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DRINKING WATER AND SANITATION DECADE

Corrigendum

Cover page and page 1 of the document, lines 2 and 3 of the footnote:

"Eng. Wesley Eskenfelder" should read "Eng. Wesley Gilbertson."



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STRATEGIES FOR EXTENDING AND IMPROVING POTABLE WATER SUPPLY AND EXCRETAL
DISPOSAL SERVICES DURING THE DECADE OF THE 80's

POSSIBLE STRATEGIES FOR THE INTERNATIONAL
DRINKING WATER AND SANITATION DECADE*

* This document has been prepared with the collaboration and contributions of a panel of consultants consisting of Dr. Abel Wolman, Eng. Wesley Eskenfelder, Dr. Antonio Ordoñez Plaja, and Engineers Charles Pineo, Harold Shipman, and Eduardo Yassuda.

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POSSIBLE STRATEGIES FOR THE INTERNATIONAL DRINKING WATER AND SANITATION DECADE*

Introduction

Few development projects have greater potential for directly benefiting the health and social and economic well-being of mankind than water supply and sanitation services.

Waterborne or related diseases are among the world's three major causes of sickness and death and contribute to high infant mortality, low life expectancy, and a poor quality of life. Such diseases can be prevented if people are provided safe drinking water and waste disposal facilities.

At meetings of the Pan American Health Organization/World Health Organization, the Ministers of Health of the Americas have emphasized the importance of water supply and waste disposal in preserving and improving the health of the peoples in their countries. Despite this concern, there are still millions of people without water supply and excreta disposal facilities, particularly the poor in urban and rural areas.

Diarrheal diseases are still the most common cause of childhood illness and mortality in many of the countries of Latin America and the Caribbean and account for close to 200,000 deaths in these areas each year. This number climbs much higher if typhoid fever and hepatitis are included in the statistics.

The topic, "Strategies for Expanding and Improving Water Supply Systems and Excreta Disposal in the 1980s," chosen for the Technical Discussions at the XXVI Meeting of the Directing Council of PAHO provides Member Governments an opportunity to reaffirm the need for accelerating the promotion, planning, coordination, and development of services for meeting basic sanitary needs in rural and urban areas.

The information that follows has been prepared to aid delegates in their discussions. It outlines developments in the water supply and sanitation sectors in the last two decades, includes an analysis of factors that have contributed to the advances achieved, and identifies some of the constraints on future progress, many of which still exist and will have to be overcome if the goals for the 1980s are to be met.

*This document has been prepared with the collaboration and contributions of a panel of consultants consisting of Dr. Abel Wolman, Eng. Wesley Eskenfelder, Dr. Antonio Ordóñez Plaja, and Engs. Charles Pineo, Harold Shipman, and Eduardo R. Yassuda.

The experience in the American Region

At the beginning of the 1960s the Latin America and Caribbean countries had 209 million inhabitants, 102 million in urban areas and 107 million in rural areas. Sixty million (59 per cent) of those in urban areas had water services whereas less than 8 per cent of the rural population had service, either at home or through public fountains. Sewerage was available to only 29 million (28 per cent) of those in urban areas and to almost no one in rural areas.

In 1961, the Hemisphere's Governments, in the Charter of Punta del Este, established the goal of providing water and sewerage to 70 per cent of the urban and 50 per cent of the rural population by 1971.

By the end of 1971, 152 million of the 287 million people in Latin America and the Caribbean had piped water. Of the total urban population of 155 million, more than 121 million (78 per cent) received water either through house connections or public hydrants. During this same 10-year period, water supply services to the rural population more than tripled: an estimated 31 million (24 per cent) of the area's 131 million rural residents were served in 1971.

Although the Punta del Este goals for sewer services in urban areas were the same as for water supply, limited resources made it necessary to give priority to providing drinking water. Still, there was some progress. By 1971 sewer services had been provided to 59 million people (38 per cent of the total) in urban areas and many fewer in rural areas.

In 1972 the Ministers of Health, at their III Special Meeting in Santiago, Chile, reviewed progress and set new goals for the 1970s. These goals expressed the hope that water would be provided through house connections to 80 per cent and sewerage to 70 per cent of the urban population, and water supplies and waste water or excreta disposal facilities to 50 per cent of the rural population.

By the end of 1977, 198 million of 325 million people in Latin America and the Caribbean had access to a water through house connections or public fountains. Of the 197 million in urban areas, 140 million (71 per cent) had house connections, and 34 per cent of the rural population had access to potable water. In the same year, 84 million (43 per cent) of the people in urban areas but only 3 million in the rural areas had sewerage services.

Figure 1 shows the population coverage, and Table 1 shows the investments made from 1961 to 1970 and from 1971 through 1977.

