

14-3-103
via F.V. Dam
2-3

WORLD HEALTH
ORGANIZATION



ORGANISATION MONDIALE
DE LA SANTÉ

7 1

SOUTH-EAST ASIA REGION

SEARO 82

SEA/EH/286
2 February 1983
RESTRICTED

ENVIRONMENTAL HEALTH RESEARCH

Report of a Regional Consultation,
New Delhi

12-15 October 1982

LIBRARY KD 4043
International Reference Centre
for Community Water Supply

WHO Project: ICP BSM 001

91SEARO82
-4043

LIBRARY, INTERNATIONAL REFERENCE
CENTRE FOR COMMUNITY WATER SUPPLY
AND SANITATION (IRC)
P.O. Box 93190, 2509 AD The Hague
Tel. (070) 814911 ext. 141/142
RN: 4043
LO: 71 SEARO 82

LIBRARY, INTERNATIONAL REFERENCE
CENTRE FOR COMMUNITY WATER SUPPLY
AND SANITATION (IRC)
P.O. Box 93190, 2509 AD The Hague
Tel. (070) 814911 ext. 141/142
RN:
LO:

CONTENTS

	<u>Page</u>
1. INTRODUCTION	1
2. OBJECTIVES AND SCOPE OF THE CONSULTATION	1
3. INAUGURATION	1
4. STRATEGIES FOR THE PROMOTION OF ENVIRONMENTAL HEALTH RESEARCH	2
5. OBSERVATIONS ON THE CURRENT SITUATION	5
6. RECOMMENDATIONS	6
6.1 Strategies for Research Promotion and Implementation	6
6.2 Priority Research Topics	8
6.3 Research Topics on Health Aspects of Water and Sanitation Programme	8
6.4 Research Related to Support Programmes for Promoting Water Supply and Sanitation	10
6.5 Research on Appropriate Technology	11

ANNEXES

1. List of Participants and Secretariat	13
2. Agenda	16

1. INTRODUCTION

A regional Consultation on Environmental Health Research was held in the WHO Regional Office for South-East Asia from 12 to 15 October 1982. There were eight participants (WHO temporary advisers) from five countries of the Region, as well as four observers. For a full list of the participants, consultants and secretariat, see Annex 1. Annex 2 gives the programme of the Consultation.

2. OBJECTIVES AND SCOPE OF THE CONSULTATION

The WHO South-East Asia Advisory Committee on Medical Research (SEA/ACMR) meets periodically to review the overall research programmes and to identify priority areas and approaches for implementing research. This committee is complemented by meetings of research study groups convened to deliberate in depth on specific subjects. On environmental health (EH), the last such meeting was held in 1978 to review "Appropriate Technology for the Improvement of Environmental Health at the Village Level". Since then various developments have taken place. In particular, the International Drinking Water Supply and Sanitation (IDWSS) Decade was launched in January 1981 leading to reviews of many facets of environmental health work in the Region.

The present consultative meeting was held to enable an overall review of the research priorities in the light of the Decade approaches and the HFA 2000 and primary health care strategies, so as to consider ways and means of promoting and implementing environmental health and related research.

The specific objectives of the Consultation were as follows:

- (1) To identify high priority research needs in environmental health, taking into account the totality of accepted strategies for the International Drinking Water Supply and Sanitation Decade and Health for All by the Year 2000 with PHC as the key approach;
- (2) To review the research areas/topics identified by the Research Study Group in 1978 in terms of the guidelines provided by the SEA/ACMR in 1981 and determine priority needs, and
- (3) To discuss ways and means of promoting research activities and their application at country level ensuring the participation of collaborating institutions and operating agencies at all stages.

3. INAUGURATION

The Regional Director, Dr U Ko Ko, welcomed the participants and observed that in view of the imperative need to meet national Decade goals and to incorporate in all water supply and sanitation programmes the specific approaches which had collectively come to be known as the "Decade approach", research should not be confined to hardware technology but should include various software components as well. These included community education and

participation, development of human resources, institutional aspects, exchange of information, water quality surveillance, health impact studies and other related items to ensure that the ongoing national programmes for the provision of water and sanitation facilities would have a greater impact on the improvement of health than they had had previously.

