

622.2

IRC 75

WHO
International Reference Centre
for
Community Water Supply

The Hague, The Netherlands

Seventh Annual Report 1975

Nw. Havenstraat 6, Voorburg (The Hague)
The Netherlands

Postal Address:

P.O. Box 140, Leidschendam, The Netherlands

622.2-IRC75-1.7

I.17

622.2

NL.1R 75

WHO INTERNATIONAL REFERENCE CENTRE
FOR
COMMUNITY WATER SUPPLY

SEVENTH ANNUAL REPORT
1975

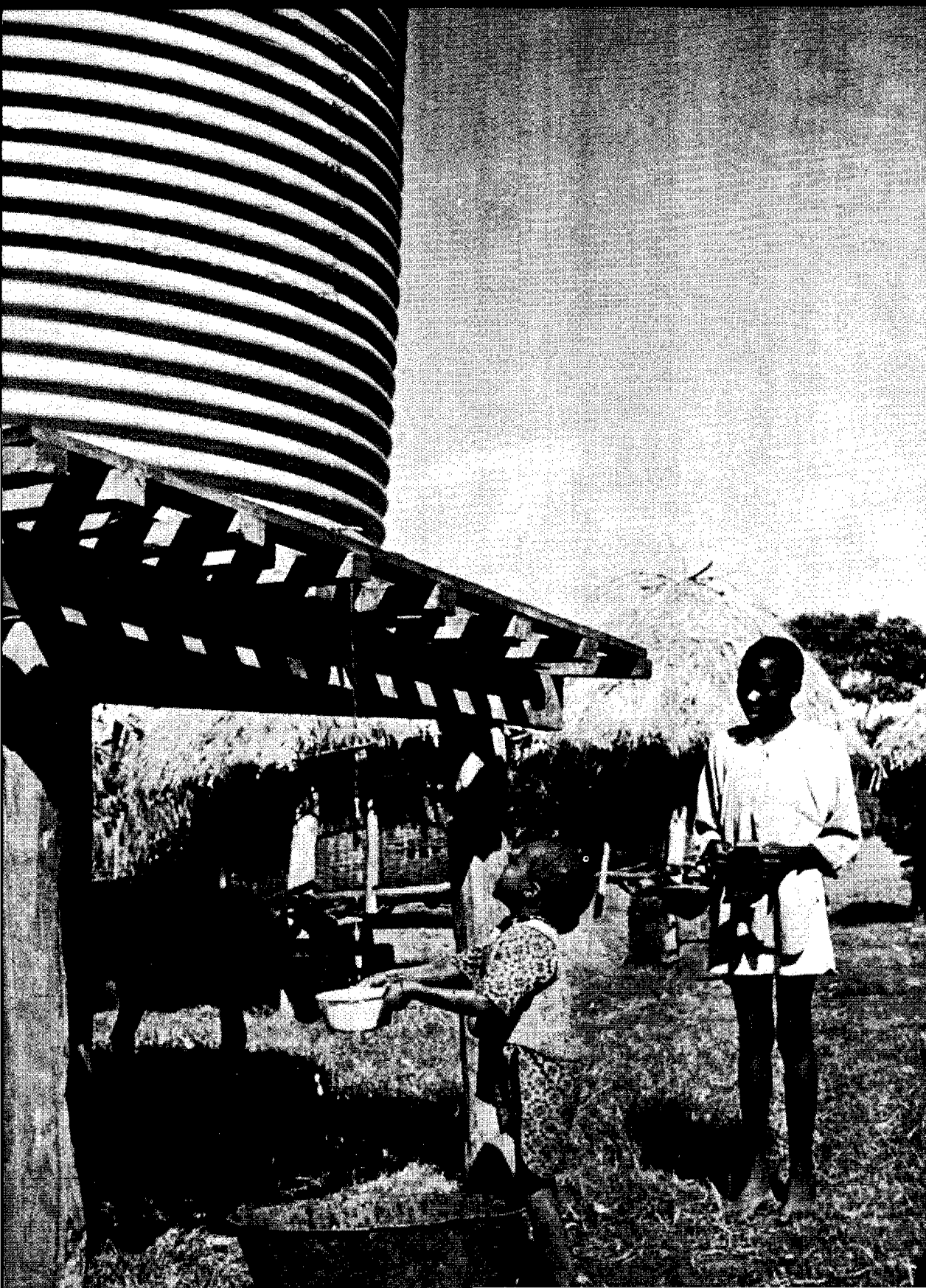
WHO
INTERNATIONAL REFERENCE CENTRE
FOR
COMMUNITY WATER SUPPLY
1975

Nw. Havenstraat 6, Voorburg (The Hague)
The Netherlands

Postal Address:
F.O. Box 140, Leidschendam, The Netherlands

CONTENTS

	Page
1. Introduction	5
1.1 General	5
1.2 Ad Hoc Working Group on Rural Potable Water Supply and Sanitation	7
1.3 Programme Development	8
1.4 The IRC from a bird's eye view	11
1.5 The Network	12
1.6 The Centre's links, budget and staff formation	14
2. Description of IRC Programmes	17
2.1 Appropriate Technologies	17
2.2 Slow Sand Filtration	20
2.3 Public Standposts for Developing Countries	23
2.4 Handpumps for Developing Countries	25
2.5 Health Aspects of direct and indirect re-use of waste water for human consumption	27
2.6 Training	29
2.7 Twinning	32
2.8 Programme on International Exchange of Information	34
2.9 Newsletter	34
3. Supporting Sections	35
3.1 Library and Cataloguing	35
3.2 Administration	35
Annex 1. Visitors	37
Annex 2. Regional Reference Centres and Collaborating Institutions for Community Water Supply	41
Annex 3. The International Network for Community Water Supply and the WHO-Offices	45



1. INTRODUCTION

1.1 General

The IRC was established as a result of a contract between the World Health Organization and the Netherlands Government (Ministry of Public Health and Environmental Hygiene) at the Netherlands Institute for Water Supply in The Hague in 1968. The general objective of the IRC is to initiate, develop and carry out, on a collaborative basis, and in close cooperation with the WHO, supporting activities of a fundamental and infrastructural nature aimed at development and improvement of water supply systems.

The IRC functions as the nexus of a worldwide network of regional and national collaborating institutions. Although the activities concern both industrialized and developing countries, they are largely concentrated on the problems of water supply in the third world, that being the area where the need is the greatest. The emphasis is on promotion of research; the drawing up of development programmes; the exchange and transfer of information; and education and training programmes.

The year 1975 has been a period at the IRC during which an acceleration of several developments took place. Firstly, the number of staff could be increased by five, bringing the total IRC staff to five persons with a university background, one sub-professional and three administrative assistants. Secondly, it was the first year the IRC had its own budget of over 1 million guilders and thus was able to increase its programme activities. Thirdly, its development was greatly stimulated by international discussions that took place within the framework of the Ad Hoc Working Group on Rural Potable Water Supply and Sanitation. In this Group nine international organizations are working together to draw up an international programme relating to water supply and sanitation; the IRC may have to play an important role in the development and implementation of this programme. These discussions were not completed by the end of the year under review, but they will be continued in the coming year.

With regard to the IRC activities, particular attention was given to the drawing up of a consolidated and balanced programme to include all those elements the IRC hopes to cover in accordance with its appointed task. In the course of the year, as a result of the further expansion of the IRC and the above-mentioned international discussions, five points emerged as guidelines for future development:

1. There is a need for an international centre which will initiate, develop and coordinate programmes relating to water supply and sanitation and which will work in close cooperation with representatives from developing countries and various national and international bodies and organizations.
2. The programme to be developed will have to be of an inter-disciplinary nature and pay attention to technical, socio-economic and public health aspects. In developing countries these elements have to be fitted into a wider framework of socio-economic development. It is important that a significant part of the programmes is aimed at rural areas and the fringes of cities in developing countries.
3. A key factor in the operation of an international centre such as the IRC is the part played by national and regional institutes in the network of contacts. The success of the IRC will depend largely on the active participation of carefully selected centres in this network.
4. There is also a great need for coordination programmes relating to research and development activities in western countries. Active participation by the IRC in these programmes is not only desirable, it is absolutely essential if the centre itself is to develop and prosper.
5. The IRC will acquire much greater flexibility and will be capable of quicker reactions if it can achieve a more independent status than that of a government department. With regard to this point, it can be said that the IRC has come a step nearer to becoming an independent foundation and can be expected to change its status in the very near future.

