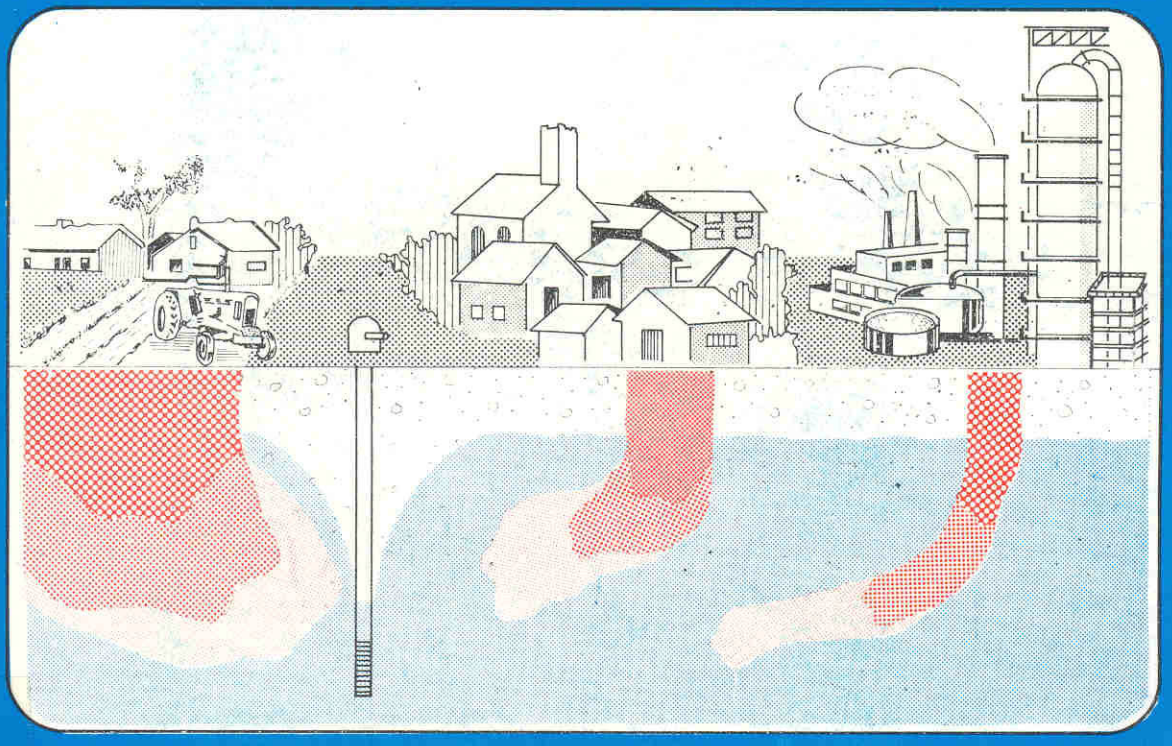
PAN AMERICAN CENTER FOR SANITARY ENGINEERING
AND ENVIRONMENTAL SCIENCES (CEPIS)
Regional Program on the Prevention and Control
of Groundwater Contamination

GROUNDWATER POLLUTION:



an executive overview of the Latin American-Caribbean situation in relation to potable water-supply

WORLD HEALTH ORGANIZATION
PAN AMERICAN HEALTH ORGANIZATION
Environmental Health Program (HPE)

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(Translation of Spanish version of same date)

1987

WORLD HEALTH ORGANIZATION (WHO)
PAN AMERICAN HEALTH ORGANIZATION (PAHO-HPE)
PAN AMERICAN CENTER FOR SANITARY ENGINEERING
AND ENVIRONMENTAL SCIENCES (CEPIS)
Lima, Peru

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SUMMARY

Groundwater plays an important, and in numerous cases vital, role in the potable water-supply of many urban and rural areas of the Latin American-Caribbean Region. Nevertheless, uninformed professionals tend to view groundwater flow as something approaching the mystic or metaphysical. There is thus difficulty over the perception of groundwater contamination and widespread ignorance or complacency about pollution risks, even among administrators of water and land resources. Little attention has thus been paid to the prevention of pollution of groundwater sources themselves, and even less to the protection of aquifers as a whole.

Groundwater flow and pollutant transport are neither readily observed nor easily measured. Both processes are generally slow and groundwater pollution tends to be insidious, can be widespread and is invariably very persistent. The restoration of aquifers once polluted is excessively expensive and technically problematic.

The present report focusses attention upon groundwater pollution risks in the Latin American-Caribbean Region. In some areas, primarily within, or in the vicinity of, major urban centers, pollution has already occurred, creating public health hazards or causing abandonment of existing groundwater supplies with associated loss of financial investment and natural resources.