Dr Ko Ko stated that in order to undertake such research, there was a need to attract a diverse group of research workers, including the traditionally relied sanitary/environmental engineers and physicians, as well as sociologists, anthropologists, economists, ecologists, scientists and health educators. Furthermore, such research must not be confined to laboratories only, but must include field work in the communities themselves if realistic results were to be achieved.

Mr Hans Heep, Assistant Representative, UNDP, New Delhi, addressing the Consultation on behalf of UNDP, expressed his appreciation of the value of environmental health research, particularly in attaining the goals of the International Drinking Water Supply and Sanitation Decade. He reaffirmed the interest of his agency in environmental health and pointed out that UNDP-supported projects in the Region were promoting research in a general way. Regarding the promotion of environmental health research, Mr Heep emphasized the need to obtain results that would be applicable to the local situation.

Mr J.B. Mendis, UNICEF Programme Officer, speaking on behalf of UNICEF, referred to UNICEF's role in environmental health and its commitment to the goals of the IDWSS Decade. He also mentioned that more than a quarter of the global UNICEF assistance had been provided for the improvement of water supply and sanitation. UNICEF hoped that the deliberations of this consultation would contribute further to the development and improvement of environmental health.

4. STRATEGIES FOR THE PROMOTION OF ENVIRONMENTAL HEALTH RESEARCH

In all, 11 papers were presented during the Consultation. Some of the highlights of the presentations are given below. Discussions based on the presentations and general discussions are summarized under the headings 'Observations on the Current Situation' and 'Recommendations'.

In his presentation, "Strategies for EH Research Development", Dr Lohani stressed the Decade approach as WHO global strategies and its relation to primary health care. Community action and participation, health and hygiene education, development of appropriate technology and the related facets of the PHC approach were all integrated components of the Decade programme.

He emphasized the need for a multi-disciplinary PHC approach and the development/use of appropriate technologies for the Decade programme. The research needs in environmental health had to be restructured and suitable strategies for the development of research programmes had to be determined.

In the priority areas of EH activities, to fulfil the goals of the Decade programme and the target of Health for All by the year 2000, Dr Lohani emphasized the need to promote research in the following areas in order of priority: water supply and sanitation, solid waste management, education and manpower development, appropriate technology extension, information exchange and other areas such as environmental impacts, water quality management and the setting of standards and criteria.

Dr Feachem in his presentation, "Environmental and Behavioural Approaches to Diarrhoeal Disease Control", drew attention to the role of environmental and behavioural factors in the transmission of agents responsible for causing diarrhoeal diseases. The control of diarrhoeal diseases was a major objective of the Decade and it was an objective which would not be achieved without close collaboration between those responsible for designing water supply, excreta disposal and associated behavioural interventions and those working in the fields of diarrhoeal disease etiology and epidemiology.

Mr Arceivala in his presentation, "Research Needs and Priorities for IDWSS Decade in SEAR countries", gave a brief overview of the on-going environmental health research activities in South-East Asian countries. He outlined the action taken so far in the promotion of EH research: invitations to countries, institutes and experts; inclusion in on-going country projects, and general institutional support.

In their presentation, "Research Component in the Regional UNDP Decade Advisory Services Project", Mr Subrahmanyam and Mr Stevens stated that the objectives of the project were: to develop and test a simple field procedure for finding, verifying and describing effective methods of water supply/sanitation improvement in on-going national programmes and using this procedure in a few selected areas to evolve "methodology" guidelines applicable in similar areas.

The country programme aspects to be studied would be successful methods of human resources development, of health education and of supporting community participation, appropriate technology, and effective institutional methods.