1.2 Ad Hoc Working Group on Rural Potable Water Supply and Sanitation

This group was formed in April 1974 by the World Health Organization (WHO), the U.N. Development Programme (UNDP), the World Bank (IBRD), the U.N. Children's Fund (UNICEF), the U.N. Environment Programme (UNEP), the Organization of Economic Cooperation and Development (OECD) and the International Development Research Centre (IDRC) in Canada. Since then the U.N. and the U.N. Food and Agriculture Organization (FAO) have also joined the Group. Its aim is to take joint action, with help from donor countries, to promote the improvement of water supply and sewage disposal in rural and urban fringe areas in developing countries and to develop programmes accordingly. It has been intended that an important role be given to a system of centres closely collaborating with regard to the exchange of information, training and research. This system would consist of national centres (possibly more than one per country), regional centres (e.g. in Latin America, West Africa, South Asia, etc.) and an international centre. The Netherlands were asked whether the IRC could function as an international centre for these new activities, for which the necessary extra funds would be made available. The IRC's current work on certain general international aspects of water supply would nevertheless continue.



Contaminated Sources of Water

A meeting was held in Geneva in November 1975, the purpose of which was to discuss the action programme prepared by the Ad Hoc Working Group with a group of potential donor countries and developing countries. It was attended by the 7 member organizations of the Group, representatives from 22 countries and 5 international organizations (including the European Economic Commission (EEC), the FAO and the U.N.) During the meeting it was recommended unanimously that the Ad Hoc Working Group should continue with its preparatory work and adapt earlier proposals in the light of certain wishes and criticism that had been expressed. It was emphasized that another meeting of this kind should be held as soon as appropriate. Those present at the meeting expressed their satisfaction at the Dutch delegation's announcement that the IRC would be willing, on request, to make its experience available in connection with the preparatory work that still had to be done. Further consultations about the official role of the IRC within this Group are continuing.

In connection with preparatory activities of the Ad Hoc Working Group visits were paid during the year to Switzerland (Geneva), the U.S.A. (New York) and Canada (Ottawa). In addition, on the initiative of the World Health Organization, a conference of experts was held on the premises of the IRC.

1.3 Programme development

As a result of continuing discussions in close collaboration with the World Health Organization on the one hand and the above mentioned Ad Hoc Working Group on Rural Potable Water Supply and Sanitation the other hand, the expertise of the IRC in relation to the problems of water supply in developing countries increased considerably in the course of the year under review. At the same time, policies as to the functions and desired programme of the IRC were refined.

With respect to water supply programmes in developing countries in general, three distinct stages can be distinguished. The first stage

consists of a series of activities which can be said to be of a basic or infrastructural nature. These include general activities directed to the development of a motivation to devote funds and manpower to water supply; exchange information; evaluation and transfer of suitable methods and technologies adapted to the prevailing conditions; training of personnel; health education and involvement of the local population; etc. The second stage concerns sector and feasibility studies and actual implementation of water supply projects. The third stage includes follow-up to the implementation stage; further training; assistance as to certain aspects of water supply management, operation and maintenance and continual exchange of information. The first stage is the basis for the second stage; the third stage consolidates the other two stages. The second stage aims at solving problems in a particular situation. The first and third stages are of a more general nature and can be carried out effectively by means of regional and international cooperation. Although technological investigations and the transfer of methods and techniques form an essential part of these programmes, certain aspects are not of a technical nature.

It is obvious that the programmes that come into the first stage are of an interdisciplinary nature and often will have to be discussed on a multi-sectoral basis. Water supply programmes have to be part of a general development in which sociological, economic, public health and other aspects play an important role. The ultimate aim of such programmes should be "self-reliance" in the developing countries.

To achieve self-reliance it is essential to strengthen or set-up national and regional institutes and organizations. This means that as far as possible work should be carried out in the developing countries themselves in which the IRC could perform a stimulating and coordinating role. Programmes of this kind have to be worked out in collaboration between countries, directly or indirectly working on water supply programmes. It is essential that sufficient attention be given to the coordination with multi-national and

national programmes and that activities would develop in accordance with the basic principles of national policy. The IRC's network of hundreds of personal contacts simplifies this aspect; journeys are undertaken regularly to maintain contacts.

The desire for efficient and effective use of available manpower and funds requires activities which may well have a kind of snowball effect. The continuous increase in population and the desire to keep pace with it by constructing adequate water supply facilities demands a rapid increase in activities at local level. Programmes will be successful if they are designed for specific groups of people among whom the effects are likely to spread by itself. Very often in developing countries these groups will consist of the poorer sections of the population.



A Village Water Well

1.4 The IRC from a bird's eye view

A number of the IRC programmes developed in close cooperation with developing countries include activities of a technical nature and use an integral approach in which all the above mentioned aspects play a part. In 1975 a start was made with the development of an international programme relating to the evaluation, adaptation and demonstration of currently available handpumps; programmes relating to slow sand filtration and public standpipes were extended. These parts of the programme are a first step in each of the main stages of providing a water supply system, i.e. water catchment, water treatment and water distribution, specially suited to specific situations in developing countries.

Broadly speaking, these programmes can be divided into three phases. The first phase involves amassing bibliographical information from all over the world and learning from the results of practical experiences. Then meetings are organized to ensure an integrated feedback of information and the collected information is published. During the second phase selected methods and systems are tested both in the laboratory and in the field. The third phase includes demonstration projects, socio-economic studies, educational and training programmes and seminars for policy makers. In this way much information is transferred to the people in the developing countries. A last but naturally important step during this phase is putting the ideas into practise.

Other long-term activities of the IRC are of a more general nature. The first is a programme on appropriate technologies, which in a sense gave rise to the three above mentioned technical programmes and in the framework of which more programmes will follow.

The second is concerned with information exchange services. The IRC Newsletter and first attempts to deal with requests for information are the first specific activities of the IRC within this framework, in cooperation with various other organizations. There was a specific development in the year under review, again within the framework of the

previously mentioned Ad Hoc Working Group on Rural Potable Water Supply and Sanitation, in which the IRC was asked to play a leading part in the development of an international system for exchange of information on water supply and sanitation.

With regard to training, a programme is in development for the systematic training of instructors in developing countries based on a study of the requirements and facilities in such countries. Another training programme which is being developed is a series of regional seminars for executive engineers in developing countries. These seminars will be organized in the first instance in cooperation with the International Water Supply Association.

A fourth general programme concerns the possible health hazards involved in the re-use of waste water. This programme is primarily aimed at the industrialized world, although it is generally assumed that in the long term this subject will become significant in the arid areas of developing countries. This programme includes the coordination of research activities and studies on the subject. The programme puts emphasis on the stimulation and promotion of new studies based on worldwide cooperation, exchange of information and other similar activities.

Clearly the nature of the work done by the IRC will lead to a steady increase in its range of tasks. It is assumed that the IRC programme can be further extended as a result of the participation of entities which will supply the necessary finance for specific parts of the programme. In fact there has been marked growth of this kind in the course of the year under review. Chapter 2 deals in greater details with specific parts of the programme.

1.5 The Network

It is obvious that in order to carry out the above mentioned activities the IRC requires the cooperation of persons, institutions and organizations specializing in a great variety of subjects and

representing various interests and programmes. The IRC has learnt from experience that two different kinds of communication systems, or networks, can be distinguished:

1. An informal network of contacts with existing institutes or persons who in certain fields and according to the subject of study cooperate in specific programmes provided these are within their field of competence. The structure of this network may vary from time to time. The tasks of the network include:

1. collecting information on specific topics;
2. carrying out particular investigations;
3. cooperating in certain types of training programmes;
4. compiling specific handbooks and manuals;
5. carrying out sociological and public health studies;
6. developing particular projects; etc.

