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INTERNATIONAL DRINKING WATER SUPPLY AND SANITATION DECADE

FINAL EVALUATION REPORT

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by

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EUR/HFA target 20

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TARGET 20

Water pollution

By 1990, all people of the Region should have adequate supplies of safe drinking-water, and by the year 1995 pollution of rivers, lakes and seas should no longer pose a threat to human health.

Index:

WATER SUPPLY
SANITATION
DRINKING WATER
EVALUATION
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THE INTERNATIONAL DRINKING WATER SUPPLY AND SANITATION DECADE IN EUROPE

EVALUATION REPORT

1. INTRODUCTION

The idea of improving water and sanitation services can be traced back to the First United Nations Development Decade. The Second U.N. Development Decade which ended in 1980 placed emphasis on better potable water supply and wastewater services as an important measure towards the improvement of the health of the population. Both the United Nations Conference on Human Settlements, held in Vancouver, Canada, in 1976, and the United Nations Water Conference, held in Mar del Plata, Argentina, in 1977, set targets of water supply and sanitation for all.

The importance of water and sanitation was reinforced at the WHO/UNICEF Conference on "Primary Health Care", Alma Ata, (1978), which recognized water supply and sanitation as an essential element of Primary Health Care and of the Health For All by the Year 2000 strategy, (HFA 2000).

The United Nations General Assembly, at its thirty-fifth session, formally launched the WATER DECADE through Resolution 35/18, adopted on 10 November 1980, proclaiming the period 1981-1990 as the International Drinking Water Supply and Sanitation Decade, (IDWSSD).

At the beginning of the Water Decade, the European Region of WHO comprised 33 sovereign Member States plus two non-active Members; two countries were situated outside the geographical boundaries of Europe (Algeria and Morocco) and were later transferred to other WHO Regions, while Israel joined the Region on 11 May 1985.

The analysis made at the beginning of the Decade showed certain deficiencies in the level of services provided to the different countries. A large disparity was found between the services available to urban and to rural areas as regards both quantity and quality. Similarly, great differences existed between the provision of water services and the disposal of wastewaters. For that reason, it was considered appropriate, for evaluation purposes, to subdivide the Region, with some minor adaptations, into three groups of countries, following the criteria used by the United Nations for providing technical assistance to countries.

Group I comprised five states whose governments regularly applied to external financing agencies such as the World Bank or other such agencies for investments in water supply and sanitation, (Algeria, Morocco, Malta, Portugal and Turkey).

Group II comprised 12 countries whose governments were receiving or had received technical assistance from UNDP Programmes covering all or part of their national territory: (Albania, Bulgaria, Czechoslovakia, Greece, Hungary, Ireland, Italy, Poland, Romania, San Marino, Spain and Yugoslavia). It included countries which had made considerable progress industrially but still had a large underserved rural population.

Group III comprised the remaining 16 countries of the Region. Their concerns related more specifically to management of the quality of water and sanitation services and to control of pollution of water sources.

In 1981 at its 31st session, the Regional Committee, by Resolution EUR/RC31/R9, established the priorities for the Regional Office's Decade Programme in line with World Health Assembly Resolution WHA 30.33. In 1984 the Regional Committee adopted target 20 as one of the Region's 38 targets for Health for All.

TARGET 20: WATER POLLUTION

BY 1990, ALL PEOPLE OF THE REGION SHOULD HAVE ADEQUATE SUPPLIES OF SAFE DRINKING-WATER, AND BY THE YEAR 1995 POLLUTION OF RIVERS, LAKES AND SEAS SHOULD NO LONGER POSE A THREAT TO HUMAN HEALTH.

2. OBJECTIVES OF THE WATER DECADE PROGRAMME IN EUROPE

The above-mentioned Regional Committee resolution "recommend Member States to take the necessary action to improve conditions at the national level, particularly through:

- a) establishment of national drinking-water quality criteria;
- b) improvement of water source protection, including toxic chemical control;
- c) improvement of rural water supply and sanitation, including adequate measures for quality control;
- d) development and application of appropriate technology, including that for the reuse of water;
- e) improvement of structures for organization, management and the planning of water resources both in relation to future demand and other land uses;

- f) development of manpower, with emphasis on operational personnel;
- g) provision of necessary resources to achieve the objectives of the Decade;
- h) support to research on the health effects of substances contained in water".

3. THE EUROPEAN WATER DECADE STRATEGY

In line with the main thrust of the global Water Decade Programme, the Member States of the Region adopted a common European strategy for the attainment of the above-mentioned objectives. The strategy placed emphasis on the "meaning of the Decade as a component of health for all". The main elements of this strategy were:

- a) promotion of the Decade,
- b) national institutional development,
- c) development of human resources,
- d) information exchange and monitoring,
- e) mobilization of financial resources.

4. EVALUATION OF RESULTS ACHIEVED

An analysis of the results achieved by the end of the Decade indicates that, so far as the supply of drinking-water in urban areas is concerned, it is only in the slum districts of a few urban agglomerations that there will still remain some people served by poorly maintained stand-pipe networks. (See Table No. 4 and Graph No. 3). One of the major problems to be solved, however, relates to the interruption of services in heavily populated Mediterranean towns receiving a seasonal influx of large groups of tourists. Another problem common to many of the large European cities is the considerable amount of treated drinking-water that never reaches the consumer due to leakages or unnecessary wastage.

With regard to rural areas, the level of water connections in the home, as originally envisaged, is not yet sufficiently high to claim total coverage. It is expected, however, that by the turn of the century the whole rural population of Europe will at least have easy access to proper water supply systems. (See Table No. 5 and Graph No. 3)

With the ever-increasing rhythm of industrialization in Member States, however, there will be a need for the introduction of sound water conservation policies to balance the priorities of the different water users.

In the matter of the disposal of wastewater, a major effort is still required to provide many urban towns with appropriate sewerage networks, to connect dwellings in peripheral urban belts to sewerage networks, and to provide a large number of existing networks with appropriate treatment facilities to avoid the discharge of raw sewage into the aquatic environment. (See Tables Nos. 6 and 7 plus Graphs Nos. 4, 5, 6, and 7)

With regard to future water quality problems, the control of pollution of surface and groundwater sources must still be considered high priority for many countries in the Region. A wide range of old and new organic and inorganic pollutants will undoubtedly continue to reach drinking water sources, and there will therefore be a need to strengthen programmes for arriving at a more accurate determination of the health effects of water pollutants.

Particular emphasis will have to be laid on the development of human resources in order to sustain the development achieved. Countries will have to conduct a thorough analysis of their training needs in order to strengthen existing institutions dealing with human resources development and achieve the improvements required in this sector, which is vital for the optimization of water and sanitation investments.

With regard to the evolution of diseases related to water and sanitation, epidemiological assessment has proved difficult because the systems of data collection on infectious diseases at country level are oriented mainly towards diseases preventable through vaccination campaigns.

Most of the health problems encountered at the beginning of the Decade in connection with the biological quality of drinking water and recreational waters were located mainly in southern Europe. The incidence of enteric diseases was not, however, confined only to areas in the Region with inadequate water and sanitation services. Other factors, such as social habits, types of food and lack of public health education, were also responsible for repeated outbreaks of diseases such as: typhoid, hepatitis, cholera, amoebiasis, shigellosis, salmonellosis and other waterborne diseases which are still present in the Region.

In 1981/82, studies on coastal water quality and the associated health problems were carried out in Mediterranean countries. Bathers were affected particularly by eye, ear, throat and nasal infections. Dermatitis, furunculosis and diarrhoea were also very common. In many instances, however, the illnesses reported were not supported by laboratory analyses. Epidemiological assessment therefore was possible only in terms of the number of outbreaks occurring per country per year.

The available records indicate that the improvements achieved in the provision of adequate water and sanitation services have resulted in a considerable decrease in disease outbreaks. However, there are still concerns with regard to such diseases as legionellosis and diarrhoea associated with the presence of Campylobacter. Protozoa and helminths are also detected with increased frequency, particularly in rural water supplies. Giardiasis caused by the protozoon Giardia lamblia, and the presence of Entamoeba and Balantidium in water supplies that have not been filtered during the treatment process, also require increased attention by water managers in order to reduce the health risks of the population exposed.

On the question of chemical contamination of seafood, while available evidence indicated that problems were probably confined to relatively isolated "high-consumption" coastal areas, the extent of the overall situation still requires determination.

4.1 WATER QUALITY

A distinctive feature of the Water Decade Programme in the European Region has been the concern, by national water authorities, of the quality of the water being supplied. Since the early days of the Programme the Member States recommended that the Organization carry out a revision of existing national drinking-water quality criteria. This would cover new chemicals and take account of the latest information on the health implications of pollutants present in drinking-water.

The development of drinking-water guidelines was organized and carried out jointly by WHO headquarters and the Regional Office, with the active participation of scientists from more than 30 WHO Member States. The Guidelines, published in 1984, describes the quality of water suitable for drinking purposes under all circumstances. The recommended levels for water constituents and contaminants are not standards in themselves. They are intended to be used by countries as a basis for the development of national standards adjusted to prevailing local environmental, social, economic and cultural conditions.

With regard to the use of "water quality guideline values", the majority of the Member States follow either international standards such as the EEC Directive on drinking-water quality, or their own national standards, or simply apply the recommended WHO guideline values.

It has, however, been recognized that the formulation of recommendations for the quality of drinking water is an ongoing process, as new and better data and improved methods of assessment become available, but also as the interpretation that people give to "guideline values" evolves with time. Because of the presence of new pollutants in drinking-water, and because further knowledge has been acquired in connection with the health effects of water contaminants, the above-mentioned guidelines are therefore now under review. It is expected that this revision will be completed in 1992.

Another major area of concern has been the adoption of quality criteria for "raw water" which is to be used for domestic consumption. In the European Region, a wide range of chemical micropollutants resulting from industrial or agricultural activities and from the disposal of waste, including atmospheric fall-out, are affecting the quality of both surface and groundwater. To overcome this problem, a large number of Member States have not only developed "raw-water quality criteria", but have also introduced strategies to prevent pollution of water sources.