Dr Jayaweera in his presentation, "Collaborating Centres and Research", made an overall review of WHO's objectives and mechanism for the promotion of research in collaboration with the Member countries of the Region. The primary objectives were to strengthen national research capabilities and to promote and coordinate research. These broad objectives were developed in collaboration with Member countries through the establishment of a work plan implemented through a variety of mechanisms including the support of research activities either as invited proposals or as commissioned research projects, and by offering training courses in research methods, advisory services, technical assistance and the designation of WHO collaborating centres and national centres. Any one or all of these activities were emphasized as possible mechanisms for supporting EH research in the countries of the Region.

In her presentation, "Research Needs and Priorities for National Drinking Water Supply and Sanitation Decade in Indonesia", Mrs Sri Soewasti Soesanto outlined the National Development Plan for Indonesia and its relation to the Decade. She emphasized that research studies were needed in both technical aspects and support programmes so as to help achieve the Decade targets. In general the priority topics identified by the Research Study Group in 1978 were still valid.

In their presentation, "Research Needs and Priorities for IDWSSD in South-East Asian Countries, with particular reference to Sri Lanka", Dr Rodrigo and Mr Madugalle stressed that strengthening of the research base was a pre-requisite for optimizing functional outputs as related to Decade strategies. The need for strengthening the behavioural and environmental dimensions of research also assumed greater significance.

In reference to Sri Lanka, with limited resources available for investment to attain the Decade targets, it was essential to identify research needs on appropriate technology and various support programmes. Wells and handpumps, rural water supply schemes, suitable low-cost latrines and waste disposal, operation and maintenance, community participation and education, and water quality management were among the priority topics suggested for research.

Dr Sundaresan in his presentation, "EH Research on Appropriate Technology in Water Supply and Sanitation for Rural and Urban Underserved Areas", stressed the choice of technology. Technology options should be looked at critically, so that the requirements of the majority of the population scattered over a larger area in the villages and urban squatter settlements could be met.

He brought to the attention of the meeting a comprehensive review of research literature prepared by the National Environmental Engineering Research Institute, India (NEERI) on appropriate technology in environmental health applicable to rural and urban underserved areas in the South-East Asia Region. Topics identified at NEERI for environmental health research were highlighted.

In his presentation, "Support Programme for Promoting Water Supply and Sanitation", Mr Lert mentioned the importance of support programmes for water supply and sanitation agencies in regard to coverage. He cited an example in Thailand where studies were needed in support programmes, including institutional analyses, consumer needs and education.

Mr Lert recalled the support programmes areas discussed in the Regional Workshop on Support Programme for IDWSS Decade held in 1981 at the Regional Office, i.e., human resources development, promotion of community education and participation, integration of the Decade activities with those of primary health care, operation and maintenance, and quality surveillance.

Mrs Sri Soewasti Soesanto in her presentation, "Environmental Health Research on Health Impacts of Rural and Urban Development", stressed that environmental impact assessment studies were needed to improve techniques and methodologies for evaluating the social, cultural and economic aspects of development projects with special emphasis on their health impact.

Research in this respect in support of the IDWSS Decade programme would have to consider the impact of development projects on health in rural and urban areas.

Prof. Madan in his presentation, "Behavioural Science Research Needs in Environmental Health", mentioned that, depending upon the nature of the ecological setting, socio-cultural background, epidemiological history and other related factors, including technological capabilities available locally, a certain degree of variability in support programmes was unavoidable. This variability would be taken into account in research on support programmes.

Research studies under support programmes would include manpower, equipment, financial resources, institutional support, community education and participation, and ethnographic and sample surveys.