During the past two decades, primary attention has been given to building new and expanding existing systems. Less attention has been paid to the quality of water and the need for adequate operation and

maintenance to safeguard health and protect the investments being made. Intermittent service and the poor condition of distribution systems has resulted in water losses estimated at 40 to 60 per cent and the infiltration of contaminants into the systems when negative pressures develop. Designs too have had their shortcomings. Some of the water supply systems built were oversophisticated and hence not fully in line socially and culturally with local conditions and economically viable.

Lack of trained manpower also contributed to the problem. The significant efforts in the 1940s and 1950s to establish graduate and postgraduate courses in sanitary engineering and the awarding of a large number of fellowships did not keep pace with expanding water and sanitation programs and so resulted in shortages of skilled manpower which contributed to poor operation and maintenance. It is these and other concerns that prompted the Ministers of Health to approve Resolution XIV at the XIX Pan American Sanitary Conference in 1974 urging Member Governments to give greater attention to improving the bacteriologic quality of drinking water.

Over the past ten years, there have been useful innovations in the concept and structure of the institutions responsible for providing water supply and sewerage in urban and rural areas. In the major cities and metropolitan areas there are now specialized water supply and sewerage authorities responsible for system design, finance, construction, and operation. Institutional improvements in smaller communities are now being accelerated.

An overall assessment of past activities shows that by the end of 1977 most of the Region's countries had almost fulfilled the goals for the decade with respect to urban water supply services, but that less progress had been made in providing urban sewerage and rural water supply and excreta disposal services.

Among the constraints that made it difficult to reach the prescribed goals were:

- (a) Competition from other development sectors for the use of limited human, financial, and material resources available.
- (b) Lack of information among public opinion molders about the needs and aspirations of the people, so that higher priority would be given to providing basic sanitary services.
- (c) Lack of knowledge, understanding, and motivation among public administrators about the importance of water supply, sewerage, and excreta disposal in a country's development.
- (d) Fragmentation of responsibilities among many agencies resulting in uncoordinated program activities.

- (e) Absence of realistic financial policies, particularly for smaller communities and rural areas.
- (f) Lack of trained manpower.
- (g) Unsuitable administrative structures and an inadequate legal framework.

The International Drinking Water and Sanitation Decade

The need to extend water supply and sanitation services globally was examined at the United Nations Conference on Human Settlements in 1976. This world gathering and those that followed in 1977 and in 1978--the United Nations Conferences on Water and Primary Health Care--all stressed the goal of providing drinking water and sanitation services to as many people as possible by 1990 particularly to those in rural and urban underserved areas. This global effort has been designated the International Drinking Water and Sanitation Decade.

For Latin America and the Caribbean this raises the expectation that many of the 338 million people living in urban areas and the 147 million in rural areas may have adequate water supply, sewerage, and excreta disposal facilities by 1990. There is also hope that special attention will be given to extending services to large squatter settlements, which represent as much as 25 per cent of some urban populations, and to small communities and the dispersed rural population. Realizing these goals assumes that major commitments will be made at the highest levels of government and that innovative training, financing, and institutional development programs will be initiated.

Possible constraints

Governments in the Americas are becoming increasingly aware that providing water and sanitation services is the single most important and cost-effective activity that can be undertaken to improve the health of their people and raise productivity. Progress in the future will nevertheless depend on overcoming some of the same constraints encountered during the past two decades. Briefly it will mean: obtaining support at the highest levels of government for expanding basic sanitation services as an essential component of national development; collecting and analyzing detailed information about the sector for project development; overcoming institutional weakness at all levels; better coordination of responsibilities among agencies; developing national training systems for manpower development; and overcoming economic and financing problems.

Motivation

It is difficult to justify investments in water supply and sanitation facilities on a strictly quantifiable cost-benefit basis because no

satisfactory method has been developed to provide this type of information. Decisions must thus be based on qualitative assessments such as improved public health and the resulting increase in productivity, and in rural areas the slowdown in rural-urban migration through redistribution of real income in favor of the rural poor.

It must also be recognized that epidemiologic studies do indicate that the provision of basic sanitation services can be a major factor in reducing diarrheal diseases, the most common cause of death among infants in developing countries (Figure 2). It has further been shown that a number of debilitating parasitic diseases such as typhoid, cholera, and shigellosis are linked to inadequate and contaminated water supply and poor sanitary conditions.

Decision-making is sometimes affected by lack of information about the sector. An important consideration is thus the collection of sector information to identify problems and constraints, analyzing development strategies, estimating investments needed, and recommending policies, institutional improvements, and other measures necessary to assure the success of programs.

Technical specialists can also assume an active role in influencing favorable decisions by transforming technically sound ideas into realistic plans acceptable to political decision makers. By preparing long-range plans, for example, they can define and justify the objectives to be attained in a particular program and establish priorities in carrying it out. Such long-range plans can also provide orientation and guidance to future governments and thereby improve program continuity.

