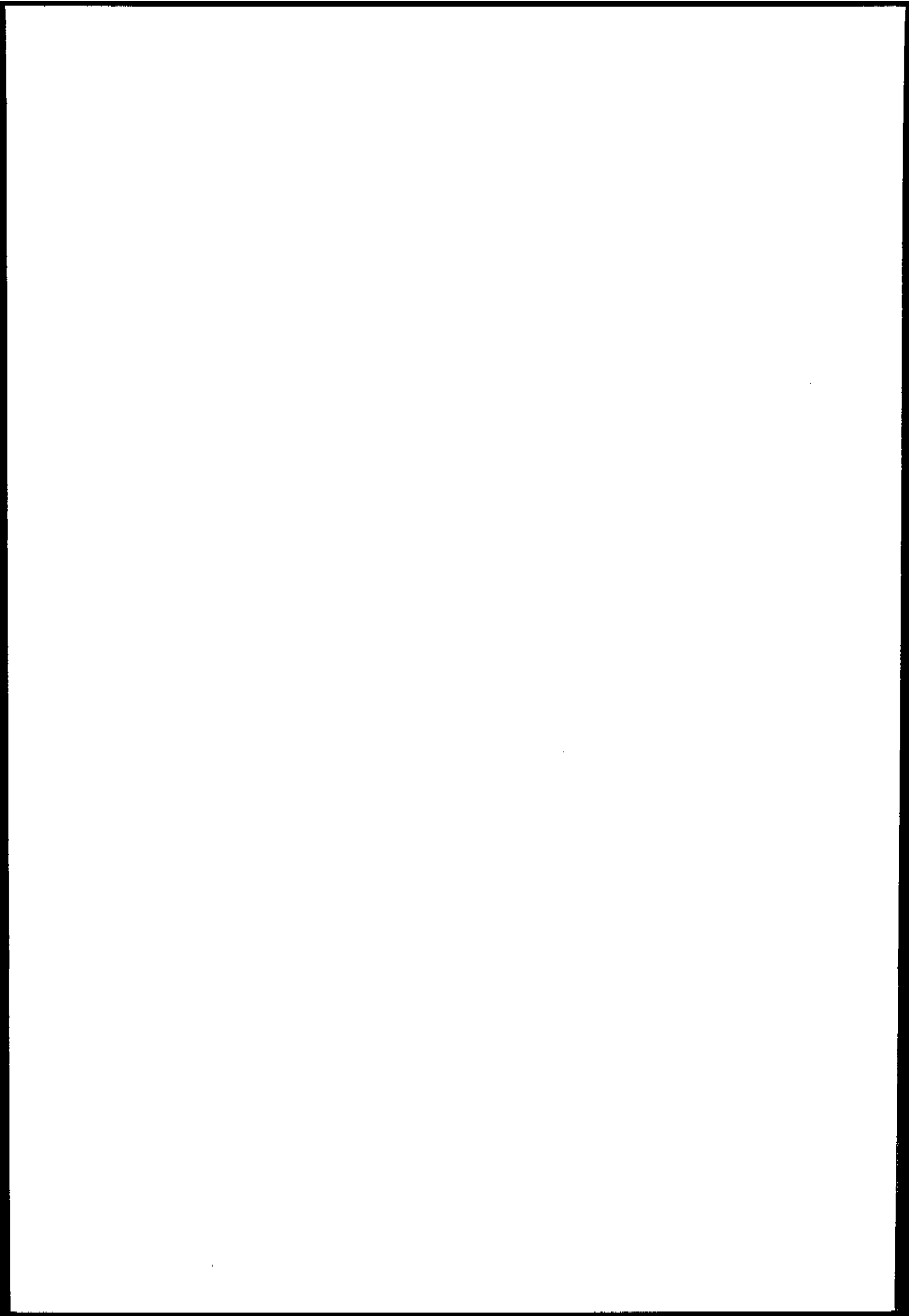
### Comments on how GEENET could further promote environmental health training and research

Several participants asked whether GEENET could assist with publication of research findings in environmental epidemiology, particularly those of developing country researchers.

A number of participants described professional isolation as a major constraint, particularly in countries where postage and telephone charges are high or international travel restricted, or for whom the cost of international travel is prohibitively high. Several suggested that

GEENET should include electronic mail addresses in its participants list and establish a bulletin board accessible by electronic mail, which members could use to contact one another and to access information about environmental health matters.

Some members suggested that GEENET should produce a document on how to respond to environmental health "incidents". Such a document would deal not so much with the investigation of causes (which is covered in training texts) but rather with how to manage acute episodes. Environmental health law was another area mentioned by a number of respondents as an important issue, and one with which GEENET could usefully become involved.



## 5. Discussion

Of all the materials distributed by GEENET, the training-materials, particularly the problem-based exercises, were the best received. These have been used in a variety of settings, and according to respondents, more such training materials would be welcome. It would be helpful to seek further information from members about the problem-based exercises that GEENET has already prepared and circulated, and to consider how these materials could be strengthened and expanded.