5. OBSERVATIONS ON THE CURRENT SITUATION

From the presentations and the discussions, the participants briefly reviewed the current situation of EH research in the South-East Asia Region with special reference to the goals of the IDWSS Decade, and made the following observations:

- (1) While research activities and capabilities vary considerably among the countries of the Region, EH research in most countries is not yet an integral part of their national programmes for the Decade. Research effort is mainly of an ad hoc nature, often undertaken by academic institutions with limited linkages to the agencies implementing water and sanitation programmes or to the communities which are to benefit from the research.
- (2) Few national agencies or ministries in the Region allocate funds to promote or sponsor research on specific water and sanitation problems. Furthermore, only a few agencies have research and development cells or any other institutional mechanisms to identify and sponsor research and then carry it through the necessary field trials to a stage where its findings can be implemented in practice. Research is also not sufficiently linked to developmental activities, and results of EH research have generally not been followed up by a quick and ready transfer to the field.
- (3) In rural water supply and sanitation it is evident from published research results that technology is not the main bottleneck. Technological capabilities exist but the importance of social and cultural factors and community behaviour is not yet fully recognized. People's participation is generally missing. Social relevance and community acceptance of the research findings are thus jeopardized.
- (4) EH research in South-East Asia is also not sufficiently disease-focused. The key health issues in the Region are known but have not been considered adequate in designing the research effort and concurrent environmental health promotion programmes.

6. RECOMMENDATIONS

The participants discussed the various strategies available for research promotion and implementation at the national level, and identified research topics of special importance in the Region with regard to technology, software support and health. The participants also identified three topics for commissioned or sponsored research.

6.1 Strategies for Research Promotion and Implementation

- (1) To be effective, EH research must be an integral part of the national programmes for the Decade and benefit from a programmatic approach to its various facets ranging from institutional and financial support to the field application of results and their evaluation.
- (2) National implementing ministries and agencies would benefit from sponsoring research on selected priority topics from their own resources. A strong and continuing collaboration between the implementing and research agencies, and their collaboration with the communities is essential to ensure that research findings are acceptable and properly applied in the field.
- (3) EH research must, among other things, meet the requirements of disease control, particularly for diarrhoeal disease and vector control programmes in which environmental intervention plays an important role. In those countries where water supply and sanitation programmes are implemented by ministries other than the ministry of health, the latter must exert its influence to incorporate the essential health component in the research.
- (4) Social and cultural factors affecting community behaviour as well as workers engaged at all levels in providing water and sanitation services, must be adequately considered in designing and implementing EH research. Comprehensive research must include studies on the socio-economic, institutional, technological and health aspects of the problems through the use of multi-disciplinary research teams, even though multidisciplinary and multi-agency involvement and field-testing with people's participation impose their own organizational problems.
- (5) Research, especially on the technological aspects of rural water supply and sanitation, often requires adaptation of known solutions to the local situation. Thus research quite often constitutes more of 'search' than 'research', and the availability of literature and information at the national level is important. Fellowships for training, as well as study tours and workshops at the national and inter-country level are particularly useful for the transfer of technology to the local scene.

- (6) WHO is one of the several international agencies providing funds for EH research in the South-East Asia Region. In addition, WHO plays an important catalytic role by providing field personnel and/or experts to assist with the development of research proposals for external funding.
- (7) EH research is conducted through three different approaches within the Region. In each case, the research requires financial and institutional support from national sources with support from external agencies by way of funding and/or technical assistance.

(i) In-house research by national implementing agencies

Such research is undertaken by national implementing agencies either singly or in collaboration with others, including academic institutions, mainly through their own resources, to work on priority problems identified by the agencies. The establishment of a research and development cell with an adequate budget within an implementing agency linked with other agencies wherever necessary, and the provision of some incentives for researchers would greatly help promote research and its field application.

Support for EH research from external agencies is mainly technical in nature and can cover a wide range of activities, from specialist inputs in, for example, the preparation of research protocols, and the provision of expertise on certain aspects of the research, to the award of fellowships for training and study tours, and mutual exchange of information through networks of collaborating institutions, documentation and literature support. WHO support is mainly in the form of technical assistance, which can support any or all of the latter activities. Some external agencies may also provide funding for the research activities.

Support to the in-house EH research of national agencies is likely to prove most productive, as such research addresses problems of direct relevance and priority to the nation's needs, and has the best chance of implementation in the field.