With regard to the quality of "recreational waters", which is one of the most important components of the Water Decade Programme in Europe, mention needs to be made of the various efforts successfully conducted by Member States for the adoption and implementation of international agreements and conventions aimed at protecting the quality of sea waters and of seafood. Examples of such efforts can be found in the established programmes for the protection of the Baltic Sea and the North Sea, and in the Mediterranean Action Plan in which the Regional Office plays an important role.

European countries have also recognised the increasing importance of the health aspects of the reutilization of wastewater and of human and animal excreta in agriculture or aquaculture. A score of scientists from various countries have been engaged in research activities to find appropriate technology for the safe use of waste matters in agriculture.

4.2 PROTECTION OF WATER SOURCES

The First European Water Decade Consultation convened by the WHO Regional Office at Copenhagen (7-11 December 1981) strongly emphasized that, because of the recognized increased danger of contamination of water sources by chemicals and other hazardous wastes, there was a need for mobilizing public opinion on source protection and for adopting adequate protective measures at national levels in the early planning stage of water supply services.

The above-mentioned Consultation urged Member States to implement sound managerial strategies for the protection of water resources. The first recommended step was the assessment of contamination sources, together with the identification of the mode of entry of pollutants and respective concentration levels.

The second recommended step was the adoption of national codes of practice for the protection of water resources that would include not only the assessment of water resources available, but also guidance for agricultural and waste disposal practices, and for land use planning. Priority was to be given to the introduction of preventive measures and particularly to the establishment of an early warning system for the protection of transboundary water sources.

The Consultation considered that, as contamination of a large proportion of water sources had already occurred in many countries of the Region, there was a need to establish research programmes for the rehabilitation of such sources when no other solution was available.

With regard to the assessment of the sources of contamination, and in compliance with the above recommendations, Member States have since conducted studies that indicate that in Europe, surface and subsurface water sources are exposed to contamination mainly via:

- a) Uncontrolled utilization of agrochemicals
- b) Uncontrolled discharge of domestic and industrial wastewaters
- c) Uncontrolled discharge of municipal stormwaters
- d) Unmanaged disposal of solid and hazardous wastes
- e) Uncontrolled land-use practices.
- f) Acid Rain.

As a result, most countries in the Region took measures with respect to the following:

- ... Adoption of legislation to regulate the use of different agrochemicals, their rate of application on land, the kind of equipment to be used during application, and permissible rates of concentration of agrochemicals in soil.
- ... Introduction of improved wastewater collection and treatment methods, for both domestic and industrial wastewaters.
- ... Introduction of regulations to establish quality criteria for treated wastewaters and for the aquatic environment receiving such emissions.
- ... Enlargement of the national network of municipal sewer systems conveying domestic and storm waters, whether together or separately. The surveys made at national levels showed that a large proportion of urban municipalities in Europe were without appropriate sewerage systems, including sewage treatment and safe disposal of sludge (See Graphs Nos 5, 6 and 7).
- ... Improvement of the operation and maintenance of sewerage systems. To achieve this objective, countries developed training programmes and guidelines for plant operators, particularly for small and medium size municipalities.
- ... Inventory and mapping of solid and hazardous waste tips, especially of those representing a potential threat to water resources, and adoption of regulations with regard to the selection of waste dumping places.
- ... Adoption of national land-use codes of practice in order to regulate all development activities that may have an influence on water quality, such as: urban developments (housing, streets, industrial, commercial and leisure areas), agricultural, forestry and horticultural uses, energy and mineral exploitation; etc.
- ... Introduction of methods for controlling the deposition into the soil of hazardous substances resulting from domestic and industrial emissions. The risk of such events can be reduced by good engineering design and the installation of efficient air filtration devices.

The Regional Office, together with a Collaborating Centre in the United Kingdom (the Water Research Centre), also organized an international conference on "The health effects of land use on fresh waters" at the University of Stirling in June 1985. The conference focused on the effects of four major uses of land on fresh water above and below the ground: agriculture, forestry, urbanisation and the exploitation of minerals. Agricultural practices were seen as those requiring most attention.

With regard to the protection of water resources, the Regional Office made considerable efforts in designing and implementing, at the specific request of countries, project schemes to be supported by the various United Nations Agencies involved in the Global Water Decade Programme. The presentation of a detailed analysis of each project carried out during the DECADE is beyond the scope of this paper. A short summary and presentation of some of the most important ones is given below:

"The prevention of non-point sources of water pollution".

A joint UNDP/FAO/WHO project implemented in Hungary along the River Danube, for investigating water pollution stemming from agricultural activities. It concluded that land run-off was the chief contributor to river water pollution.

"Protection of bank-filtered drinking-water resources".

An ongoing project in Hungary, financially supported by UNDP. Its main objective is the establishment of methods to increase the safety of public water supplied from wells constructed along the River Danube banks.

Utilization of water resources".

A UNDP funded project in Malta, which started in 1982 and ended in 1986. One of its main outputs was the study on water resources preservation by activating a leak detection programme.

Municipal Water Supply and Water Resources Protection:

An ongoing UNDP supported project in Poland aiming at strengthening the protection of water resources and the provision of water and sewerage services at municipal level.

"Water Quality Management and Pollution Control in the Tejo River and its Estuary", a joint UNDP/UNESCO/WHO project in Portugal, that permitted the identification of pollution discharged into the river and proposed technological solutions. One of its main outputs was the production of a model for integrated management of water resources which is being adopted now for other hydrographic basins in Portugal.

"Establishment of a System for Testing Food and Water Quality Safety" (Danube, Yugoslavia). A project supported by UNDP. Started in 1986, a second phase is due to be initiated in 1990 for three more years. The project aims at developing methods for the protection of water and food sources by protecting the quality of the River Danube waters, which are being used for drinking-water purposes and for irrigating agricultural land.

"Environmental Protection Related to the Development of Large-Scale Mineral Exploitation" (Kosovo, Yugoslavia). This is a large-scale project financed by UNDP and still operational. It is not exclusively related to water or sanitation activities (it deals mainly with air pollution problems resulting from mining activities), but it covers the water pollution aspects of mineral exploitation.

"Surface and Underground Water Masses Protection in SR Macedonia"
Supported by UNDP. Completed in 1987. Developed methods for the protection of surface and groundwater sources in Macedonia, Yugoslavia.

"Reduction of Water Pollution in the Spreca River-Basin in the Socialist Republic of Bosnia and Herzegovina, Yugoslavia".
Large project financed by UNDP and completed in three phases. The last one ended in 1987. Consequent to the study, a World Bank loan financed urban and industrial liquid wastes treatment facilities.

"Water Resources Development in North African Countries". A large UNDP supported project involving three countries: Algeria, Morocco and Tunisia. It covered three main components:

- a) the safe re-use of treated sewage,
- b) reservoir eutrophication control, and
- c) underground pollution control.

The project was successfully completed and results handed over to EMRO.

"European Cooperation on Environmental Health Aspects of the Control of Chemicals". A large intercountry project supported by UNDP. Several phases of development have already been completed. Although this project is not part of the Water Decade Programme, it has strong links with regard to the pollution of water sources due to the utilization of agrochemical products.

"River Danube Water Quality Protection". An important intercountry project supported by UNDP whose primary function is to build the institutional framework of international cooperation for protecting the quality of the River Danube water sources. After several years of unsuccessful negotiations the project now seems to be on the way to being accepted by all the Danube Riparian countries.

Three countries, Bulgaria, Romania and Yugoslavia, have recently signed the plan of operations and it is expected that Hungary will soon do the same.

The project will probably be fully operational before the end of this year when the approval of the remaining countries: Austria, the Czech and Slovak Federal Republic, the Federal Republic of Germany, and the Soviet Union might be obtained.

"Mediterranean Action Plan". This is perhaps one of the largest and most important intercountry projects of the Programme. It is being implemented with the support of UNEP, UNDP and of the sixteen participating countries. The project covers a wide range of topics such as: the upgrading of methods for determining bacterial concentrations in marine waters, finding the relationship between pathogens and indicators, including indicators of viral contamination. Also covered are the identification of carcinogenic and mutagenic marine pollutants and the assessment of pollution loads in relation to receiving waters.

4.3 IMPROVEMENT OF RURAL WATER SUPPLY AND SANITATION

The results of the rapid assessment exercise carried out at the beginning of the Water Decade period indicated that rural areas were particularly poorly served in some European countries, with up to 75% of the rural population not receiving satisfactory water supply and, in some cases, almost none having a satisfactory means of sewage disposal.

The Second Consultation on the Water Decade Programme in Europe, held in Copenhagen from 9 to 12 January 1984, proposed the identification and adoption of indicators and parameters for evaluating the measure of the success of the Decade in terms of the European Region. It was felt necessary to collect basic data on water supply and sanitation on a country-by-country basis, since this information was essential for the establishment of the indicators. Such indicators would be complimentary to the global indicators for monitoring the progress of the health for all movement.

The Consultation proposed to use as an indicator the percentage of households with a sufficient volume of water for drinking purposes and for keeping the house and its immediate surroundings clean. It was, however, pointed out that the existence of a water outlet in the house was not in itself a guarantee that water could be safe.

In the absence of a water outlet in the house, another proposed indicator was the availability of a water standpoint or protected well within a given walking distance from the home - for example, 15 minutes.

With regard to safe or adequate wastewater disposal facilities, the majority was of the view that, in urban areas, connection to a sewerage system was the desirable target. For peri-urban and rural agglomerations, a water closet at home, connected to an appropriate disposal facility (a septic tank followed by a pipeline for the dispersion of liquid wastes into the soil), was to be considered a safe method. For isolated rural houses, an hygienic latrine was considered appropriate.

Taking into consideration the above recommendations, Member States prepared their own plans of action to reach their targets. In spite of differences between countries with regard to the situation of water and sanitation services in rural areas, the general approach adopted by most countries in the Region was based on the following principles:

- ... The implementation of a data collection system for rural areas, (Situation Analysis).
- ... The setting of priority areas.
- ... The allocation of adequate resources for improving rural services.
- ... The establishment of an adequate institutional framework to carry out rural water and sanitation works.
- ... The development of manpower training facilities for operators of rural water and sanitation services.
- ... The education and information of the public in general.
- ... The introduction of low cost technology.
- ... The improvement of operation and maintenance services in rural areas.
- ... The improvement of research capabilities applied to rural areas.