The existence of this network means that studies and activities can be developed through collaboration. In this way duplication of effort is avoided and energy is effectively channelled.

2. A formal network of contacts on a continuous basis with existing institutes which are designated as official regional or national centres of the region or country concerned and which interact with national and local water supply programmes. This network, which much have an adequate geographical coverage, in fact forms the backbone of the network system by means of which programmes are initiated, developed and executed. Also, this system ensures a certain amount of feedback which in turn leads to increased effectiveness of the programmes.

The latter network of contacts is intended to be of a permanent nature and its structure does not often change, although a certain amount of adaptation may be necessary from time to time. The purpose of this network of contacts is as follows:

1. to initiate and prepare international and regional programmes;
2. to carry out these programmes, with the assistance of other institutes when necessary;

3. to ensure a flow of information to the area concerned and to promote the application of results of international and regional programmes by working closely with the various national and local development programmes;
4. to ensure a feedback of experience and information.

To these aims can be added the following general functions:

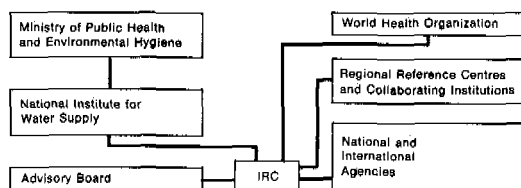
1. the collection and exchange of information;
2. dealing with matters affecting international and regional centres on the one hand and local centres on the other hand;
3. the supply of information to the international centre or regional centres about programmes carried out in a particular country;
4. the ensuring of government participation or application of the results of programmes to national programmes.

This means that at national level the network of contacts will consist of institutions which are focal points in their own country and which also, as far as possible, form a link between the IRC and regional centres on the one hand and the interest of their own country on the other hand. Special attention must be given to the selection and development of existing national centres. They must be capable of giving active cooperation and making contributions to national development programmes and they must be designated specially as a result of close consultation with government organizations. They will also have a part to play in improving contacts within their own country.

By means of its various programmes and activities the IRC is trying to widen its contacts still further and is gaining valuable experience in international cooperation. In connection with a further extension of the network, visits were paid in 1975 to various countries including Lebanon, Iran, Afghanistan, India and Sri Lanka. The annex of this report contains a survey of the IRC's current network of contacts.

1.6 The Centre's links, budget and staff formation

The organization of the IRC can be pictured as follows:



The Netherlands Ministry of Public Health and Environmental Hygiene and the Ministry of Foreign Affairs (foreign aid programme) provide the IRC with funds; apart from funds for specific projects the World Health Organization gives a contribution of \$10,000.- a year. The regular budget for the IRC was \$400,000.- in 1975; the total budget, including programme funds, amounted to approx. \$600,000.-.

The IRC collaborates closely with the Community Water Supply and Sanitation Unit, Division of Environmental Health of WHO. There are also contacts with a number of other WHO units and with the WHO Regional Offices. In addition to limited financial aid, the IRC also receives scientific and informative support and cooperation from the organization.

In the performance of the IRC's programme good use is made of the know-how of the technical scientific and supporting departments of the National Institute for Water Supply and of the facilities available.

In addition to the IRC, the network embraces two centres, the duties of which are similar to those of the IRC, but on a regional scale: viz.:

- the National Environmental Engineering Research Institute, in Nagpur, India;
- the Pan American Centre for Sanitary Engineering and Environmental Sciences (CEPIS), in Lima, Peru.

Other regional centres with which close working contacts are maintained:

- the Inter-african Committee of Hydraulic Studies (CIEH), at Ouagadougou, Upper Volta;
- the State Company for Pollution Control and the Protection of the Environment (CETESB), in Sao Paulo, Brazil.

The network further consists of more than 30 collaborating institutions which can be defined as institutions dealing with matters of community water supply which are prepared to and have the facilities for collaboration within the framework of an international programme by means of technical work, training and exchange of information and have contact with and recourse to organizations and national agencies active in the relevant field in their own country. A list of regional reference centres and collaborating institutions is given in annex 2.

The Advisory Board of the IRC has an advisory function and consists of representatives of bodies and institutions with programmes in the water supply field, both within and outside the Netherlands and with which the IRC has direct or indirect relations. Representatives of the following bodies are members of the Board:

- a. the World Health Organization;
- b. the Netherlands Ministry of Public Health and Environmental Hygiene;
- c. the Netherlands Waterworks Association;
- d. the Testing and Research Institute of the Netherlands Waterundertakings, KIWA Ltd.;
- e. the Delft University of Technology, Chair for Civil Sanitary Engineering;
- f. International Courses in Hydraulic and Sanitary Engineering, Delft;
- g. the Netherlands Research Institute for Public Health Engineering TNO;
- h. the Netherlands National Institute for Public Health;
- i. the Committees on Problems in Developing Countries and on Education and Training of the International Water Supply Association;
- j. representatives of collaborating institutions in developing countries have a permanent invitation to participate in the Advisory Board Board meetings in order to gear recommendations to immediate needs, especially in developing countries.

At present the permanent staff of the Centre consists of 12 persons: a Manager, 5 Engineers, an Information Officer, a Documentalist and 4 Administrative Assistants. Additionally, frequent use is made of consultants on specific topics.

2. DESCRIPTION OF IRC PROGRAMMES

2.1 Appropriate Technologies

Various activities began in connection with the study programme entitled "Appropriate Technologies" which advises developing countries to use simple techniques for water supply and sewage disposal and adapt these to their own conditions. The first step was to send an IRC questionnaire to various countries throughout the world. The idea behind this was to collect hitherto unpublished information about "practical solutions to problems connected with the provision of drinking water supply and sewage disposal in developing countries". In this way the results of sound, practical experience became available for inclusion in a preliminary report.

It is expected that wide-scale distribution of this report will act as a stimulus in certain areas where means are limited and the water supply is inadequate. It is hoped that those people who read the preliminary report, will then want to describe their own experiences. Their contributions can then be included in the final report.

Contacts were established with the University of Oklahoma which for some time now has been conducting an investigation into "Low Cost Water and Waste Water Treatment in Developing Countries". Supported by the U. S. Agency for International Development, the IRC and the University convened an International Workshop on "Appropriate Techniques for the Treatment of Water and Waste Water in Developing Countries" in Voorburg from the 17th to 22nd November, 1975. The conference was attended by 35 experts from industrialized and developing countries and by representatives of international organizations. They discussed the nature of the obstacles preventing a quicker provision of water supplies and sewage disposal facilities in developing countries and the possible use of simple techniques adapted to local conditions. The experts were asked to cast their critical eye over a number of results of studies and investigations and to indicate the direction in which they thought

further action should be taken. The main subjects discussed at the conference were:

- the various reactions to the above mentioned IRC-questionnaire;
- a state-of-the-art by Prof. L. Huisman of the Delft University of Technology as regards "Water treatment for rural areas in developing countries". It included a bibliography on the subject compiled by a group of students;
- a study undertaken by the Universities of Oklahoma and Texas of methods of waste water treatment and waste disposal in developing countries. In relation to this study a bibliography was compiled by a student of the Delft University of Technology;
- a mathematical predictive model which has been developed under the guidance of Prof. G.W. Reid of the University of Oklahoma and which was intended to be a tool for predicting the best type of system for treating drinking water and disposal of waste water in particular circumstances.



An Appropriate Water Supply

The conference produced 18 recommendations for subjects of study in the field of water supply, waste disposal and with regard to a number of important socio-economic conditions, all of which should stimulate the correct use of appropriate techniques. A number of these recommendations relate to matters such as:

- Simple disinfection methods
- The planning of small supplies of drinking water for use in rural areas which can be constructed with local materials, with a minimum number of pipes, mechanical parts and special components
- Simple methods for lifting ground water.
- The use of slow sand filters
- Methods of artificial recharge
- Oxidation ponds
- Excreta disposal in rural areas
- Training courses and seminars
- Development of a system for the exchange of information.

The IRC will play a prominent part in the implementation of these recommendations and in the follow-up.