(ii) Individual research efforts

EH research is conducted by individuals primarily in academic institutions and mainly involves research on technological topics or field surveys on socio-economic and health aspects. The research efforts can be of a high order of scientific competence but often are limited in their objective, scope and duration because of the usual constraints of academic institutions.

Individual research efforts can be harnessed by national implementing agencies, which can invite the researchers to collaborate on specific aspects of their problems. Thus, larger problems may need to be broken down into smaller, researchable topics to be farmed out to academic institutions.

External assistance, including that of WHO, could support activities outlined in (i) above. There is need to continue and even strengthen support to the excellent scientific talent in the countries, but the cost effectiveness of the support would markedly increase if the research topics were carefully selected and some linkage with implementing agencies established to ensure application of the research.

(iii) Commissioned or sponsored research

The participants emphasized the need for commissioned or sponsored research to achieve the Decade objectives since several common problems were faced to a greater or lesser extent in many countries of the Region. A well-designed, comprehensive project conducted in a multi-country setting could produce useful information which may also be utilized by other developing countries.

WHO technical support for selecting study areas and preparing detailed protocols for research was welcomed as it would help to obtain governmental and/or any external funding for the research. Continued WHO technical assistance during implementation and assistance with wide dissemination of the results was also considered beneficial.

6.2 Priority Research Topics

The participants identified a number of research topics covering health aspects, software support and appropriate technology, as described in the following sections. It was not considered desirable to establish any inter se priorities since these could be determined only at the national level, but it was decided that most of the topics in general were of high priority in most countries of the Region. Of these topics three were considered appropriate for commissioned or sponsored research, in that they appeared relevant to problems common to most countries of the Region. These topics are:

- (1) Comparative studies including technological, institutional, socio-economic and health aspects of the operation, maintenance, and surveillance of water supplies and sanitation in rural areas.
- (2) Comparative studies including technological, institutional, socio-economic and health aspects of excreta disposal and environmental sanitation in urban underserved areas.
- (3) Health aspects of waste recycling in agriculture and aquaculture. [See item (4) of 6.3].

6.3 Research Topics on Health Aspects of Water and Sanitation Programme

Governments in the South-East Asia Region are investing substantial amounts of money into water supply and sanitation programmes. One of the major motivations for these investments is to improve the health of the people, especially those living in rural areas, urban slums and squatter settlements.

Diseases associated with water supply and sanitation are among the most important health problems for these people and effective control and prevention strategies for many of these diseases have not been developed owing to lack of information.

The participants recommended that research activities should be limited to selected priority topics and that comprehensive listing of all research topics should not be attempted. Furthermore, a disease-focused approach was considered appropriate in defining some of the research topics on the health aspects of Decade activities. Among the diseases related to poor water and sanitation, the participants identified diarrhoeal diseases, gut nematode-related diseases and Bancroftian filariasis as being most common and of the greatest public health importance in the Region.

Guinea worm is an important water-related disease in certain parts of India, but recommendations on Guinea worm research were not made because there were already studies going on in India. The importance of food-borne diseases was discussed, but research on this subject was not considered as the participants wanted to maintain the focus on water supply and sanitation activities.

On the basis of the selection of diseases for consideration for research, the following broad topics were recommended to serve as a basis for developing specific research protocols aimed at the prevention and control of these diseases:

- (1) The effectiveness and Operation-Feasibility of Education on Hand-washing, and Other Specific Personal Hygiene Practices, to Reduce the Transmission of Diarrhoeal Diseases. The forms of personal hygiene should be selected following an initial survey of such habits in the study communities by a social scientist.
- (2) The Prevention of Transmission and Control of Enterotoxigenic E. coli, Campylobacter jejenum, Shigella and Rotavirus with Special Reference to Transmission Routes and Control Strategies Related to Water Supply, Sanitation and Hygienic Behaviour.

Many specific research projects are required within this broad topic. The meeting concluded that priority should be given to research that could be completed within a limited time period (say within one year) and that a number of highly specific and limited projects would be preferable to one large, expensive project of long duration. Further definition of research projects within this topic should come from specialist research institutions.