The number of participants who had participated in GEENET-sponsored country workshops on environmental epidemiology was relatively small. However, it is notable that those participants were more likely than non-participants to report that they had started new training activities, or new research activities with the help of GEENET. These findings suggest that the workshops have been successful in encouraging use of Network resources.

This survey has also shown that the Network contributes to increased collaboration, both within and between research disciplines, and countries/regions. Members have often initiated activities that go beyond the immediate services offered. The survey results also demonstrate the willingness of members to get involved in additional GEENET activities.

The participants took the opportunity to make several suggestions for future activities. But a substantial number also commented on the activities carried out to date:

*"Keep going on the services! They are very helpful and important for us" (Brazil).*

*"I am very impressed with the volume and quality of material received to date" (UK).*

*"Excellent book in basic epidemiology" (Finland).*

*"Continue with present work" (Turkey).*

*"A very useful and helpful Network" (Croatia).*

*"GEENET is a great resource for training materials and for overall information exchange" (Ethiopia).*

*"GEENET is doing an excellent job" (Singapore).*

*"Since I have received the publication GEENET worldwide inventory on training courses, I am in the position of contacting other training institutions for collaboration and upgrading of the training in our country" (Zambia).*

Clearly GEENET has chosen an appropriate path for its activities, and has great potential for future strengthening of networking and collaboration among environmental health professionals in both developing and developed countries.

# Annex

## GEENET MEMBER SURVEY 1992

### FOR MEMBERS OF THE WHO GLOBAL ENVIRONMENTAL EPIDEMIOLOGY NETWORK

The aim of this survey is to improve and extend the services WHO provides for you as a member of this Network.

Please take the time to answer the questions below and return the completed survey form as soon as possible (preferably before 15 September 1992). We realize that there are many questions, but each one is important for the future of the GEENET project.

Every member who returns the completed survey form will receive as a token of our appreciation a personal copy of the final published report of the WHO Commission on Health and Environment *Our Planet, Our Health*. This major report was the WHO main input into the Rio Conference on Environment and Development. It reviews all aspects of environment and health and may very well become a "classical" book to refer to in the future.

PLEASE USE CLEAR PRINT LETTERS FOR ALL ANSWERS, e.g.: Name:

#### A. INFORMATION ABOUT YOURSELF

Q.1 Your first name and family name (in that order, please) \_\_\_\_\_

Q.2 Your institutional affiliation (as in GEENET membership list) \_\_\_\_\_

Q.3 Your country of residence \_\_\_\_\_

Q.4 You should have received a copy of the membership list (dated May 1991); an updated list is currently being prepared. Please check the information carefully and use the attached membership form to let us know any changes or mistakes in address or other information, spelling errors and please add missing data (particularly phone, fax and telex numbers. For these numbers include country code and area code, e.g. +41-22-7913760: 41=Switzerland, 22=Geneva, 7913760=GEENET number)

Is the information accurate?       Yes       No      (if no, please return completed form with name and changes)

Q.5 When did you join GEENET?       1988       1989       1990       1991       1992

Q.6 Are you involved in:       Teaching       Research       Government Public Health Administration       Other

Q.7 If you are involved in teaching, how many working days approximately did you spend in teaching activities in the last 12 months? \_\_\_\_\_ days

Q.8 If you are involved in research, how many environmental and occupational epidemiology research projects have you worked on in the last 12 months? \_\_\_\_\_ projects

Q.9 How many reports or articles on environmental and occupational epidemiology projects did you publish in the last 2 years? \_\_\_\_\_ reports



Q.10 GEENET has produced a number of information inventories, training materials and newsletters. Please answer the following questions.  
 First column: Did you receive the document, Yes/No?  
 Second column: Did you read or use the document, Yes/No?  
 Third column: How useful is/was it for your work, on a scale from 1 to 5?  
 (Please mark the relevant boxes)

	Received		Read/used		Very Useful			Not Useful	
	Yes	No	Yes	No	5	4	3	2	1
<u>Information Inventories</u>									
I. Inventory of Audiovisuals	10	<input type="checkbox"/>	11	<input type="checkbox"/>	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
II. Inventory of Basic Textbooks	13	<input type="checkbox"/>	14	<input type="checkbox"/>	15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
III. Inventory of Training Courses	16	<input type="checkbox"/>	17	<input type="checkbox"/>	18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IV. Inventory of Newsletters	19	<input type="checkbox"/>	20	<input type="checkbox"/>	21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Inventory of Ongoing Research	22	<input type="checkbox"/>	23	<input type="checkbox"/>	24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VI. Reference Information for Environmental Health Training and Research	25	<input type="checkbox"/>	26	<input type="checkbox"/>	27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Training Texts</u>									
VII. Health Monitoring in the Prevention of Diseases Caused by Environmental Factors	28	<input type="checkbox"/>	29	<input type="checkbox"/>	30	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VIII. Investigating Environmental Disease Outbreaks	31	<input type="checkbox"/>	32	<input type="checkbox"/>	33	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IX. Problem-based Training Exercises for Environmental Epidemiology	34	<input type="checkbox"/>	35	<input type="checkbox"/>	36	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
X. <i>Basic Epidemiology</i> textbook (draft version)	37	<input type="checkbox"/>	38	<input type="checkbox"/>	39	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>Newsletter</u>									
XI. GEENET UPDATE	40	<input type="checkbox"/>	41	<input type="checkbox"/>	42	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q.43 Have you received other materials from GEENET that you found useful?  Yes  No