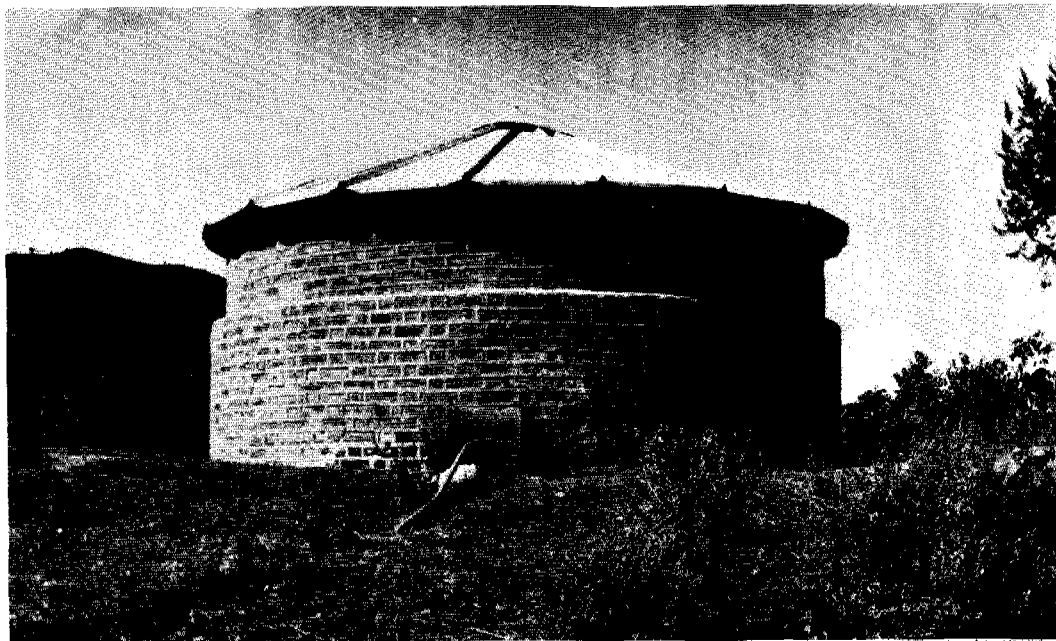
Prior to the workshop, the IRC was represented at a conference in Berlin in September, 1975 on the subject of "Appropriate Technologies for Semi-Arid Areas: Wind and Solar Energy for Water Supply". The present state of technology in regard to distillation by solar energy is such that there is still much work to be done if solutions are to be found that are economically viable. Much careful consideration must be given to the problems of adaptation to local conditions. In certain cases it may be possible to lift water by wind driven pumps.

Within the framework of the programme in question contacts will be established in the coming year with institutes and organizations which have an active programme in the field of appropriate technology. In addition, a start will be made with the implementation of recommendations put forward by the Workshop particularly in the field of small-scale water supply systems.

2.2 Slow Sand Filtration

The objective of this research and demonstration programme is to promote the application of slow sand filtration for the biological treatment of drinking water in developing countries. The programme is being financed by the Technical Assistance Department of the Ministry of Foreign Affairs.

The programme is divided into two stages. In the first preliminary stage various aspects of biological sand filtration are studied closely in several developing countries on the basis of an internationally coordinated programme for applied research. The second stage aims at setting up various village installations, on which detailed investigations will be carried out under local conditions and which will be used for demonstrating the suitability and applicability of slow sand filtration. Following this, implementation programmes will be initiated in many countries, leading ultimately to the construction of slow sand filters on a large scale.



A Slow Sand Filter in a Rural Area

At the beginning of the year under review, an overall programme was developed to coordinate the investigations of the first stage of the programme. The programme includes field investigations, experiments at pilot installations, literature studies and additional organizational activities. Several institutes participating in the project have made a substantial contribution to the development of the programme.

An advisory group has been formed to guide and support the technical aspects of the programme. At the first meeting of this group attention was paid to the general set-up of the programme and to a more detailed implementation of the programme of investigations for the first stage.

In order to coordinate activities in the various participating countries visits were paid to Ghana, India, Kenya, Sudan, Thailand and Turkey. The purpose of these visits was to find out whether it would be possible for these countries to participate in this international cooperation programme and to work out the details in joint consultations. Visits of a more exploratory nature were paid to Afghanistan, Indonesia, Sri Lanka and England.

Following the preliminary consultations, definite agreements regarding the first stage of the programme were reached with four institutes: the University of Science and Technology in Kumasi, Ghana, the National Environmental Engineering Research Institute in Nagpur, India, the University of Nairobi, Kenya and the Asian Institute of Technology in Bangkok, Thailand. As far as the University of Khartoum in Sudan and the Institute for Public Health Engineering Research in Lahore, Pakistan are concerned, consultations regarding their participation in the programme have already reached an advanced stage; similar contacts have also been established with some institutes in South America.

As far as the scope of the investigations is concerned, the agreements have certain aspects in common:

- a study of the slow sand filtration process under local conditions

to find out to what extent it can improve the quality of the water and remove organic matter, turbidity and specific bacterial and chemical impurities;

- an investigation concerning the extent to which the biological filtering process is affected by factors such as filtration rate, filter media, shading from direct sunlight and seasonal variations of the quality and temperature of the raw water;
- an inventory of simple pre-treatment methods such as sedimentation and filtering through coarser materials;
- a detailed investigation on the possibility of the slow sand filtration process to function as a reliable biological purification system, possibly in conjunction with a suitable pre-treatment process;
- finding the best way of constructing, operating and maintaining the small type of sand filters bearing in mind local conditions and the possible application of local techniques and indigenous materials.

For the purpose of these investigations pilot installations were set up in various countries. At the same time it was emphasized how important it was to examine the performance of existing installations, particularly with regard to non-technical aspects that are directly linked with local conditions. All investigations are actually being carried out in and by the developing countries concerned.

The promotion of national and international cooperation between research institutes and various executive entities is an integral part of the programme. Such cooperation will ensure that each country makes the optimal contribution. A start has been made with setting up a bibliography and the international exchange of information. Also some thought has already been given to the development of a proposal for the second phase of the programme. The second stage will focus on practical demonstrations and the transfer of know-how. Next to this technical aspects such as the development of a suitable method for purifying drinking water using sand filtration and the formulation of appropriate criteria for simple construction, operation and maintenance, at this stage, also a systematic approach to the introduction of water supplies into rural communities in developing

countries will be developed. An essential element of the integral approach is the "preparation of the soil", of which education, motivation and training are important aspects.

This year again there has been an encouraging increase of interest in the slow sand filtration programme on the part of the international organizations and technical experts. The exchange of ideas between those engaged on project development activities of the Ad Hoc Working Group on Rural Potable Water Supply and Sanitation and those working on the IRC's slow sand filtration programme has proved to be very fruitful.

2.3 Public Standposts for Developing Countries

The World Bank has commissioned and is partly financing a study of the technical, financial, operational and social aspects of the application and use of communal watering points in developing countries. The study which began already last year is progressing well.

Millions of people in the third world, particularly those who live in the country and in the slums of urban areas have to live without a regular supply of hygienic, reliable drinking water. As a result the health of these people is seriously threatened. Special attention must be given to improving this situation. It should be realized however, that because of the technical and financial constraints prevailing in many developing countries, simple and appropriate constructions should be selected. Furthermore, one must opt for solutions best suited to local conditions; in many cases public water taps can be regarded as a very acceptable form of water supply.

The study undertaken by the IRC contains a list of water tap systems which are currently in use or which have been developed. It also includes planning advice with regard to a comprehensive water supply system (including a drainage system) and a series of recommendations relating to planning, technology, control, management and maintenance.

The Consulting Engineering Bureau IWACO B.V., in Rotterdam was asked by the IRC to carry out general field studies in about 15 countries in Asia, Africa and Latin America, whereas the Royal Tropical Institute, Amsterdam and the Ir. F. Zandvoort Townplanning Consultants, Hendrik Ido Ambacht, the Netherlands, carried out some sociological studies in Kenya and Zambia.