- (3) Methods of Controlling the Breeding of Culex Mosquitoes Associated with On-going Projects on Low-cost Excreta and Sullage Disposal to Reduce the Transmission of Bancroftian Filariasis.

This research should determine the effectiveness and feasibility of utilizing technical and behavioural intervention strategies to reduce Culex breeding.

(4) Health Aspects of Waste Recycling in Agriculture and Aquaculture.

These studies should focus on identifying the epidemiological risks associated with waste recycling and on methods of reducing these risks. Specific diseases and specific waste recycling practices should be studied at various sites in the Region. Diseases selected may include diarrhoeal diseases (in both agricultural and aquacultural recycling), common gut nematode infections (in agricultural recycling), tapeworm infections (where wastes are used to fertilize fodder or pasture) and trematode infections, especially opisthorchiasis, clonorchiasis and fasciolopsiasis (in aquacultural recycling).

(5) The Occupational Health Risks of Waste (Nightsoil, Sewage or Refuse) Workers and Means of Preventing these Risks.

These studies should include detailed behavioural observations to identify the individuals most likely to spread disease. The epidemiological component should compare the prevalence and/or incidence of selected infections and/or diseases among various groups of waste workers and between waste workers and a control population. The diseases selected should include diarrhoeal diseases and may also include hepatitis 'A' infection, enteroviral infections, leptospirosis, helminthiasis and skin diseases.

(6) Studies on Acceptable Levels of Certain Water Contaminants.

Such studies are needed in order to develop water quality guidelines for small rural water schemes. The subject of acceptable nitrate levels requires particular attention, but other contaminants are also of local importance. The health risks associated with various concentrations of faecal indicator bacteria are an important topic for research, but such research poses several difficult methodological problems.

6.4 Research Related to Support Programmes for Promoting Water Supply and Sanitation

Support programmes have been defined as coordinated and planned activities which make it possible to initiate and/or reinforce water supply and sanitation programmes, the water supply and sanitation programmes themselves being both conceptually and administratively integrated into the HFA/PHC 2000 programme.

Support programmes vary considerably, depending upon the nature of ecological setting, socio-cultural practices, epidemiological history and the technological capabilities available locally. This variability will need to be incorporated into the design of research on support programmes. Such diversity of conditions and the resultant variability in support programmes notwithstanding, it is not only desirable but also possible to evolve a common

framework for research on support programmes. Thus, research will have to be conceived of as consisting of a number of directly or indirectly related projects which are held together by the objective of water supply and sanitation activities.

In view of the strictly applied nature of the research on support programmes, each project will have to be designed with a view to increasing the feasibility and practicability of the support programme even at the cost of some methodological sophistication.

As a result of the observations and discussions, the following general topics were recommended for research on support programmes related to the promotion of water supply and sanitation.

- (1) Methodological studies on community education and participation, and motivation-generation, including development of suitable educational materials.
- (2) Studies on the significance of socio-economic and educational variables in the acceptance of innovations in technology.
- (3) Comparative studies of the institutional aspects of the operation, maintenance and surveillance of community water supplies and sanitation, including the use of primary health centres, cooperatives, voluntary agencies, etc.
- (4) Attitudinal surveys of technical and managerial staff employed in the operation, maintenance and surveillance of completed schemes, to promote job motivation.
- (5) Studies on appropriate management information systems for water supply and sanitation organizations.
- (6) Studies on ways and means of resource-generation from within the community.
- (7) Socio-economic aspects of (a) water supply systems and water usage, and (b) recycling of wastes (human and animal waste, solid wastes, etc.).

6.5 Research on Appropriate Technology

Research activities should focus on strengthening technology to ensure wider field application within the shortest possible time in Member countries of the Region. The success or otherwise of environmental health programmes would depend upon the choice of technology in rural areas and urban underserved areas. Attempts to superimpose high-cost and energy-intensive technological options under the pretext of ready availability should be viewed with caution, as their cultural relevance and social acceptance may be limited.