Analysis of the results achieved by the end of the Decade indicates that, so far as the supply of drinking water in rural areas is concerned, the level of appropriate services will reach total coverage before the turn of the century, while, with regard to the disposal of human excreta, there will be very few families in Europe that will not have at least an hygienic pit latrines at home. (Tables Nos 5 and 7 plus Graphs 3 and 4)

4.4 DEVELOPMENT AND APPLICATION OF APPROPRIATE TECHNOLOGY

Priority has been given to the development of guidelines for solving basic water and sanitation problems in areas with specific geographical characteristics, such as: cold climate areas, arid areas, islands with a fluctuating tourist population, inland and coastal recreational areas, and international waters affected by transboundary pollution problems.

In this context, a group of countries along the Mediterranean Sea have extended their work on the health-related aspects of an Action Plan for the protection of the Sea against pollution, more particularly in the Long-term Programme of Pollution Monitoring and Research in the Mediterranean Sea, (MED-POL). The activities are aimed at implementing methods for the safe disposal of liquid and solid wastes in order to protect water quality against land-based sources of pollution.

Another example of effective collaboration in technological developments has been the introduction of computerized information systems, such as AQUALINE, (the on-line data base created by the Water Research Centre in the United Kingdom), and the TOXLINE and ENVIROLINE data base systems. The Regional Office has used those systems to answer an increasing number of ad-hoc queries from Member States, thus providing rapid scientific and practical information when and where needed.

In the southern part of the Region, technological development has focussed on the provision of services rather than on the quality of the services provided. The problems addressed have been the provision of water and sanitation in arid areas, rural water fluoridation and disinfection methods, demineralization of brackish waters, and the development of low-cost and low-maintenance water and wastewater networks. In the highly industrialized regions of Europe, efforts have been directed to the identification of pollutants and their concentration in water sources, and to investigations of their harmful effects on human health.

4.5 PLANNING, ORGANIZATION AND MANAGEMENT OF WATER RESOURCES

The planning and organization of water and sanitation services vary from country to country. It has now become frequent to find a structural pattern such that, in addition to the private sector, more than one ministry or government institution is involved, due to the wide range of vested interests in water and wastewater management.

Experience has shown that whatever organizational structure is adopted, local management must be given the necessary authority and resources to carry out its responsibilities effectively, and the managers must be supported by the central authorities to enable them to deal with exceptional or emergency situations.

The Regional Office, recognizing the importance of multisectorality in the development of the water and sanitation sectors, has promoted increased inter-ministerial and inter-UN agency coordination and cooperation in this area. In addition, important institutional and legislative changes have been introduced since the beginning of the Decade with a view to controlling water pollution, and these have markedly improved the protection of water sources.

Several instances of modification to systems of water charges have been reported, the aim being to make water supply and sanitation more economically viable. The introduction of "the polluter pays" policy is another important development that the Organization has been continuously advocating, as well as the notion that the cost of services, particularly in urban areas, needs somehow to be recovered. To this effect, in collaboration with WHO/Headquarters, consultations at national level have been carried out to exchange views on managerial and financial principles to reach sustainable community water supply and sanitation services.

National Action Committees have been established in Finland, Greece, Hungary, Morocco (no longer a Member State of the Regional Office for Europe), Portugal, and Turkey.

Perhaps one of the most important promotional activities of the Decade in Europe has been the continuous effort to ensure proper monitoring of the progress made during the Decade. Improvement of the collection and analysis of basic data still remains one of the highest priorities of this Region.

The evaluation process established has made it possible, within certain limitations, to measure how far countries are from reaching their Decade targets, thus enabling the programme, through consultations with Member States, to reformulate national commitments with regards to this objective. One of those commitments was the establishment of new evaluation procedures to overcome the difficulties encountered during the early days of the programme. The new evaluation system will, however, be in full operation only in 1991.

4.6 DEVELOPMENT OF MANPOWER

The activities of Member States for the development of Human Resources throughout the years of the Decade, have focussed on:

- a) Increasing the capacity of training institutions so as to reduce their dependence on external assistance and when required, arranging fellowships and study tours to enable national technicians to visit other countries with advanced technology in water and sanitation subjects.

- b) Establishment of multilateral collaboration agreements between national training institutions for the provision of courses on water and sanitation activities for technicians from the less developed countries of the Region, and also for participants from other WHO Regional Offices.
- c) Assessment of the availability of human resources at country level.
- d) Promotion of planning for human resources development, with due regard to career structures.
- e) Identification of training institutions, of their training syllabi and timetables, and of the cost of training.
- f) Production of training handbooks and guidelines.

Model curricula for the training of water supply or waste disposal technicians have been collected by the Regional Office from collaborating institutions and guidelines distributed to Member States. The WHO Handbook on Human Resources Development for the IDWSSD, produced at Headquarters, has been widely accepted and distributed in the Region, and in some cases even translated into national languages: Spanish, Turkish, etc.

Special mention should be made of the important role that the European Water Decade Programme has played with regard to the development of human resources for other WHO Regions. The Fellowships department of the Regional Office has systematically assisted Member States outside this Region in identifying appropriate training places and in completing the arrangements required for such studies. The Regional Office publications have been widely accepted in the other WHO Regions, as basic documents permitting the transfer of technology, where needed. (See Annex No. 1)

4.7 MOBILIZATION OF FINANCIAL RESOURCES

During the first years of the Decade, no appreciable increase in the funding of water and sanitation projects was noted. Perhaps this situation was due to the global economic crisis of the U.N. System in the early 1980s, when UNDP investment programmes were reduced to almost half the original figures. In spite of the difficulties mentioned, Member States, however, gradually came to appreciate the relevance of the IDWSSD to general socioeconomic development, and this has resulted in increased political and financial commitment on the part of Governments, so that, in those countries of the Region where work was required to attain the Decade objectives, the funds allocated to water supply and sanitation programmes have been progressively and substantially increased.

The Regional Office for Europe has made all possible efforts to mobilize financial resources for the development of Decade activities in the Member States. EURO has contacted bilateral and multilateral development cooperation agencies, as well as non-governmental organizations to obtain support for the Water Decade Programme activities.

A national consultation was organized in 1983 in Rabat, Morocco, bringing together representatives of bilateral and multilateral institutions with the objective of studying project proposals awaiting financial support. Some 50 projects were identified requiring funds of a total of US\$ 572 million. However, only a small fraction of this amount was made available. In some countries, like Malta, nearly 16% of the country's total expenditure was invested in water projects, indicating clearly the priority given to this sector. In Turkey also, the allocation for urban sanitation increased from 3 billion Turkish Lira in 1981 to 20 billion in 1984.

One of the best examples of collaboration with international agencies is the case of DANIDA (Danish International Development Agency), a polyvalent institution, simultaneously national, bilateral and multilateral. The financial support given by Danida at the beginning of the Decade permitted the production of the WHO Guidelines on Drinking Water Quality (in three volumes) which were published in 1984. The Regional Office was responsible for the sections on organic and inorganic chemicals, together with radioactivity and organoleptic considerations.

A second contribution received from Danida at the end of the Decade will facilitate a review of the above-mentioned Guidelines, permitting the up-dating of data on the health effects of pollutants and adding safety guideline values for new chemicals that have entered the aquatic environment.

In order to optimize the financial resources available at country level, Member States have promoted the introduction of cost-effective solutions to problems, placing emphasis on the use of technologies appropriate to each specific situation, e.g., the adoption of appropriate tariffs to secure an economic return and, in some instances, to allow for the use of some of the resources collected to subsidize needy communities.

In view of the administrative decentralization that has taken place in most countries in Europe, the WHO/EURO strategy for procuring investments for the water and sanitation sector will require some fundamental modifications. As financial resources are now in the hands of municipal authorities, it will be necessary to establish contacts with such authorities, through central administrative coordinating mechanisms.

4.8 RESEARCH ACTIVITIES

There is hardly a country in this Region that has not been engaged, during the last decade, in research activities related to the development of water and sanitation services. It is not possible, within the scope of this summary evaluation, to provide a comprehensive list, by country, of such activities in the past ten years. Instead, we shall group research activities by main headings and describe only the major achievements in the field, and which are peculiar to European research conditions.

a) Water Resources:

- Studies on the potential yield of ground and surface water sources, including high technology for yield measurements (ultrasound).
- Mathematical modelling of water sources.
- Hydroclimatology, subterranean and surface hydrodynamics of water.
- Recharge of aquifers.
- Satellite imagery and aerial surveying for locating water sources.
- Groundwater exploration (drilling methods).
- Management of water resources (conservation policies).

b) Water Treatment:

- Research on equipment and chemical supplies used for water treatment technologies.
- Slow and Rapid Sand Filtration.
- Methods for treating impurities in groundwater.
- Advance methods for the removal of organic and inorganic micropollutants, (chlorinated solvents, pesticides, herbicides, nitrates, ammonia, arsenic, cadmium, aluminium, iron, etc).
- Water desalination (reverse osmosis, etc.).
- Water chlorination and chlorination by-products.
- Package water treatment units for emergency situations.

c) Water Supply (Transmission and Distribution):

- Research on material and accessories for pipelines.
- Research on the effect of pressure on pipelines.
- Corrosion, leakages and control of water un-accounted for.
- Measurements of water flows (water meters, etc).
- Inspection of pipelines (ultrasonic methods).
- Operation and maintenance of water networks.
- Replacement and rehabilitation of pipelines.
- Advanced techniques for water pumping.

d) Water Analysis and Quality Monitoring:

- Determination of dissolved and particulate trace metals.
- Atomic Absorption Spectrometry in water analysis.
- Gas Chromatography in water analysis.
- Mass Spectrometry of organic compounds.
- Membrane-filtration for total coliform detection.
- Development of various models of "autoanalyzers".
- Advanced techniques for the determination of the organoleptic characteristics of drinking-water.
- Remote sensing and computer-aided control.

e) Water Quality and Health:

- Asbestos in drinking-water.
- Lead, aluminium and iron in drinking-water.
- Nitrates in drinking-water.
- Toxins in drinking-water.
- Renal dialysis and water.
- Bacteriological and virological quality of drinking-water.
- Water reuse and health.
- Bacterial and viral pollution of bathing waters.
- Water quality criteria for fresh waters.
- Biodegradability of organic compounds.
- Carcinogenic and mutagenic agents in water.
- Radioactive materials in drinking-water.

f) Wastewater collection and disposal.