Reports on the various investigations and studies were collected and incorporated in a draft version of the final report which was completed towards the end of the year under review.

One of the World Bank's main reasons for asking the IRC to launch this study was the desire to prevent water being wasted. It was thought that the development of an effective tap might be a solution. However, as expected, the problems were not really of a technical nature. There is likely to be just as much water wasted with the more sophisticated tap systems as there is with the ordinary screw tap. The most effective way of preventing wastage is to appoint an attendant or a water seller. The best guarantee for the success of these systems is good maintenance, correct usage and proper training of the supervisor and education of the user.



Use of Public Taps

It is intended that after the report has passed through the hands of experts working in the field and has been adapted according to the comments, the final version will be ready by the middle of 1976. This final version will then be distributed in the form of an IRC publication. While compiling the report it was felt that some more detailed studies on various, also non-technical aspects of this type of water supply may be useful. Thought is already being given to carrying out more extensive investigations of successful schemes which are satisfactory not only in a technical sense but which fit in easily with the behaviour pattern and requirements of the user. There might also be a further investigation into the best ways of managing and controlling central water taps.

2.4 Handpumps for Developing Countries

Piped supplies of drinking water are known in urban areas of developing countries, but a great many people, especially in the rural areas, are dependent on other sources such as ground water drawn from wells by means of simple water lifting devices. This type of water supply is likely to serve rural villagers for many years to come.

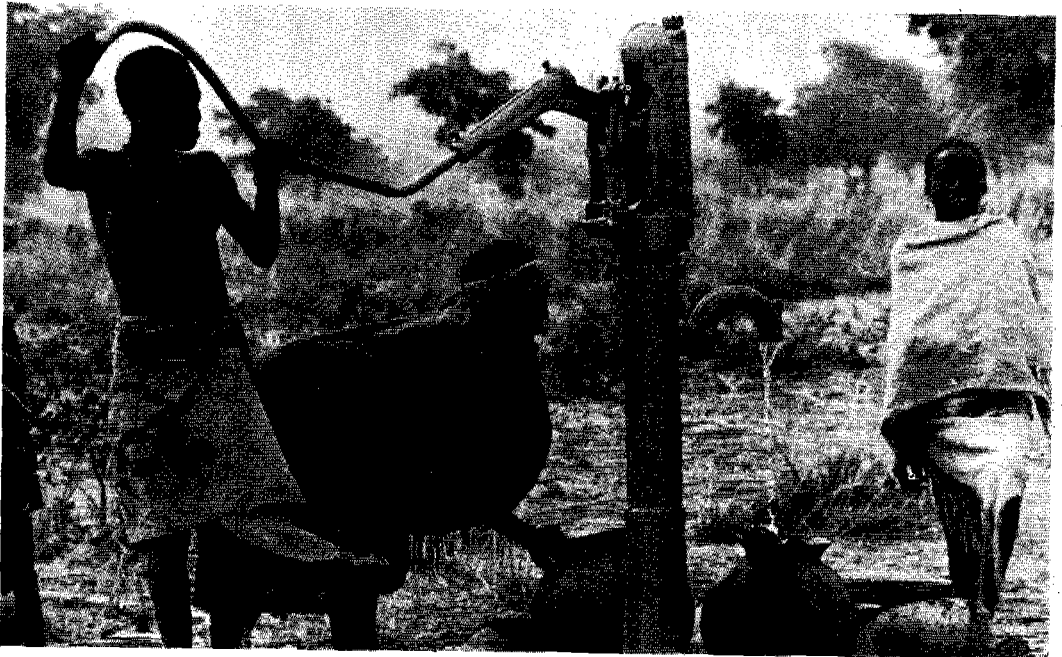
One of the best ways of improving living conditions in the rural areas will be the provision of reliable, sturdy handpumps ensuring an unsophisticated yet effective domestic water supply.

Experiences with handpumps presently in use in various countries are not satisfactory. Generally, the pumps prove unable to stand up to the intensive use - sometimes misuse - they are subjected to in rural villages where up to 500 people may depend on a single unit. In some developing countries situations exist where at any one time 30% or more of the handpumps are out of order and awaiting major repair. Better maintenance would contribute greatly to improve performance, but appears hard to achieve.

Over the last few years, a number of major studies and investigations have been made on handpump performance, both in developing and industrialized countries. Critical factors of design, manufacture and maintenance have been considered more carefully than before.

In consultation with international organizations such as the World Health Organization (WHO), the U.N. Children's Fund (UNICEF), the U.N. Environment Programme (UNEP), the World Bank (IBRD) and the International Development Research Centre (IDRC), IRC has initiated a coordinative programme to collect, and disseminate information the handpump study projects, investigations and test results of the organizations and agencies involved. The objective is to facilitate the flow of information to the benefit of all working on handpump development and rural water supply programmes. IRC's work in this field is financially supported by UNEP and carried out with major WHO assistance.

The working relationship with the U.N. Environment Programme and the World Health Organization was defined and set out in a Technical Services



The Testing of a Sturdy Hand Pump

Agreement. Towards the end of 1975 consultations about the detailed implementation of this agreement were completed and the IRC was given permission to carry out the proposed work, with UNEP and WHO providing general guidance. The first part of the programme is primarily concerned with compiling a manual entitled: "Handbook on Handpumps". This manual will contain extensive information received by the IRC from all parts of the world. The IRC has entrusted the task of sorting, classifying and re-writing this mass of material to Dr. F.E. McJunkin, of the U.S.A., who has extensive knowledge and experience of handpumps. A large number of international organizations and developing countries will be asked to evaluate the draft manual. For that purpose a meeting of experts will be arranged in 1976. It is intended that during the second stage of the programme certain pumps selected at the meeting will be evaluated and demonstrated.

2.5 Health Aspects of direct and indirect re-use of waste water for human consumption

IRC aims at monitoring relevant activities in community water supply worldwide, in order to trace gaps in knowledge, technology, information and data. From the continuous information exchange and contacts within the IRC network and outside, numerous groups and organizations are known to be either involved in or responsible for research and studies on all aspects of the use of contaminated surface waters for public supplies, including re-use of waste water. Especially important are health effects relating to the use of these low-quality waters for human consumption.

Health studies and epidemiological research relating to waste water re-use have not paralleled the developments in waste water treatment technology. At the Meeting of Directors of Institutions Collaborating with WHO International Reference Centre for Community Water Supply at Bilthoven, the Netherlands, in April 1973, a proposal was submitted concerning the review of research required to establish confidence in the potable re-use of waste water. Also at the WHO meeting of Experts on Re-use of Effluents: "Methods of waste water treatment and health

safeguards", similar recommendations were put forward. Since, the IRC has found an increasing need for international expert meeting to review the present research requirements. Consequently, a group of experts was convened in Amsterdam from 13 to 16 January, 1975 to review the existing knowledge and the research and studies being carried out to supplement it. Participating in this International Working Meeting were over 20 experts in the field of analytical chemistry, micro-biology, toxicology and epidemiology, and representatives of various international organizations.

The conference generally was successful in meeting the following objectives:

- A. The review of current knowledge and research in the field of analytical chemistry, micro-biology, toxicology and epidemiology, relating to the health effects of waste water re-use.
- B. The identification of research urgently needed and the formulation of research projects and activities for implementation within an internationally coordinated and financed framework.

A resolution was adopted by the meeting recommending that:

"The IRC assume the role of international coordinating agent for the study of health effects of direct and indirect re-use of waste water for human consumption".

The report of the expert meeting appeared as Technical Paper Series Number 7 of the IRC. It was mailed widely and extremely well-received. Very regular requests for the report still come in at the IRC.

A number of high priority research activities and projects were identified by the group of experts. Amongst the research proposals assigned priority allocation were health studies of populations in areas receiving treated polluted river waters as compared to treated water from high-quality sources. This was considered very useful research relating to waste water re-use, especially in respect of the health effects of long term exposure to organic pollutants in drinking water.