The basic concepts in water supply and sanitation remain the same, but technological adaptations which take full advantage of the locally available skills at country and regional level have a better chance of success.

A review of technological options in the South-East Asia Region reveals that several innovative techniques are already being adopted at various levels. Although such technology is available in the Region, it is not being judiciously applied to suit the local requirements. Furthermore, several research projects have been undertaken on an ad hoc basis without well defined overall objectives at national or regional levels, resulting in several of them remaining on paper awaiting acceptance and application at the field level by professionals as well as the communities.

In view of the need to improve the technology related to water supply and sanitation in the South-East Asia Region, the participants suggested that the following topics be adopted for future research consideration:

- (1) Comparative studies on low-cost excreta/wastewater disposal systems with or without by-product utilization, including operation, maintenance and cost-benefit analysis (partly supported by the UNDP/World Bank global project).
- (2) Studies on the application of the systems approach to integrated water supply and waste management systems for urban underserved areas.
- (3) Design norms and operational measures for minimizing hazards due to intermittent water distribution systems.
- (4) Factors affecting pollution of tubewells and other drinking water sources and methods for effective surveillance.
- (5) Low-cost methods and materials for the collection, treatment, disinfection and distribution of water for community supplies (sand filters, rainwater tanks, village ponds, infiltration galleries, etc.).
- (6) Water quality surveillance and improvements in bathing ghats and temple tanks.
- (7) Studies on the use of renewable energy in water supply and sanitation (wind and solar energy).
- (8) Cost-benefit analysis of various technology options.
- (9) Rapid techniques for the detection of faecal bacteria in the field.

LIST OF PARTICIPANTS AND SECRETARIAT

I. Participants (Temporary Advisers)

BANGLADESH

1. Mr S. Waheed
Chief Engineer, Dhaka Water and Sewerage Authority
Dhaka

INDIA

2. Dr T.N. Madan
Professor
Institute of Economic Growth
University of Delhi
Delhi
3. Dr B.B. Sundaresan
Director
National Environmental Engineering Research
Institute (NEERI)
Nagpur
4. Mr V. Venugopalan
Adviser (PHEE)
CPHEEO, Ministry of Works and Housing
Nirman Bhawan
New Delhi

INDONESIA

5. Mrs Sri Soewasti Soesanto
Chief, Division of Physical Environment
Health Ecology Research Centre
National Institute of Health Research and Development
Ministry of Health
Jakarta

SRI LANKA

6. Mr T.B. Madugalle
General Manager
National Water Supply and Drainage Board
Ratmalana

SRI LANKA (cont'd)

7. Dr Mohan Rodrigo
Assistant Director
(Environmental & Occupational Health)
Ministry of Health
Colombo

THAILAND

8. Mr Lert Chainarong
Deputy Governor
Provincial Water Works Authority
Vipavadi Rangsit Road
Tung Song Hong
Bangkhaen
Bangkok-21

II. Consultants

9. Dr R. Feachem
Ross Institute
London School of Hygiene and Tropical Medicine
London, U.K.
10. Dr B.N. Lohani
Associate Professor
Environmental Engineering Department
P.O. Box 2754
Asian Institute of Technology
Bangkok-10501, Thailand
11. Mr P.A. Stevens
WHO Consultant
WHO Regional Office for South-East Asia
New Delhi

III. Observers from United Nations and Other Agencies

UNDP

1. Mr Hans Heep
Assistant Resident Representative
New Delhi

UNICEF

2. Mr J.B. Mendis
Programme Officer, UNICEF Regional Office for South-Central Asia
New Delhi
3. Mr P. Wan
Project Officer, UNICEF Regional Office for South-Central Asia
New Delhi