- Advanced methods of wastewater treatment (rotary biological contactors, biological filtration, etc.).
- Improvement of conventional wastewater treatment plants.
- Stabilization Ponds, Aerated Lagoons, and Oxidation Ditches.
- Reutilization of wastewater effluents.
- Quality of industrial wastewater effluents.
- Sludge treatment and reutilization.
- Contamination problems in the treatment and disposal of sewage sludge.
- Economic aspects of sewage sludge disposal.
- Design, construction and maintenance of marine outfalls.

NOTE: All research activities enumerated under item "c" above, with regard to drinking-water pipes networks are also valid for sewage pipes networks.

5. THE NETWORK OF WHO COLLABORATING CENTRES

One of the major achievements of the European Water Decade Programme has been the establishment of a network of national institutions appointed as WHO collaborating centres for Water Decade activities. Such Institutions have provided valuable contributions by making available to other Member States and to the Regional Office their technological experience and institutional facilities for convening meetings or conducting training activities on their premises. In addition, the centres have, in many cases, allowed their professional staff to carry out various kinds of temporary assignments.

- i) The Water Research Centre, (WRC) in the United Kingdom, a major contributor to investigations on water pollution control, has actively collaborated in the preparation and review of the WHO Drinking-Water Quality Guidelines.

- ii) The "Centre national du machinisme agricole, du génie rural, des eaux et des forêts" (CEMAGREF), France, has assisted the Region in the development of various guidelines on wastewater disposal.
- iii) The Research Centre for Water Resources Development (VITUKI), Hungary, has completed studies on the protection of water resources and on the removal of pollutants from contaminated water.
- iv) The "Centre international de l'eau" (NANC.I.E.), France, has assisted the Region in monitoring and evaluating Water Decade activities and has also conducted various missions to areas stricken by disasters.
- v) The Public Health Institute in Pamplona, Navarra, Spain, is assisting the Region to develop manpower resources, and in making another major contribution through the development of the environmental health component as an integral part of primary health care services in Navarra, a pilot project which is being successfully implemented.
- vi) The Research Institute for Hygiene and Microbiology (FHM), German Democratic Republic, conducts research studies on water microbiology and on the health aspects of different water pollutants.
- vii) The Robens Institute, University of Surrey, United Kingdom, has a dual role being also a Collaborating Centre for WHO Headquarters. The Centre has been engaged in activities related to the protection of drinking-water quality and of human health.
- viii) The WHO International Collaborating Centre for Primary Health Care in Alma-Ata, USSR, has been engaged in activities related to intersectoral collaboration and community participation in water and sanitation developments.
- ix) The International Training Centre for Water Resources Management (CEFIGRE), France, a headquarters collaborating centre, has assisted not only this Regional Office but the rest of the world in activities related to the development of human resources.
- x) The International Water and Sanitation Centre (IRC), another WHO headquarters collaborating centre for community water supply and sanitation, has collaborated with the Regional Office in supplying technicians in our Member States with valuable technical documentation. The Centre has also provided training facilities and has organized meetings on its premises.

6. BRIEF SUMMARY OF COUNTRY ACTIVITIES DURING THE DECADE.

A short description of the main Water Decade events that have taken place in the countries of the Region, with the participation of our Organization, our collaborating institutions, or of another United Nations agency, is given below:

Albania: The Regional Office helped in the drafting of proposals for two UNDP-supported projects, relating respectively to the control of dental caries through fluoridation and to techniques for the treatment of liquid wastes.

Austria: National Water authorities were actively engaged in the control of transfrontier water pollution in the River Danube. The International Institute for Applied Systems Analysis (IIASA), based in Vienna has actively collaborated with the Regional Office in the implementation of above-mentioned project.

Belgium: The University of Liège has assisted the Regional Office in implementing environment and health impact assessment courses (EHIA), in which major water and sanitation developments were considered.

Bulgaria participated in the programme for the prevention and control of environmental pollution from toxic chemicals and hazardous wastes. Water quality protection of the River Danube has been another major input.

Czechoslovakia: The Water Resources Establishment has been actively involved in the monitoring of water quality and in the control of industrial pollution. High concentrations of nitrates in drinking-water, the major problem in rural water supply systems, have been considerably reduced thanks to adequate legislation and protective measures.

Denmark: The Greenland Technical Organization assisted our Regional Office in the preparation of Guidelines for water and sanitation in cold climate conditions.

Finland: The National Board of Health has supported the Programme, providing expertise for consultant missions to other countries in the Region. In 1989 a meeting was organized in Tampere to analyse intersectoral cooperation for post-Decade activities.

France: Has actively supported the European Water Decade Programme not only through the activities developed at the two collaborating centres (CEMAGREF and NANC.I.E.) but also through the direct collaboration with the environmental health engineers at the Ministry of Health, particularly in emergency situations.

German Democratic Republic: Through the collaborating centre in Bad-Elster, investigations have been conducted on the removal of nitrates from water, and on the presence of potential mutagens in drinking-water.

Federal Republic of Germany: Has assisted the Regional Office in the elaboration of working documents in connection with modern water and sanitation technologies (removal of micropollutants from drinking water and advanced wastewater treatment methods).

Greece: Studies were conducted to assess the environmental impact of major water development schemes and on eutrophication of lakes, as well as a sectoral study on rural water supply.

Hungary: Increased its efforts to attain Decade goals, substantially improving the coverage of water and sanitation services. In addition, the national water authorities have actively collaborated with the Regional Office in work for the protection of the River Danube water resources.

Iceland: Collaborated with the Regional Office in the evaluation of the programme and in matters related to emergency situations.

Ireland: Provided experts for various kinds of temporary assignments in other countries of the Region.

Israel: Provided important technical contributions (such as those in connection with the recycling and reutilization of wastewater for industrial and agricultural purposes) to solve water and sanitation problems in areas with limited water resources.

Italy: National experts assisted in drafting guidelines for water and sanitation problems in large and small Mediterranean islands and for coastal areas with fluctuating population.

Luxembourg: Contributed with comprehensive national data for the evaluation of water and sanitation services in Europe.

Malta: Completed the construction of a municipal water desalinization plant and of a sewage network, including a scheme for wastewater reutilization.

Monaco: An active partner in the control of pollution in the Mediterranean Sea.

Netherlands: A new policy on water management was introduced, to provide a network of water systems that ensure a balance between human needs and ecology.

Norway: Studies of water quality parameters for inland waters were completed, using computer technology. The national water authorities have provided assistance in drafting guidelines for cold climate conditions, and in designing a new evaluation questionnaire for Water Decade activities in Europe.

Poland: With UNDP assistance, a project was implemented on municipal water and wastewater technologies. An international course for municipal engineers, open also to other WHO Regions, is being conducted on a yearly basis, with the financial support of the Polish Government.

Portugal: Decade activities have included the training of national municipal environmental health personnel at the National School of Public Health and the New University of Lisbon.

Romania: This country has been the operational base of an intercountry UNDP project for monitoring chemicals in drinking-water.

San Marino: Has assisted the Regional Office through a collaborating institution (CEMEC), European Centre for Disaster Medicine, in subjects related to the effects of disasters on water and sanitation services.

Spain: The Collaborating Centre in Pamplona, Navarra, has intensively promoted environmental health, and more specifically, water and sanitation, as an integral part of primary health care programmes.

Sweden: Problems relating to the training of environmental health officers have been studied at the collaborating centre in Umeaa.

Switzerland: Actively involved in monitoring the quality of inland waters (Leman lake and the Rhine river).

Turkey: The level of public investment in the water and sanitation sector has continued to increase. Substantial efforts have been made to solve the remaining problems, particularly those related to urban demographic explosions and the development of human resources.

U.S.S.R. Decade activities have been oriented towards the control of water pollution of the rivers Volga, Moskva, Dnieper, Kama and Don, and also for protecting the quality of the Arctic Basin and of the Black, Baltic, Caspian and Asov Seas.

United Kingdom: The Water Research Centre has provided training facilities for numerous visitors on short-term study tours. It has also assisted the Regional Office in drafting several technical documents used as the basis for the elaboration of Guidelines, its major contribution to the programme being technical inputs in the preparation and review of the WHO Drinking Water Quality Guidelines

Yugoslavia: Several UNDP-supported projects have been implemented, especially with regard to river pollution control, and support has been given to the River Danube intercountry project.

7. CONCLUSIONS AND RECOMMENDATIONS

Analysis of the results of the Water Decade Programme in Europe indicates that, with regard to drinking-water, there are people still receiving inadequate services only in some urban fringes areas, whereas, in rural areas, the percentage of the population unserved is still significant in some countries. With regard to the disposal of wastewater, major efforts are still needed to provide many urban sectors with appropriate sewerage networks and efficient treatment facilities. So far as rural areas are concerned, although the evaluation of results proved to be more difficult than expected, the information collected confirms that substantial efforts are needed to improve sanitary conditions in these areas.

The WHO Regional Office for Europe, with the support of the United Nations Development Programme and the Federal Institute of Public Health, Belgrade, organized a consultation in Dubrovnik, Yugoslavia, from 26 to 30 June 1990, for the purpose of conducting a subregional evaluation of the progress made during the past decade and analysing proposed national strategies and policies for the period beyond the Decade.

The consultation recommended that the momentum created by the Decade should be maintained and reinforced in order to attain satisfactory levels of services, if possible before the turn of the century. The adoption of a common European strategy for the post-Decade period was strongly recommended, to ensure sustained commitment to the sector through the 1990s. The common strategy should initiate and promote actions both at the regional (European) level and at the different administrative levels of its individual states.