Those activities which have the most widespread effect on groundwater quality are high-density urbanisation with unsewered sanitation, disposal of liquid industrial effluents and changing practices of agricultural cultivation. Their impact is illustrated by specific cases from the Latin American-Caribbean Region. Widely increasing nitrate concentrations in groundwater, ever more frequent episodes of subsurface penetration of synthetic organic solvents and disinfectants, and continuing incidents of groundwater contamination by fecal pathogens are the principal proven consequences. They amount to a serious threat to drinking water quality in relation to current WHO guidelines.

The threat of groundwater pollution described in this report indicates an urgent need for executives of the water sector to take action to quantify such risks in the area under their responsibility and to initiate appropriate protection and control measures. In the case of groundwater, it is fair to say that ability to analyse pollution episodes post-case, currently exceeds greatly the capacity to identify and to reduce pollution risk. The report is, therefore, aimed at executive engineers in the water sector, and their counterparts in related sectors, such as agricultural, industrial and urban development, since intersectorial agreements will be required for effective action to be mounted.

PREFACE

Background to CEPIS Program

The development of a regional groundwater pollution control program is part of the CEPIS medium-term plan adopted by the Pan-American Health Organisation for the Latin American-Caribbean Region in the period 1984-89.

The key elements of the program are:

(a) Identification of the principal groundwater contamination problems, in as much as they affect the potability of groundwater supplies.

(b) Selection of institutions with the appropriate brief and sufficient resources to apply a program of groundwater pollution control.

(c) Mobilisation of these institutions through the establishment of a cooperative network, with advisory services provided by CEPIS.

(d) Preparation and dissemination of manuals on groundwater pollution and aquifer protection relevant to the regional context.

The overall goal of this program will be that by 1989 various countries in the Region will have commenced groundwater pollution control programs, backed by adequate procedures for the identification and evaluation of groundwater pollution risk and by appropriate policies for the selective control of land-use activities and better design of effluent and residue disposal facilities.

Scope of Present Report

The present report attempts to identify and to aid the understanding of groundwater pollution risks in the Latin American-Caribbean Region. In this way it is hoped that such risks will be given more serious and coordinated consideration.

Although the report is technical in nature and presents results from various case studies in the Region, it is not intended as a systematic manual nor a comprehensive text. Scientific evaluation is not taken any further than is necessary to illustrate the principal points of significance for regional policy. Moreover, in view of the executive style of this report, conventional scientific referencing has been avoided.

The report is confined to consideration of groundwater pollution from man's activity at the land surface. Other important related questions, such as natural groundwater quality problems, saline water encroachment and upconing associated with overabstraction, and reduction of groundwater recharge due to urbanisation with mains sewerage and stormwater drainage are not considered. It should also be remembered that the commonest cause of microbial pollution of groundwater is inadequate sanitary completion of groundwater sources; although fundamental, this aspect is also outside the scope of the present report.

Acknowledgements

The report has been reviewed and improved by the Technical Committee guiding the CEPIS Regional Program on the Prevention and Control of Groundwater Contamination, which includes representatives of institutions in Argentina, Bolivia, Brasil, Cuba, Mexico, Peru and Puerto Rico. The most active participation of Eng. Geroncio de Albuquerque Rocha of DAEE, Sao Paulo, Brasil, is especially acknowledged.

Much of the field data in this report was provided through the members of the Technical Committee. The authors are indebted to the following persons who provided detailed insight on the investigations from their respective countries cited in the report:

Argentina	Eng. Fernando Máximo Díaz (INCYTH)
Bermuda	Eng. James Thompson (PWD)
Brasil	Eng. Rodrigo César Cunha, Eng. Daniel Gomes (CETESB), Eng. Seiju Hassuda (USP-CEPAS), the late Dr. Rosa Beatriz Gouvea da Silva (DAEE)
Mexico	Eng. Rubén Chávez (SARH), Eng. Alfredo David Guidi (SEDUE), Eng. Armando Canales (ITSON), Eng. Miguel Villasuso (FIUDAY)
Peru	Eng. Nelly Nakamatsu and Eng. Carlos Valenzuela (SEDAPAL)
Puerto Rico	Eng. Carlos Jiménez and Dr. Eng. Carl-Axel Soderberg (EQB)

The authors are most grateful to Eng. Alberto Flórez Muñoz (CEPIS Director) and Eng. Henry Salas (CEPIS) for their initial interest and continued encouragement in the preparation of this report, and to Eng. Fred M. Reiff and Dr. Antonio Rivera-Cordero (PAHO-HPE) for provision of useful information.

The excellent secretarial work of Ms. Sonia de Victorio in relation to the production of this report in its Spanish and English versions is also acknowledged.