INTERNATIONAL REFERENCE CENTRE, HAGUE

4. Mr E.H.A. Hofkes
Programme Officer

IV. Resource Persons from SEARO

1. Dr Uton Muchtar Rafei
Senior Public Health Administrator
Primary Health Care
2. Dr N.K. Shah
Senior Public Health Administrator
Communicable Diseases
3. Dr V.K. Sharma
Medical Officer, Primary Health Care
4. Dr Topo Harsono
Technical Officer, Health Manpower Development
5. Dr A.K.M. Kafiluddin
Medical Officer, Diarrhoeal Diseases
6. Dr D.M. Watts
Technical Officer, Medical Research

V. Secretariat

1. Dr B.A. Jayaweera
Chief, Medical Research
2. Mr D.V. Subrahmanyam
Chief, Environmental Health
3. Prof. S.J. Arceivala
Regional Adviser, Environmental Health
4. Mr H.S. Suphi
Regional Adviser, Environmental Health
5. Mr A. Besa
WHO Sanitary Engineer
6. Mr D.N. Wijeyaratne
WHO Sanitary Engineer, Bangladesh
7. Dr Vithya Pienvichitr
WHO Sanitary Engineer

AGENDA

Tuesday, 12 October 1982

0900 hrs	Registration	
0930 - 1030	Opening Session	
	- Opening of the Consultation	Regional Director
	- Statements from other United Nations Agencies	
	- Introduction of Participants	Secretary
	- Appointment of Chairman and Rapporteur	
1100 - 1300	Adoption of Agenda	Chairman
	Strategies for EH Research Development	Dr B.N. Lohani
	Presentation and Discussion	
1400 - 1500	Environmental & Behavioural Approaches to Diarrhoeal Diseases Control	Dr R. Feachem
	Presentation and Discussion	
1530 - 1700	Research Needs and Priorities for IDWSS Decade in SEAR Countries	Mr S.J. Arceivala
	Research Needs and Priorities for IDWSS Decade in Indonesia	Mrs Sri Soewasti Soesanto
	Research Needs and Priorities for IDWSS Decade in SEAR Countries with particular reference to Sri Lanka	Dr M. Rodrigo and Mr T.B. Madugalle
	Presentation and Discussion	

Wednesday, 13 October 1982

0900 - 1000	Research Component in the Regional UNDP Decade Advisory Services	Mr D.V. Subrahmanyam and Mr P.A. Stevens
	Presentation and Discussion	

Wednesday, 13 October 1982 (Cont'd)

- | | | |
|-------------|--|---------------------------|
| 1030 - 1200 | EH Research on Appropriate
Technology in Water Supply and
Sanitation for Rural and Urban-
Underserved Areas | Dr B.B. Sundaresan |
| | Presentation and Discussion | |
| 1200 - 1300 | Research Needs in "Support"
Programmes for Promoting Water
Supply and Sanitation | Mr Lert Chainarong |
| | Presentation and Discussion | |
| 1400 - 1515 | EH Research on Health Impacts of
Rural and Urban Development | Mrs Sri Soewasti Soesanto |
| | Presentation and Discussion | |
| 1545 - 1700 | Behavioural Science Research
Needs in Environmental Health | Prof. T.N. Madan |
| | Presentation and Discussion | |

Thursday, 14 October 1982

- | | | |
|-------------|--|-------------------|
| 0900 - 1000 | Collaborating Centres and
Research | Dr B.A. Jayaweera |
| | Presentation and Discussion | |
| 1030 - 1200 | General Discussions on Strategies
for Promoting EH Research in
SEAR countries | |
| 1200 - 1300 | Group Discussions on Strategies
for EH Research Developments
in SEAR countries | |
| | Priority Topics for EH Research
in SEAR countries | |
| 1400 - 1700 | General Discussion (continued) | |

SEA/EH/286

Page 18

Annex 2

Friday, 15 October 1982

0900 - 1030	General Plenary Discussions
1100 - 1300	Discussion of Draft Report
1400 - 1500	Final Report and Recommendations
1530	Closing Session

- Concluding Remarks

Chairman
Participants
Regional Director