The global strategy, of which the regional strategy will form a component, should provide a frame of reference for the national strategies.

The general objectives of the common European strategy for community water supply and sanitation for the post-Decade period can be enunciated as follows:

"Water and sanitation developments should be oriented towards the achievement of integrated management of water resources, stressing its perspective of environmental protection and health".

"This orientation must be undertaken in the context of its overall goal of Health for All through primary health care approaches".

"Investments at the national level should be based on cost-recovery for the services provided. The price of water must be established taking into account both capital and recurrent cost. Where appropriate, the cost of sanitation services may be incorporated into the charges levied for water".

"At the international level, the strategy should be oriented towards the promotion of investments and of technology transfer to countries in the Region where systems are less developed. There should be mutual support between countries through exchange of experience, using approaches similar to those used by the United Nations Department of Technical Co-operation for Development".

"There should be a role for all countries of Europe to utilize their acquired experience, knowledge and skills to support the development of water supply and sanitation programmes in the less developed countries of the other regions of the world".

The First European Conference on Environment and Health, held in Frankfurt, Federal Republic of Germany, from 7 to 8 December 1989, endorsed a "European Charter on Environment and Health". The Charter is considered to be an integral part of the European Regional Strategy of Health for All, adopted in 1984 by all Member States of the Region. The Charter established that one of the major urgent issues requiring attention for the protection of the environment and health is the provision of safe and adequate drinking water supplies and hygienic disposal of waste matter. It urged Member States of the European Region to take all necessary steps for the attainment of the objectives of the Charter.

The Dubrovnik Consultation recommended that, in order to comply with the European Charter on Environment and Health thus adopted, the post-Decade European strategy should be fully endorsed by national governments and by the UN system in order to ensure the political commitments necessary to sustain development efforts. At national level, such endorsement should be effected through the ministries and departments with responsibility for the sector, which implies the establishment of effective interdepartmental and interministerial coordination. At international level, to ensure the endorsement of this strategy, WHO should take appropriate action through its governing bodies and other established mechanisms within the UN system.

In the context of East/West and North/South cooperation, the UN system should act as a reference point for the identification of countries requiring various types of assistance and those willing to provide it. Potential has already been identified for cooperation between the countries of Western Europe and the rapidly changing countries of Eastern Europe in tackling their water and environmental management challenges. This must form a vital element of the Post-Decade Water Supply and Sanitation Strategy for Europe.

Table No. 1

WHO/EURO: DEMOGRAPHIC INFORMATION

Countries	1980			1990		
	Population x 1000			Population x 1000		
	Urban	Rural	Total	Urban	Rural	Total
Albania	1 197	1 849	3 046	1 417	1 933	3 350
Austria	4 192	3 294	7 486	4 316	3 391	7 707
Belgium	6 889	2 952	9 841	6 908	2 961	9 869
Bulgaria	5 507	3 355	8 862	6 339	3 054	9 393
Czechoslovakia	9 792	5 484	15 276	10 077	5 644	15 721
Denmark	4 276	838	5 114	4 489	750	5 239
Finland	2 856	1 926	4 782	3 094	1 851	4 945
France	39 396	14 395	53 791	41 416	14 707	56 123
German Democratic Republic	12 750	3 989	16 739	12 907	3 599	16 506
Germany, Federal Republic of	52 661	8 931	61 592	52 057	7 565	59 622
Greece	5 657	2 962	8 619	5 626	2 855	8 481
Hungary	5 682	5 007	10 689	6 500	4 172	10 672
Iceland	205	24	229	229	26	255
Ireland	1 879	1 519	3 398	2 238	1 603	3 841
Israel	3 393	519	3 912	4 068	488	4 556
Italy	41 655	16 199	57 854	42 055	16 355	58 410
Luxembourg	208	157	365	210	159	369
Malta	237	79	316	274	91	365
Monaco	27	--	27	27	--	27
Netherlands	12 234	1 908	14 142	13 122	1 704	14 826
Norway	1 776	2 309	4 085	2 580	1 623	4 203
Poland	20 781	14 813	35 594	23 764	14 890	38 654
Portugal	4 228	5 605	9 833	7 669	4 592	12 261
Romania	11 500	8 646	20 146	13 255	10 738	23 993
San Marino	22	--	22	23	--	23
Spain	23 114	14 250	37 364	20 906	18 674	39 580
Sweden	6 913	1 407	8 320	7 162	1 387	8 549
Switzerland	3 633	2 738	6 366	3 651	2 795	6 446
Turkey	19 645	25 092	44 737	31 949	25 386	57 335
USSR	176 889	111 237	288 126	295 553	59 405	354 958
United Kingdom	50 670	5 630	56 300	51 507	2 233	53 740
Yugoslavia	9 610	12 140	21 750	12 517	11 723	24 240
Total	539 474	279 249	818 723	687 905	226 354	914 259

DRINKING WATER SOURCES IN EUROPE

<i>COUNTRIES</i>	<i>Groundwater %</i>	<i>Surface %</i>
Albania	95	5
Austria	96	4
Belgium	67	3
Bulgaria	40	60
Czechoslovakia	58	42
Denmark	98	2
Finland	49	51
France	-	-
DDR	70	30
DEU	89	11
Greece	40	60
Hungary	10	90
Iceland	87	13
Ireland	25	75
Israel	63	37
Italy	91	9
Luxembourg	66	34
Malta	61	39
Monaco	80% supplied from France	
Netherlands	67	33
Norway	15	85
Poland	14	86
Portugal	94	6
Romania	-	-
San Marino	0	100
Spain	20	80
Sweden	49	51
Switzerland	75	25
Turkey	17	83
USSR	45	55
United Kingdom	35	65
Yugoslavia	84	16
AVERAGE	55,84	44,13

Table No.3
WASTEWATER TREATMENT AND DISPOSAL IN EUROPE, JULY 1990

COUNTRIES	Sewage treatment %				Discharge treated sewage %				Discharge raw sewage %						Sludge disposal %				
	None	Primary	Secondary	Tertiary	Sea	Surface waters	Land		Sea	Surface waters	Land	Sea	Surface waters	Farms	Land-fills	Incinerated	Other		
Albania																			
Austria	10	5	80	5		100				100				41	54	5			
Belgium	55	45												30	50	20			
Bulgaria	55.5	44.5	64.2			98.3	1.7			85	15			80	18	2			
Czechoslovakia	33.8	2												20.6	19.5	0.5			
Denmark	5	25	65	5						97				50	25	25			
Finland	0.7	0.1	0.5	98.7	49	51	80		3	97	75	9		50	21		20		
France	60	40			20				25										
German Dem. Rep.																			
FRG		11.2	81.1	7.7								1.77		31.95	56.2	10.08			
Greece	81.7	18.3							60	40				15	85				
Hungary	4	10	82	4			1			99	1			27	72	0.1			
Iceland	90	10										90	10	10					
Ireland	30	15	54	1					88	12		49	23	23	28				
Israel	10	15	70	5			48		10	90		20	70	10					
Italy														31.8	66.7	1.5			
Luxembourg	8	8	84							100				50	50	50			
Malta	63.4								100					50					
Monaco																			
Netherlands	15	7	100							100				53.2	28.7	9.6			
Norway	23.1	8.8	34.4	33.7					96	4		7.8	60	60	39		1		
Poland	37	40	23																
Portugal	55	20	23	2					42	43	15	2	11	11	28				
Romania	20	18	62							100			20	20	80				
San Marino																			
Spain	74	17	9																
Sweden		0.5	23.2	76.3										60	30		10		
Switzerland	17		28	55						100			60	60	4	36			
Turkey	69.9	14.5	15.5	0.1					0.6	7	92.4								
USSR																			
United Kingdom		10	80	10								30	41	41	15	3	11		
Yugoslavia	27	53.5	11	8.5									41	41	54	5			
Average	31.30	16.24	39.44	13.02	30.25	56.19	13.56		26.5	61.0	12.50	9.1	5.2	40.3	36.3	7.3	1.8		

sewage disposed in Italy

WATER SUPPLY IN EUROPE. 1990

Urban population served

(Population in thousands)

COUNTRIES	Network service at home	Public fountains	Inadequate services	Total
Albania	1,417			1,417
Austria	4,316			4,316
Belgium	6,908			6,908
Bulgaria	6,339			6,339
Czechoslovakia	9,573	504		10,077
Denmark	4,489			4,489
Finland	2,970	124		3,094
France	41,416			41,416
DDR	12,907			12,907
DEU	52,057			52,057
Greece	520	506		5,626
Hungary	5,980	520		6,500
Iceland	229			229
Ireland	2,216	22		2,238
Israel	4,068			4,068
Italy	42,055			42,055
Luxembourg	210			210
Malta	274			274
Monaco	27			27
Netherlands	13,122			13,122
Norway	2,580			2,580
Poland	22,100	1,664		23,764
Portugal	7,439	230		7,669
Romania	12,062	1,193		13,255
San Marino	23			23
Spain	20,906			20,906
Sweden	7,162			7,162
Switzerland	3,651			3,651
Turkey	25,560	4,793	1,596	31,949
USSR	289,642	5,911		295,553
United Kingdom	51,507			51,507
Yugoslavia	11,390	1,127		12,517
TOTAL	669,715	16,594	1,596	687,905
	97.4%	2.4%	0.2%	

Table No. 5

WATER SUPPLY IN EUROPE: 1990

Rural population served

(Population in thousands)

COUNTRIES	Network service at home	Public fountains	Inadequate services	Total
Albania	1,701	232		1,933
Austria	3,391			3,391
Belgium	2,961			2,961
Bulgaria	2,871	183		3,054
Czechoslovakia	3,951	1,129	564	5,644
Denmark	750			750
Finland	1,851			1,851
France	13,972	735		14,707
DDR	3,419	180		3,599
DEU	7,565			7,565
Greece	2,084	771		2,855
Hungary	3,087	668	417	4,172
Iceland	26			26
Ireland	1,298	305		1,603
Israel	478	10		488
Italy	15,701	654		16,355
Luxembourg	156	3		159
Malta	87	4		91
Monaco	-	-	-	-
Netherlands	1,670	34		1,704
Norway	1,542	81		1,623
Poland	10,423	2,978	1,489	14,890
Portugal	2,755	1,378	459	4,592
Romania	8,590	1,074	1,074	10,738
San Marino	-	-	-	-
Spain	14,939	3,735		18,674
Sweden	1,359	28		1,387
Switzerland	2,767	28		2,795
Turkey	17,770	5,077	2,539	25,386
USSR	53,464	5,941		59,405
United Kingdom	2,233			2,233
Yugoslavia	8,792	2,345	536	11,723
TOTAL	191,653	27,573	7,128	226,354
	84.7%	12.2%	3.1%	