As a follow-up to this proposal, Professor H.I. Shoval of the Hebrew

University - Haddassah Medical School, Jerusalem, served as a consultant with the IRC in the Hague from 22nd July to 15th August. A detailed draft proposal for an "International Cooperative Health Study of Communities Consuming Water Derived from Contaminated River Water" resulted from his work. Valuable contacts with interested research institutions and public health officials, both national and international, were established.

The IRC work of developing research proposals as well as the associated methodology, required a specialized contribution with respect to the identification of trace organic compounds in water. The health effects of organics have assumed great importance in recent years, as more polluted raw waters are increasingly used as sources for public supplies. Analytical techniques for determining the water quality, also in respect of non-volatile organic pollutants, are required for epidemiological studies, if these are to produce reliable findings. At the end of 1975, contractual arrangements were made for Dr. A.W. Garrison of the U.S. Environmental Protection Agency's Environmental Research Laboratory, Athens, Ga. to work with the IRC as a consultant from 19th January to 20th February 1976. Besides his specialized work, Dr. Garrison also assisted the IRC in the drafting of a programme intended to support a compilation of data on the occurrence of organics in water as well as providing accessibility thereof.

2.6 Training

Many more water supply systems could be set up in developing countries and progress could be speeded up considerably, were it not for the shortage of trained personnel. It is essential that donor countries, international organizations and other centres, realize the implications of this. By developing and making available systematic training programmes relating to the public water supply, the IRC will try, in its future programme, to provide developing countries with tools enabling them to build up their own effective training facilities on a regional and national level. In order to gain a general picture of training requirements in the various countries it will be necessary



Instruction on Disinfection of a Village Well

in the first instance to collect from these developing countries reliable estimates about the number of people available to work in the water supply services and the number likely to be needed in the future. In addition an inventory will have to be made of the training facilities already available; only then will it be possible to make specific plans to cover the stated requirements of the developing countries.

It is intended to start the training programme on two fronts. On the one hand training seminars will be organized, if possible in the developing countries themselves. These seminars will facilitate the introduction of effective methods and techniques for training people to work in the water supply services. Before and during these seminars the national authorities must be approached to ensure that they will give their full cooperation. On the other hand several interested countries will be designated as places in which a systematic training programme can be developed and tested in close cooperation with local authorities and organizations. The results, which can then be passed on via the above mentioned seminars or through direct contacts with other countries, will be useful for the development of new national training programmes.

A number of contacts were established with bodies and persons engaged in training water supply personnel on a national or international basis. And a start has been made with the collection of information about training facilities currently available in this field.

The International Water Supply Association (IWSA) is arranging a conference in Amsterdam in September 1976. Just prior to this conference the IRC is organizing its first training seminar in the same city which will be attended by representatives from developing countries. The place and time of the conference have been specially chosen so that the representatives from the developing countries can also attend the International Water Supply Congress. Some preliminary work has already been done in connection with defining the aims of the seminar and the contents of the programme.

In the course of the year under review the IRC had a film made for training purposes and this will be shown at the Habitat Conference in Vancouver in 1976.

In October a training course was organized on behalf of the World Health Organization on the subject of "Collection, analysis and evaluation of data for community water supply and wastes disposal services".

The course was attended by representatives from developing countries. Among the institutions and organizations which cooperated and gave assistance were: the Testing and Research Institute of the Netherlands Waterundertakings KIWA Ltd., University of Texas, Catchment Company "Brabantsche Biesbosch" and the International Reference Centre for Wastes Disposal.

2.7 Twinning

For some years now the IRC has been trying to establish bilateral contacts between water supply companies or organizations in developing countries and industrialized countries so that both sides can gain a better understanding of the circumstances which prevail in the countries of their partner undertaking and a better understanding of the reasons for the choice of specific methods and techniques for use in their specific situations. When there is cooperation of this kind experience and advice can be exchanged at all levels and "on the job" training becomes possible in the organization of the twinning partner.

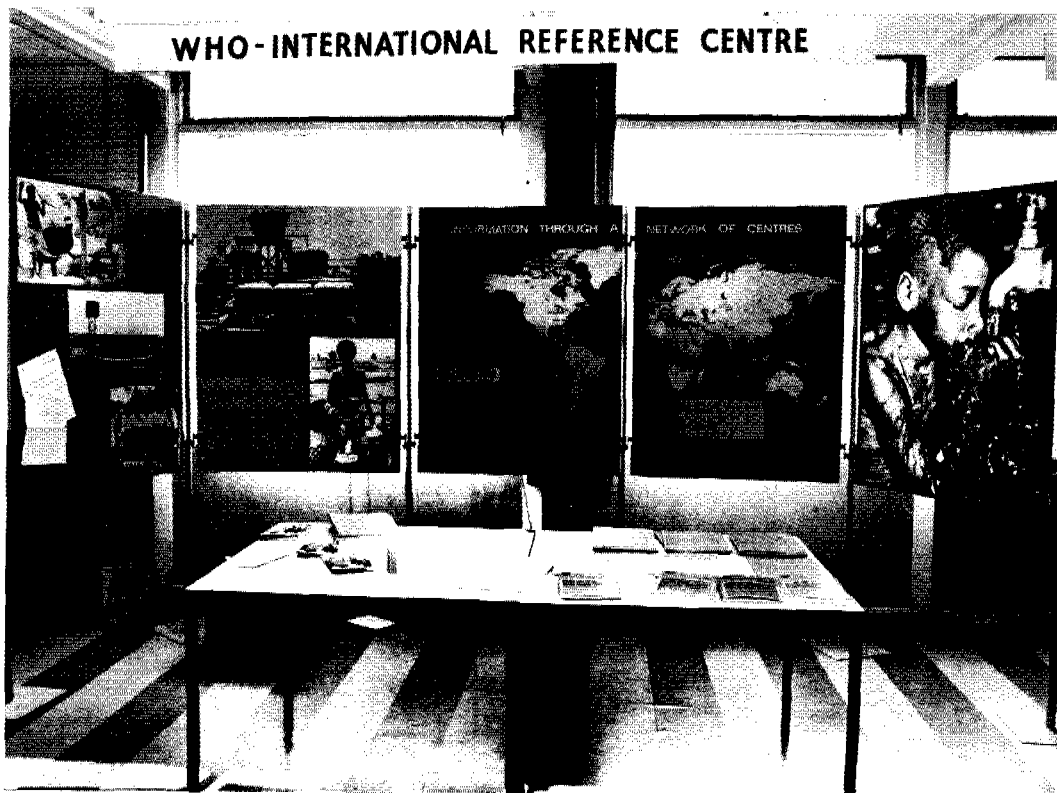
Some Dutch and Belgian Water Works have been twinned with African ones. Attempts must also be made to find partners for undertakings in Asia.

2.8 Programme on International Exchange of Information

In the past few years the IRC has been carrying out, on a modest scale, activities in the information field. In 1975, as a result of the work done by the previously mentioned Ad Hoc Working Group on Rural Potable

Water Supply and Sanitation an operational programme was prepared concerning the global exchange of information on "know-how" and experience relating to drinking water supplies and waste water treatment in and on behalf of developing countries. This programme may also be of great value to the industrialized countries. At the end of the period under review a contract between the IRC and the International Development Research Centre in Canada, was in preparation.

Next to a further extending and improving of IRC's information services, special attention was given to the collection of relevant information.



International Exchange of Information on Water Supply

2.9 The Newsletter

This year, too, the IRC regularly received requests for its Newsletter and extra copies had to be printed (English: 2800, French: 2350). The Spanish edition was again published by the Pan American Centre for Sanitary Engineering and Environmental Sciences (CEPIS), in Lima, Peru. This Centre sees to the distribution, mainly in Latin America and has a circulation of 5000 copies.

IRC news items have been referred to in various technical and scientific journals; in this way the IRC has enjoyed increased publicity. Among the journals which have featured IRC reports for the first time are: Eau de Quebec; Gas, Wasser und Abwasser; Appropriate Technology; Journal of the American Water Works Association; De Ingenieur; Noticias CEPIS.

The numerous requests for further information following reports in the Newsletter show the need for an information bulletin giving details of new developments, publications and conferences relating to the supply of drinking water. The fact that so many people would like the Newsletter to refer to certain developments or publications shows the great appreciation of the Newsletter as a news medium.