Q.44 If yes, please describe material and how it was useful: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Q.45 Have you participated in workshops on environmental epidemiology organized in collaboration with WHO (headquarters, Regional Offices or Country Office) and GEENET in your country?  Yes  No

Q.46 If yes, was the workshop useful for your work, and in which way was it useful? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Q.47 Have you used the GEENET membership list to contact other members?  Yes  No

Q.48 a) How many members have you contacted? \_\_\_\_\_

Q.49 b) If yes, what was the aim or result of the contacts?

- Information exchange
  - Research collaboration
  - Training collaboration
  - Promotion of scientific activities/methods
  - Other, which?
- 

Q.50 c) If you have developed research or training collaboration with other GEENET members, please describe the activities and their outcome (if more space is needed, please type or write clearly on a separate sheet of paper and attach the paper to this survey reply when you return it)

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Q.51 Have you contacted your library to promote the GEENET "Reference Information for Environmental Training and Research", as suggested when this document was distributed earlier this year?  Yes  No

Q.52 a) If yes, is the library planning to develop an Environmental Health Reference Collection?  Yes  No

Q.53 b) Are you planning any new collaboration activities with the library?  Yes  No

Q.54 c) If yes, please give details (if more space is needed, please use a separate sheet)

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Q.55 Have you started any new training activities or changed anything in your ongoing training activities with the help of GEENET materials or activities?

Yes  No

Q.56 a) If yes, please give details (if more space is needed, please use a separate sheet)

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Q.57 Have you started any new research activities or changed anything in your ongoing research activities with the help of GEENET materials or activities?

Yes  No

Q.58 a) If yes, please give details (if more space is needed, please use a separate sheet)

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**Q.59** Some additional information inventories are in preparation (*Inventory of research funding sources, Inventory of research recommendations from international meetings, Inventory of anatomical and physiological reference data*), the existing inventories are being updated and other inventories could be prepared.

Please suggest up to five topics/themes (including those mentioned above, if relevant) for information inventories that would be most useful to you (in order of interest):

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_

**Q.60** Some additional training materials are in preparation (*Basic Epidemiology, Environmental Epidemiology, Anthology of women and environmental health issues, Guidelines for National Training Plan Development*) and others are being considered:

Please suggest up to five topics/themes for training materials (prepared by GEENET) which would be useful to you (in order of interest):

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_

**Q.61** Some research methods guidelines are in preparation (*Guidelines for pesticide epidemiology, Guidelines for interpretation of environmental epidemiology data*) and others are being considered.

Please suggest up to five topics/themes for research methods materials (prepared by GEENET) which would be useful to you (in order of interest):

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_

**Q.62** How could the GEENET project best contribute in other ways to the strengthening of your research activities? Please list up to five specific suggestions (in order of interest):

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_
- 5. \_\_\_\_\_

- Q.63 Would you be willing to assist in pilot-testing new training materials or new training curricula as a part of your local training activities:  Yes  No
- Q.64 a) If yes, would you require any other support from GEENET than guidelines for pilot-testing and copies of the materials and curricula?  Yes  No
- Q.65 b) If you need other support, please give details: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- Q.66 Would you be willing to assist in pilot-testing microcomputer software that GEENET is distributing?  Yes  No
- a) If yes, what size/type diskettes can your microcomputer use?
- Q.67  5.25" high density  5.25" double density  3.5" high density  3.5" double density
- Q.68 Would you be willing to assist other GEENET members by reading and commenting upon their research proposals or research reports?  Yes  No
- Q.69 a) If yes, on which topics? \_\_\_\_\_  
 \_\_\_\_\_
- Q.70 We are planning to prepare GEENET global environmental epidemiology reports on priority topics such as urban air pollution effects, pesticide poisoning, heavy metal pollution effects, etc. Would you be willing to prepare bibliographies and summary reviews of data from your country?  Yes  No
- Q.71 a) If yes, on which topics? \_\_\_\_\_  
 \_\_\_\_\_
- Q.72 Do you have any other comments or suggestions on how GEENET can be improved for the benefit of your personal work and for environmental epidemiology development in your country? (if more space is needed, please use a separate sheet)  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**THANK YOU FOR YOUR ASSISTANCE**

Please return by 15 September to:

**Environmental Epidemiology  
 Division of Environmental Health  
 World Health Organization  
 1211 Geneva 27  
 Switzerland**