EXCRETA DISPOSAL IN EUROPE: 1990

Urban population served

(Population in thousands)

COUNTRIES	Sewage at home	Adequate disposal	Inadequate disposal	Total
Albania	1,275	71	71	1,417
Austria	4,316			4,316
Belgium	6,770	133		6,908
Bulgaria	5,388	76	190	6,339
Czechoslovakia	8,565	1,008	504	10,077
Denmark	4,444	45		4,489
Finland	2,816	273		3,094
France	41,416			41,416
DDR	11,745	1,162		12,907
DEU	50,495	1,562		52,057
Greece	3,376	1,969	281	5,626
Hungary	4,940	1,300	260	6,500
Iceland	229			229
Ireland	2,216	22		2,238
Israel	3,783	285		4,068
Italy	40,373	1,682		42,055
Luxembourg	210			210
Malta	260	14		274
Monaco	27			27
Netherlands	13,122			13,122
Norway	2,425	155		2,580
Poland	18,774	3,802	1,188	23,764
Portugal	6,365	921	383	7,669
Romania	9,676	2,916	663	13,255
San Marino	22	1		23
Spain	20,906			20,906
Sweden	7,162			7,162
Switzerland	3,651			3,651
Turkey	17,891	11,502	2,556	31,949
USSR	265,998	29,555		295,553
United Kingdom	51,507			51,507
Yugoslavia	10,514	1,502	501	12,517
TOTAL	620,657	60,651	6,597	687,905
	90.2%	8.8%	1.0%	

Table No. 7

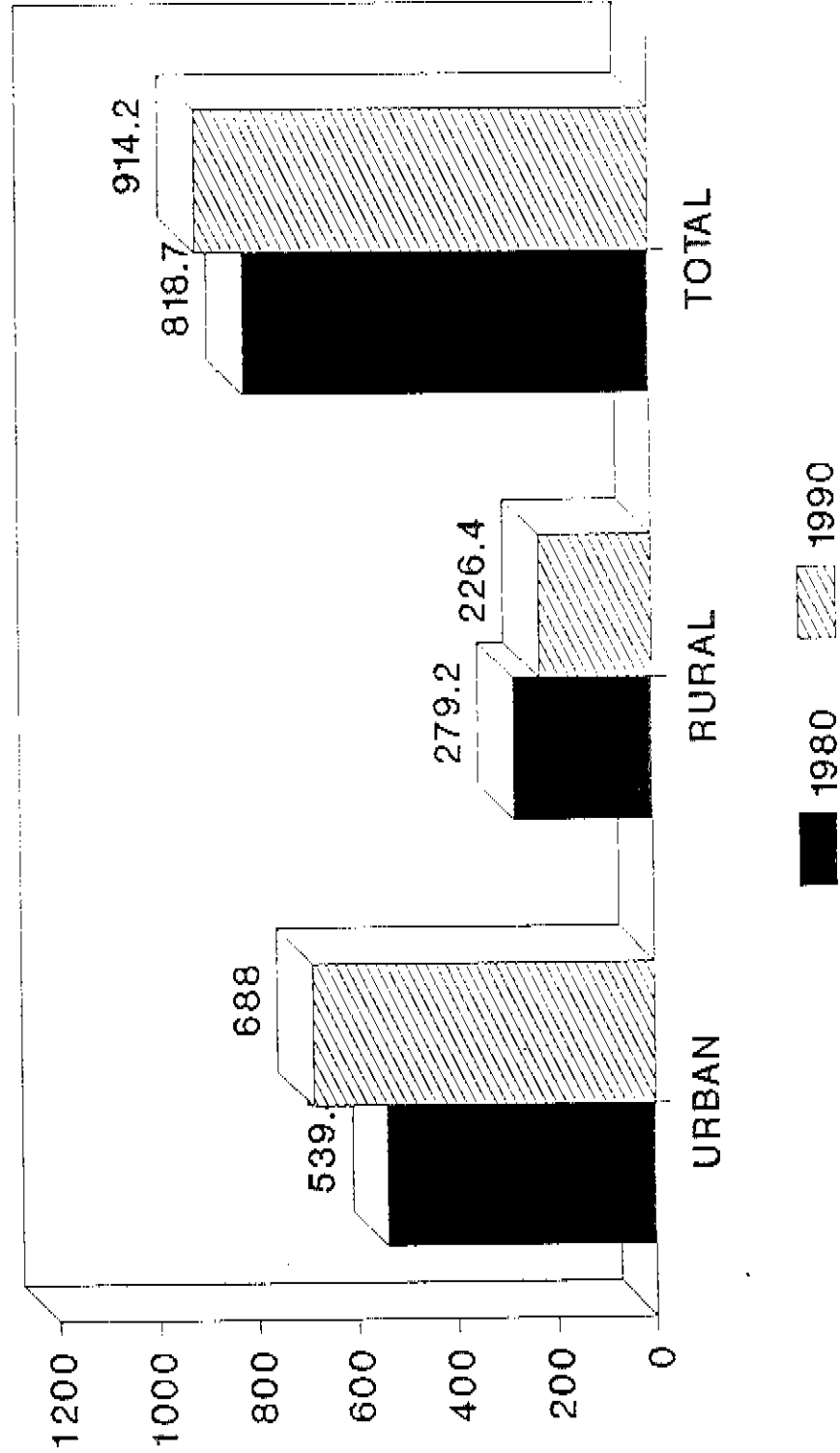
EXCRETA DISPOSAL IN EUROPE: 1990

Rural population served

(Population in thousands)

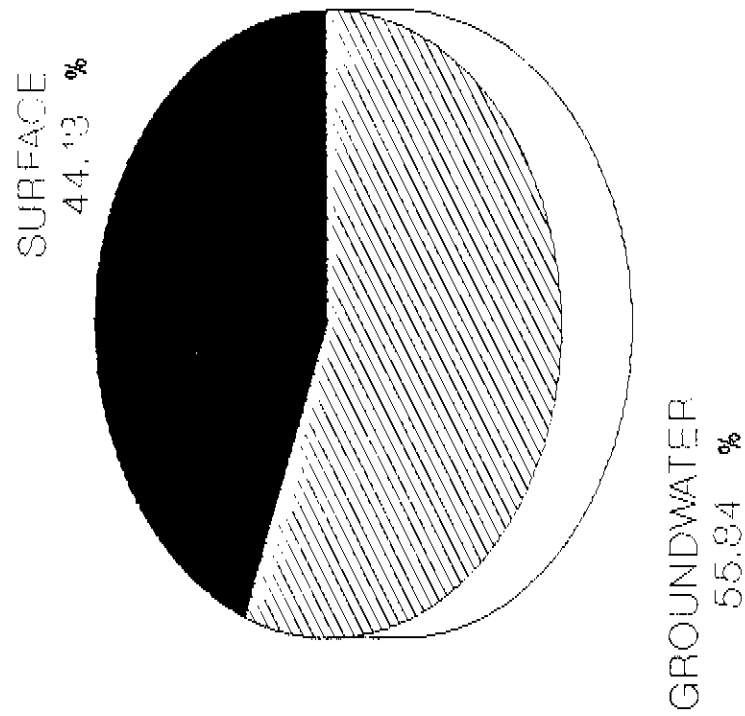
COUNTRIES	Sewage at home	Adequate disposal	Inadequate disposal	Total
Albania	967	773	193	1,933
Austria	678	2,713		3,391
Belgium	1,599	1,362		2,961
Bulgaria	1,710	1,222	122	3,054
Czechoslovakia	3,104	2,258	282	5,644
Denmark	8	742		750
Finland	185	1,666		1,851
France	9,265	5,442		14,707
DDR	2,519	1,080		3,599
DEU	6,506	1,059		7,565
Greece	1,542	1,142	171	2,855
Hungary	209	3,338	625	4,172
Iceland	26			26
Ireland	369	1,186	48	1,603
Israel	293	195		488
Italy	9,486	6,869		16,355
Luxembourg	148	11		159
Malta	76	15		91
Monaco	-	-	-	-
Netherlands	307	1,397		1,704
Norway		1,623		1,623
Poland	6,403	7,445	1,042	14,890
Portugal	413	3,949	230	4,592
Romania	1,503	8,161	1,074	10,738
San Marino	-	-	-	-
Spain	7,470	11,204		18,674
Sweden	971	416		1,387
Switzerland	2,292	503		2,795
Turkey	5,077	16,500	3,809	25,386
USSR	35,643	17,822	5,940	59,405
United Kingdom	2,010	223		2,233
Yugoslavia	3,869	6,682	1,172	11,723
TOTAL	113,787	99,637	12,930	226,354
	50.3%	4.4%	5.7%	

Graph Nr 1
POPULATION GROWTH IN EUROPE
(In Millions)