3. SUPPORTING SECTIONS

3.1 Library and Cataloguing

The staff made frequent use of the library when seeking answers to questions from other organizations. Also from elsewhere there was often a call for books and field reports, that are difficult to obtain elsewhere.

The stock of books and other publications was increased, so that the library now contains over 200 volumes and publications. The aim is to collect documents specifically directed to problems in developing countries, and those which are hard to come by. The collection now includes:

- 140 annual reports
- 900 research project reports
- 80 bibliographies
- 100 reports on conferences, congresses and symposia
- 350 photocopies of articles
- + 500 other publications.

The fact that the IRC may be involved in building up a global information programme has meant that changes have had to be made in the cataloguing system. The system the library has adopted is a simple one that can be expanded and extended to incorporate the international information exchange activities as soon as the programme becomes operations.

The IRC received 60 different periodicals, often in exchange for its Newsletter. These periodicals related mainly to water supply and cooperation in development work and some were newsletter of international organizations.

3.2 Administration

The administrative department is an essential part of the IRC. It is important that the department runs smoothly, with regard to the various

tasks to perform such as answering letters, publishing newsletters, organizing specific activities linked with the various programmes, locating documents and making numerous travel arrangements, which are all characterized by their intensity.

In the year under review a total of 3500 letters have been received and despatched.

In view of the increase in staff and the considerable extension of the work, a number of measures and reorganizations had to be taken affecting internal organization - which resulted in improved communication and teamwork. First attempts were made to coordinate diverse matters relating to various programmes; these ranged from meetings, travels, consultants, contacts with collaborating institutions, finance and contracts and terms of reference, etc. Further improvement in the organization and extension of the administrative department of the IRC is likely to be continued in the coming year.



Locally Manufactured Hand Pump

VISITORS

<u>Country/Name</u>	<u>Organization</u>	<u>Subject</u>
<u>Afghanistan</u>		
Mr. N.M. Sarij	Water Supply Authority Kabul	Possible cooperation with IRC
<u>Algeria</u>		
Dr. Ahmed Aroua	Institute for Public Health Ministry of Public Health El-Madania	Introduction to IRC
<u>Canada</u>		
Dr. S. Barabas	Canada Centre for Inland Waters, Environment Canada, Burlington, Canada	Exchange of thoughts as to setting up of a Collaborating Centre
Mr. M. Brandreth	International Development Research Centre, Information Sciences, Ottawa, Ontario	IRC information exchange system
Dr. M. McGarry	International Development Research Centre, Population and Health Sciences, Ottawa, Ontario	Possible funding of research project in developing countries
Mr. M. Mercier	International Development Research Centre, Information Sciences, Ottawa, Ontario	Programme of Ad Hoc Working Group on Rural Potable Water Supply and Sanitation
<u>Federal Republic of Germany</u>		
Dr. Ing. K.E. Schickhardt	Zeppelinheim/Frankfurt	Community water supply in rural areas
<u>Great Britain</u>		
Mr. H.W. Barker	IWSA Standing Committee on Education and Training of Waterworks Personnel	Consultation on cooperative training programmes.
Mr. R. Fairall	IWSA Standing Committee on Problems in Developing Countries	IRC activities on behalf of the Standing Committee

<u>Country/Name</u>	<u>Organization</u>	<u>Subject</u>
<u>India</u>		
Dr. I.C. Agarwal	Motilal Nehru Regional Engineering College, Allahabad	Participation in the Slow Sand Filtration Project
Dr. H.C. Arora	National Environmental Engineering Research Institute, Kanpur Zonal Laboratory, Kanpur	Introduction to IRC
Mr. S.K. Gadkari	National Environmental Engineering Research Institute, Nagpur	Participation in the Slow Sand Filtration Project
Mr. T.G. Gopalakrishnan	Tamil Nadu Water Supply and Drainage Board, Madras	Introduction to IRC
Mr. J. Narain	Water and Sewage Disposal Works, New Delhi	Introduction to IRC
Mr. S.A. Swamy	Water and Sewage Disposal Works, New Delhi	Introduction to IRC
Mr. S.K. Tyagi	Central Ground Water Board, Ministry of Agriculture, New Delhi	Information on activities of IRC
<u>Israel</u>		
Mr. E. Idelovitch	Tahal Consulting Engineers Ltd., Tel Aviv	Information on programme on re-use of waste water
Mr. N. Mintzker	Tahal Consulting Engineers Ltd., Rural Project Gahana, Accra, Ghana	Information on various programmes
Prof. H.I. Shuval	Environmental Health Laboratory, Hebrew University, Jerusalem	Consultantship in relation to the programme on re-use of waste water
<u>Italy</u>		
Mr. G. d'Antonio Mr. G. Rotondo	University of Naples, Naples	Information concerning the overall programme
<u>Kenya</u>		
Dr. K.Y. Baliga	University of Nairobi, Nairobi	Participation in Slow Sand Filtration Project

<u>Country/Name</u>	<u>Organization</u>	<u>Subject</u>
<u>Lebanon</u>		
Dr. G. Ayoub	American University of Beirut, Beirut	Programme on Appropriate Technologies
<u>South Africa</u>		
Dr. W.H.J. Hattingh Dr. R.J. Wells	National Institute for Water Research, Pretoria	Information on programme on re-use of waste water
<u>Sudan</u>		
Dr. Samia Azaharia Jahn	National Research Council, Khartoum	General information on IRC activities
<u>Switzerland</u>		
Mr. F.S. Droste	Battelle Geneva Research Centre, Geneva	Programme on re-use of waste water
Mr. L.A. Orihuela	WHO, Community Water Supply and Sanitation Unit, Geneva	International programme on rural water supplies
Mr. D.V. Subrahmanyam	WHO, Community Water Supply and Sanitation Unit, Geneva	Discussion on organization of a training course
<u>Thailand</u>		
Mrs. W. Pattamapirat	Chulalongkorn University, Bangkok	General information on IRC
<u>United States of America</u>		
Mr. H. Graves	Ad Hoc Working Group on Rural Potable Water Supply and Sanitation	International programme on rural water supplies
Mr. R. Martin	University of Oklahoma, Norman, Oklahoma	Preparations for Workshop on Appropriate Technologies
Dr. F.E. McJunkin	Environmental Services Corp. Chapel Hill, North Carolina	Possible consultant-ship on Handpumps
Dr. Myer Cohen	Ad Hoc Working Group on Rural Potable Water Supply and Sanitation	International programme on rural water supplies

<u>Country/Name</u>	<u>Organization</u>	<u>Subject</u>
Prof. G.W. Reid	University of Oklahoma, Norman, Oklahoma	Preparations for Workshop on Approp- riate Technologies
Prof. G. Rogers	University of Houston, Houston, Texas	Introduction to IRC
Mr. D.C. Spangler	International Bank for Recon- struction and Development, Washington D.C.	Handpumps
Mr. A.D. Swisher	U.S. Agency for International Development, Washington D.C.	Preparations for Workshop on Approp- riate Technologies

REGIONAL REFERENCE CENTRES AND COLLABORATING INSTITUTIONS

FOR COMMUNITY WATER SUPPLY

(as at 31 December, 1975)

Regional Reference Centres

National Environmental Engineering Research Institute (NEERI)
Nehru Marg
Nagpur-440020
India

Pan American Centre for Sanitary Engineering and Environmental Sciences (CEPIS)
Calle los Pinos 259, Urbanizacion Camacho
Casilla Postal 4337
Lima-100
Peru

Collaborating Institutions

- Institut d'Hygiène et d'Epidémiologie
14, rue Juliette Wytsman
1050 Brussels
Belgium
- Fundação Estadual de Engenharia do Meio Ambiente (FEEMA)
Rua Fonseca Teles 121-15º and
Caixa Postal 23011 - ZC 09
Rio de Janeiro, GB
Brazil
- Centre of General and Environmental Hygiene
Institute of Hygiene and Epidemiology
Srobarova 48
10042 Prague-10
Czechoslovakia
- Institute of Hygiene
University of Aarhus
Universitetsparken
8000 Aarhus-C
Denmark
- Office de la Recherche Scientifique et Technique
Outre-Mer (ORSTOM)
Section d'Hydrology
24, rue Bayard
Paris 8e
France