Source: IWD/EURO, August 1990

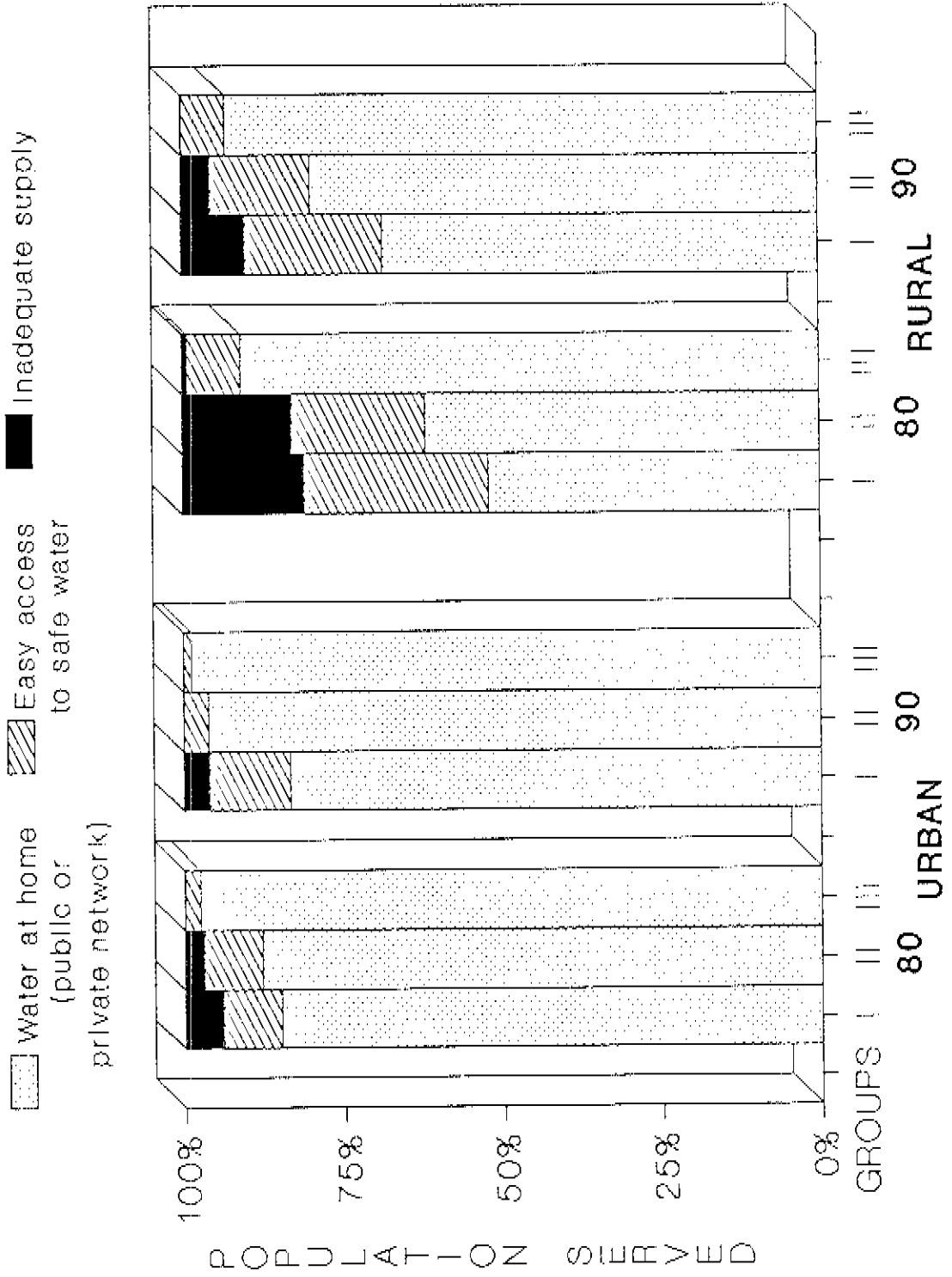
Graph Nr 2
**DISTRIBUTION OF DRINKING WATER SOURCES
1990: EUROPE**