- Department of Civil Engineering
Faculty of Engineering
University of Science and Technology
Kumasi
Ghana
- Victoria Jubilee Technical Institute
Matunga
Bombay-19
India
- All-India Institute of Hygiene and Public Health
110, Chittaranjan Avenue
Calcutta-12
India
- Institute of Hydro-sciences and Water Resources Technology
University of Tehran
64, Ghadessi Street, North Blv. Elizabeth
Tehran
India
- Environmental Health Laboratory
Hebrew University - Hadassah Medical School
P.O. Box 1172
Jerusalem
Israel
- Centro Studi e Ricerche di Ingegneria Sanitaria
University of Naples
Piazzale Tecchio
80125 Naples
Italy
- Istituto di Recerca sulle Acque
Consiglio Nazionale delle Ricerche
Via Reno 1, Irsa
Rome
Italy
- Department of Sanitary Engineering
Faculty of Engineering
University of Tokyo
Tokyo
Japan
- Department of Civil Engineering and Architecture and
School of Public Health
American University of Beirut
Beirut
Lebanon

- Testing and Research Institute of the Netherlands
Waterundertakings, KIWA Ltd.
Sir Winston Churchill-laan 273
Rijswijk 2109
The Netherlands

- Faculty of Engineering
University of Lagos
Lagos
Nigeria

- Departamento Academico de Saneamiento
Universidad Nacional de Ingenieria
Avenida Tupac Amaru s/n
Apartado 1301
Lima
Peru

- Battelle Geneva Research Centre
7, Route de Drize
1227 Carouge
Geneva
Switzerland

- Faculty of Engineering and Architecture
University of Khartoum
P.O. Box 487
Khartoum
Sudan

- Division of Environmental Hygiene
Asian Institute of Technology
Henri Dunant Street
P.O. Box 2754
Bangkok
Thailand

- Middle East Technical University
Sanitary Engineering Laboratory
Ankara
Turkey

- The Water Research Centre
45, Station Road
Henley-on-Thames, Oxon RG9 1BW
United Kingdom

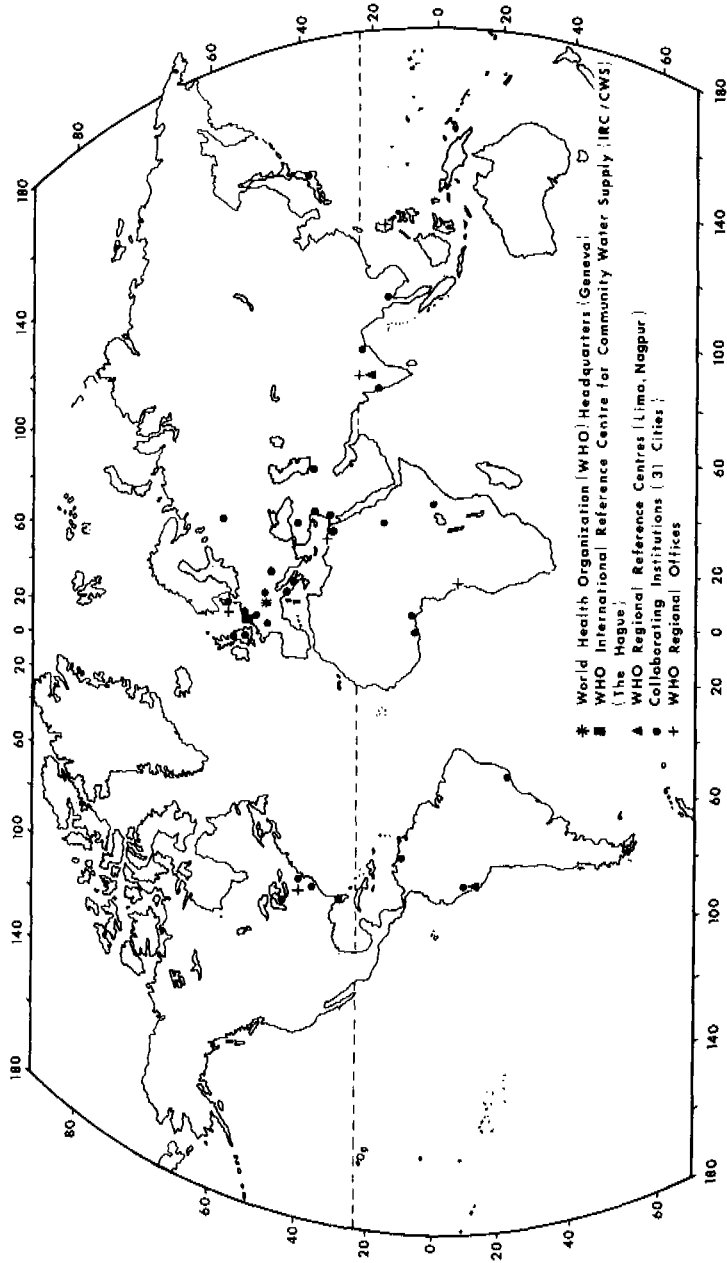
- Department of Civil Engineering
University of Newcastle-upon-Tyne
Claremont Road
Newcastle-upon-Tyne, NE1 7RU
United Kingdom

- College of Engineering
University of Florida
Gainesville, Florida 32601
U.S.A.
- Division of Water Hygiene
Water Quality Office
Environmental Protection Agency
5600 Fishers Lane
Rockville, Maryland 20852
U.S.A.
- National Sanitation Foundation
P.O. Box 1468
2355 West Stadium Boulevard
Ann Arbor, Michigan 48106
U.S.A.
- School of Public Health
The University of North Carolina
Box 630
Chapel Hill, North Carolina 27514
U.S.A.
- Academy of Community Services
(K.D. Pamfilov Academy of Community Services)
Volokamskoe Sosse 16
Moscow D-373
U.S.S.R.
- Department of Sanitary Engineering
Faculty of Engineering
Central University of Venezuela
Caracas
Venezuela

Other institutions with which is collaborated extensively

- Comité Inter-africain d'Etudes Hydrauliques (CIEH)
Boîte Postale 368
Ouagadougou
Haute Volta
- Companhia Estadual de Tecnologia de Saneamento Básico
e de Defesa do Meio Ambiente (CETESB)
Av. Prof. Frederico Hermann Jr. 345
C.E.P. 05459
Sao Paulo
Brazil

THE INTERNATIONAL NETWORK FOR COMMUNITY WATER SUPPLY AND W.H.O. OFFICES



IRC PUBLICATIONS

Technical Paper Series

- Nr. 1 - Plastic pipe in drinking water distribution practice, 1971
- Nr. 2 - The suitability of iodine and iodine compounds as disinfectants for small water supplies, 1972, B.C.J. Zoeteman
- Nr. 3 - The purification of water on a small scale, 1973 (also in French)
- Nr. 4 - Health aspects relating to the use of uPVC pipes for community water supply - Report of a Consultant Group, 1973
- Nr. 5 - Health aspects relating to the use of polyelectrolytes in water treatment for community water supply - Report of a Consultant Group, 1973 (also in French)
- Nr. 6 - The potential pollution index as a tool for river water quality management, 1973, B.C.J. Zoeteman
- Nr. 7 - Health effects relating to direct and indirect re-use of waste water for human consumption - Report of an international working meeting, 1975

Bulletin Series

- Nr. 1 - Community Water Supply Research, 1971
- Nr. 2 - Training Courses in Community Water Supply, 1971
- Nr. 3 - Community Water Supply Research, 1972
- Nr. 4 - The Story of CPHERI, 1972 (out of stock)
- Nr. 5 - Meeting of Directors of Institutions collaborating with the WHO International Reference Centre for Community Water Supply, Bilthoven, The Netherlands - Report of the Proceedings, 1973
- Nr. 6 - Community Water Supply Research, 1973