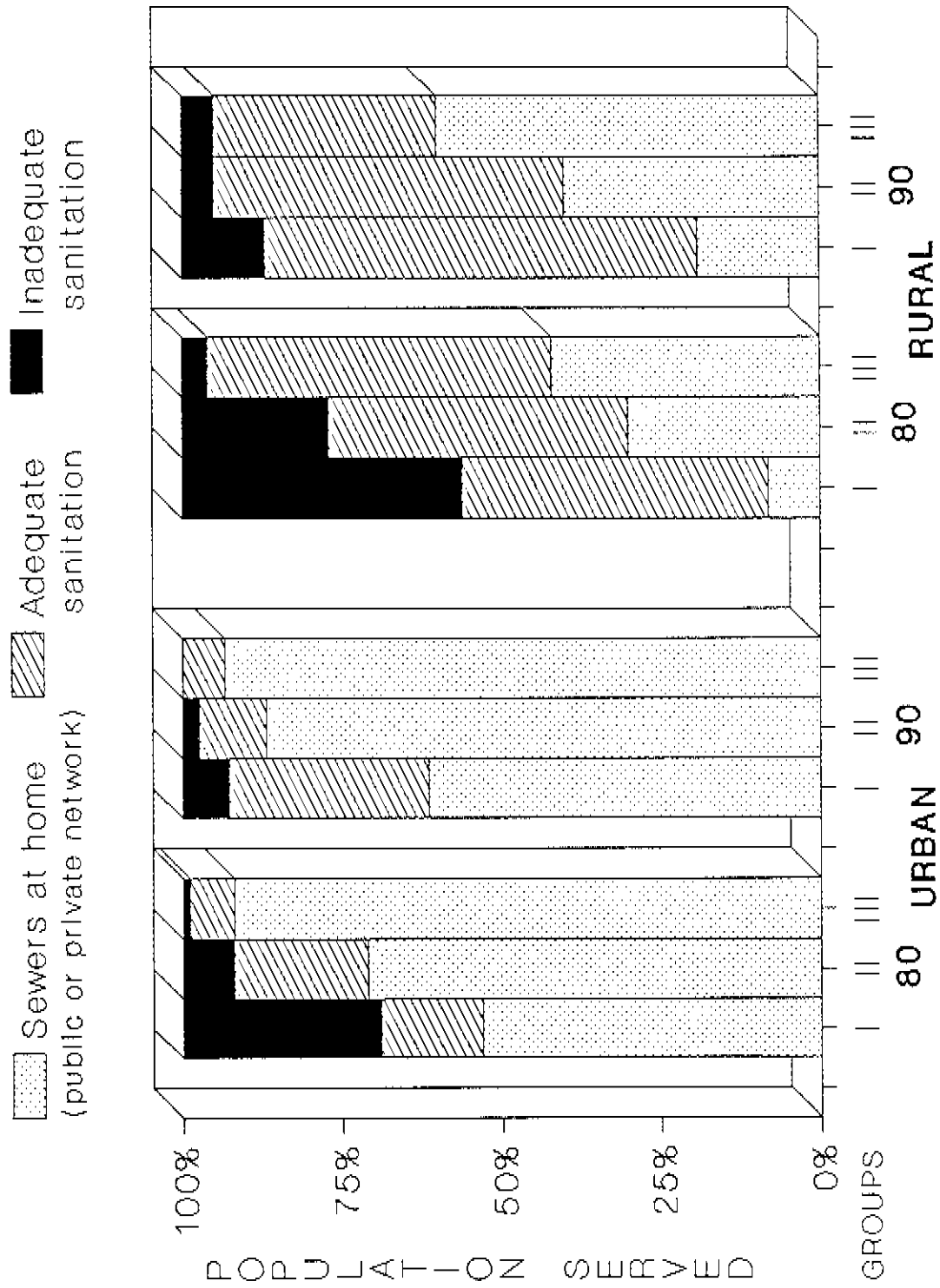
Source: IWD/EURO, August 1990

Graph No. 3

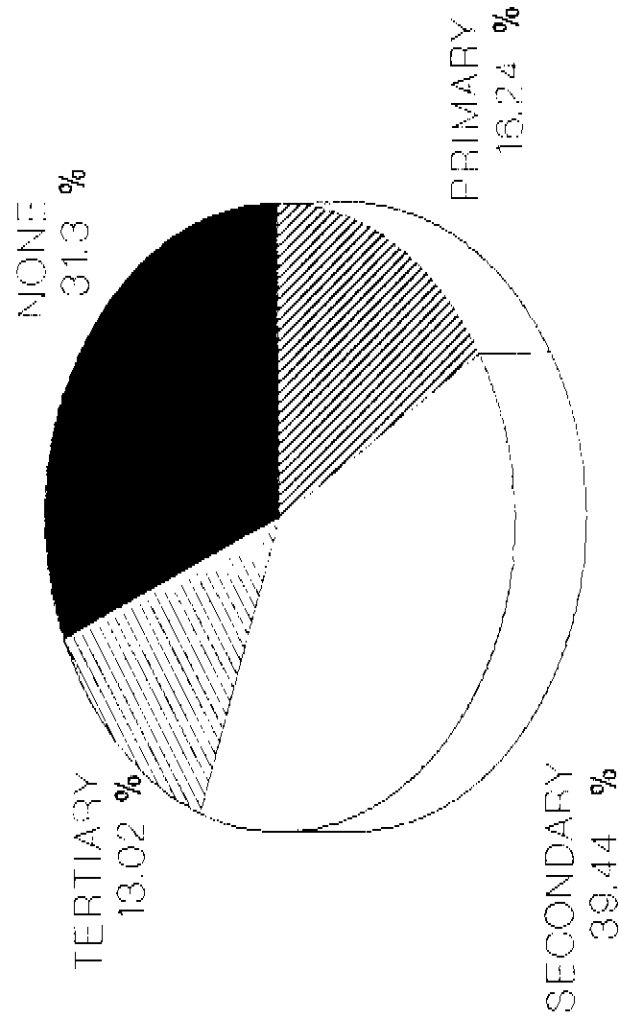
WATER SUPPLY SERVICES IN EUROPE



EXCRETA DISPOSAL SERVICES IN EUROPE

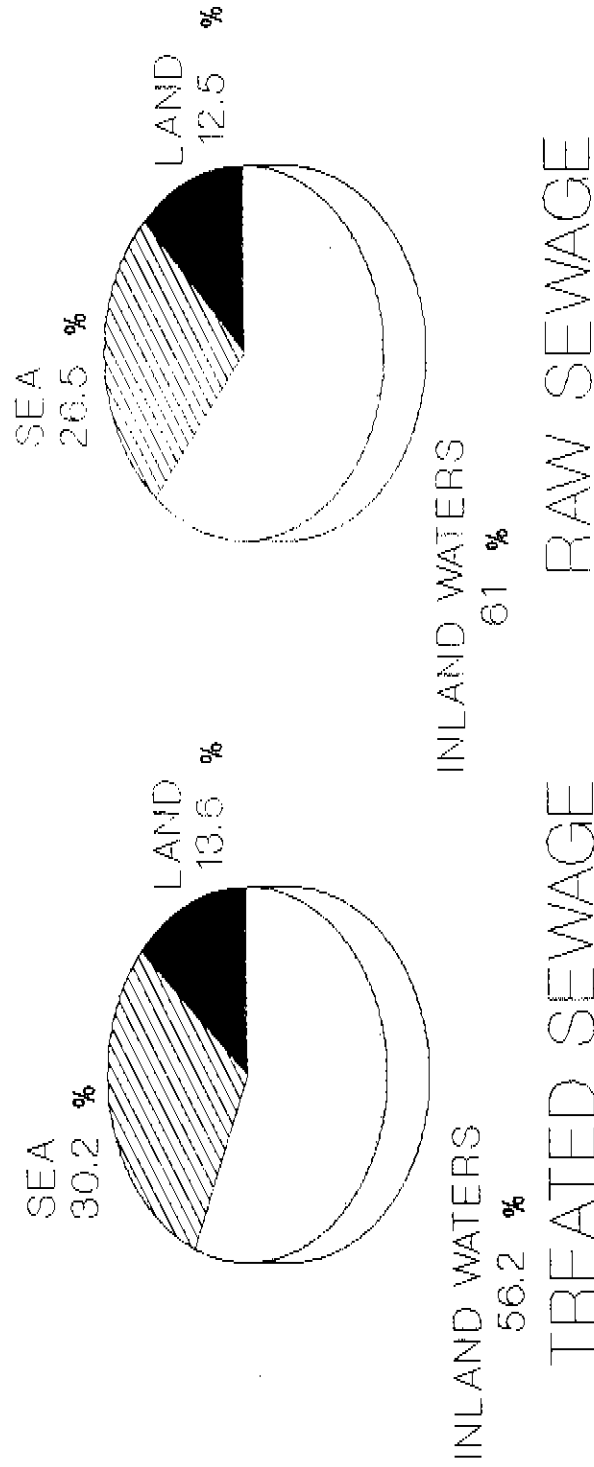


Graph Nr 5 SEWAGE TREATMENT IN EUROPE



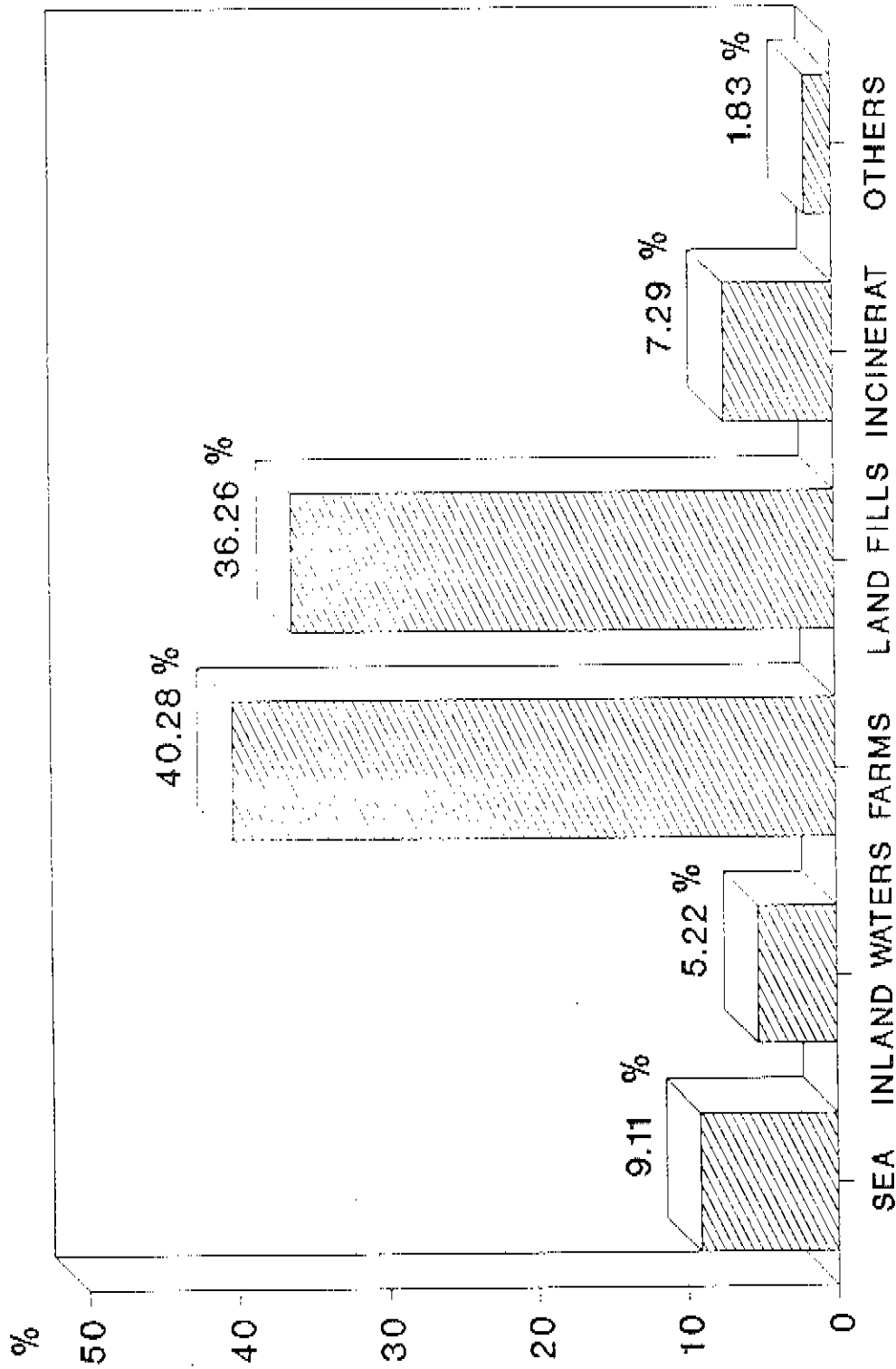
Source: IWD/EURO, August 1990

Graph Nr 6 SEWAGE DISCHARGE IN EUROPE



Source: IWD/EURO, August 1990

Graph Nr.7
SLUDGE DISPOSAL IN EUROPE 1990



Source: IWD/EURO, August 1990

Annex No. 1

WATER DECADE

LIST OF MOST IMPORTANT DOCUMENTS AND PUBLICATIONS PRODUCED
BY OR ON BEHALF OF THE WHO REGIONAL OFFICE FOR EUROPE

Disinfection of rural and small-community water supplies. Medmenham (UK), Water Research Centre, 1989.

Health hazards from nitrates in drinking-water. Copenhagen, WHO Regional Office for Europe, 1985 (Environmental Health Series, No. 1).

Treatment and discharge of industrial wastewater in the Mediterranean Area. Copenhagen, WHO Regional Office for Europe, 1986 (Environmental Health Series, No. 8).

Environmental aspects of the control of legionellosis. Copenhagen, WHO Regional Office for Europe, 1986 (Environmental Health Series, No. 14).

Drinking-water quality and health-related risks. Copenhagen, WHO Regional Office for Europe, 1987 (Environmental Health Series, No. 21).

Drinking-water guidelines for selected herbicides. Copenhagen, WHO Regional Office for Europe, 1987 (Environmental Health Series, No. 27).

Landner L. & Wahlgren, V. Eutrophication of lakes and reservoirs in warm climates. Copenhagen, WHO Regional Office for Europe, 1988 (Environmental Health Series, No. 30).

Examination of water for pollution control: a reference handbook. Oxford, Pergamon Press, 1982.

Waste stabilization ponds: a design manual for Mediterranean Europe. Copenhagen, WHO Regional Office for Europe, 1987 (unpublished document ICP/CWS 053).

Pescod, M.B. et al. Slow sand filtration: a low-cost treatment for water supplies in developing countries. Medmenham (UK), Water Research Centre, 1986.

Framework programme of environmental health for primary health care teams in Navarra. Navarra, Public Health Institute of Navarra, 1990.

Standard model designs for rural water supplies (prepared in cooperation with Hydroprojekt Consulting Engineers, Czechoslovakia). Copenhagen, WHO Regional Office for Europe, 1986.

Intersectoral approach for the management of water resources and systems of water supply and wastes disposal. Alma-Ata, WHO International Collaborating Centre on Primary Health Care, 1988.

Kiss, J. Small rural drinking-water systems in Hungary: operation and maintenance guidelines. Copenhagen, WHO Regional Office for Europe, 1990 (unpublished document ICP/CWS 199/g51).

Natural wastewater lagoons management. Lyon (France), CEMAGREF, 1989.

Bacteria resistant to antibiotics in water and wastewater and their public health implications. Copenhagen, WHO Regional Office for Europe, 1989 (unpublished document ICP/CWS 199/g53).

Strobel, K. Products of drinking-water chlorination as potential mutagens in drinking-water. Copenhagen, WHO Regional Office for Europe, 1990 (unpublished document EUR/ICP/CWS 199/g53).

Water and sanitation services in Europe. Copenhagen, WHO Regional Office for Europe, 1989 (unpublished document ICP/CWS 011).

Waste discharge into the marine environment: principles and guidelines for the Mediterranean Action Plan. Oxford, Pergamon Press, 1982.

Methods for monitoring selected pollutants in sewage effluents and coastal recreational waters. Copenhagen, WHO Regional Office for Europe, 1983 (unpublished document ICP/RCE 211-2).

Microbiological methods for coastal water quality monitoring. Copenhagen, WHO Regional Office for Europe, 1984 (unpublished document ICP/CEH 001).

Disposal of wastewater sludge and associated health risks. Copenhagen, WHO Regional Office for Europe, 1981 (unpublished document ICP/RCE 401).

Appropriate technology for the treatment of wastewater for small rural communities. Copenhagen, WHO Regional Office for Europe, 1985 (EURO Reports and Studies, No. 90).