Plans of an immediate nature are also necessary because they give prestige and credibility to a government by identifying goals to be attained during its term of office and provide the information needed for authorizing the mobilization of human, financial, institutional, and material resources.

Institutions

Assignment of program responsibilities among national agencies will vary from country to country, but the Minister of Health in each country should stress the public health justifications for providing water supply and sanitation services, stimulate national commitments, and identify the benefits to be derived from cooperation among interrelated sectors.

A Minister of Health might encourage the formation of a National Water Council, or similar mechanisms or groups of concerned agencies, to coordinate policy and guide programs. Such a council should include ministries or agencies concerned with health, planning, finance, public works, agriculture, and housing and economic development.

Institutional weaknesses usually become evident after systems are operational. There is then a realization that the agency responsible for operation and management cannot fully achieve an investment's potential benefits. It is important to remember that financial commitments do not stop with the construction of a facility. Funds must be made available to create and maintain an infrastructure to operate the utility on sound administrative and fiscal lines and with a staff adequate to maintain a satisfactory level of performance. A system that does not work or works poorly is of no benefit and wastes valuable resources.

The development of permanent community institutions, particularly in rural areas, is a high priority objective. These will vary widely, depending on the size of the water supply and sanitation services and social and governmental conditions. In any event, there are certain basic functions and responsibilities that go hand in hand with local organization, among which are: stimulating and mobilizing local community participation, including labor, in the construction phase; collecting service fees from consumers; maintaining and repairing equipment and facilities; servicing complaints; keeping records of funds and facilities; training employees; participating in planning future service extension, consistent with community needs and capacity; and cooperating with other local social and economic development efforts.

To be effective, local management requires the support of an infrastructure that can provide technical guidance. In addition, it should develop and maintain liaison and cooperative arrangements with neighboring community organizations. These contacts can be very helpful in handling emergencies as well as other problems.

Appropriate technology

In designing the level of water and sanitation services to be provided, attention must be paid to "appropriate technology." There is no easy answer to the question of what methods and equipment are suitable except that they must be compatible with existing conditions and situations. Though current technologies are generally applicable to urban projects, they usually lack the "social" focus that allows them to be integrated with the community participation that is so essential to village, rural, and slum programs. Technologies are also often misapplied because the designer does not clearly understand the basic assumptions implicit in the solutions being used. This usually results in costly overdesigns or unrealistic manpower requirements.

Basically, appropriate technology should: be compatible with the social, cultural, and economic conditions in the particular developing country; be understood by the people using it; be cost-effective (and preferably inexpensive) and simple enough to become part of the individual community's life style; be labor-intensive; use local materials

and develop local industry as much as possible; and be simple to operate and easy to maintain.

Methods and equipment with these characteristics do not necessarily mean sophisticated or modern versus simple basic technology. Depending on circumstances, there is need for modern and capital-intensive as well as small-scale and labor-intensive technologies. Simplicity and smallness should not be regarded as backward or second-rate but rather as appropriate if the intended purpose calls for them.

To meet the challenge of the 1980s, major efforts will need to be made to identify, develop, choose, apply, and evaluate technologies and to exchange and disseminate information among and within countries, including the development of institutional arrangements and systems to accomplish this end.

Manpower development

The extensive capital investment of the 1980s must be accompanied by a massive program to train national, regional, and local personnel as well as workers in the international field who are needed to guide and help carry out programs and projects. Personnel must be recruited, trained for specific duties, and given the incentives to remain on the job.

Training is required for the following specific categories of personnel:

- (a) Professional workers. These include sanitary and environmental engineers knowledgeable about water and sewerage; civil, chemical, mechanical, and electrical engineers; chemists, biologists, accountants; and above all, managers who can exercise professional leadership in the sector.
- (b) Technicians and skilled workers. This category is primarily concerned with all activities related to operation and maintenance of physical facilities, from collection of water samples to checking and reporting on the condition and performance of various types of equipment. It includes plant operators, supervisors, workshop staff, foremen, and technicians in the various specialities required.
- (c) Semiskilled and unskilled workers. This category embraces waterworks operators and tradesmen such as masons, carpenters, pipefitters, handpump and drilling equipment operators, and orderlies.
- (d) Village water system operators. Villagers will need to be trained to operate, maintain, and manage their own systems. Special training techniques need to be developed.

- (e) Health workers. Doctors, nurses, and health assistants, inspectors, promoters, and other staff need to be trained in the benefits and implications of water supply among other health education aspects of sanitation, as part of the primary health care efforts.

Although no precise statistics exist, an extrapolation of a 1972 PAHO survey shows that 400,000 people will have to be trained in the water and sanitation field by 1990. Obviously, training this number of people is a staggering task, particularly since the deficit is both quantitative and qualitative.

Training efforts of previous years have created a nucleus of technically qualified people. A broader multiplier effect is required, however. This means organizing self-sustaining training systems in each country or group of countries and optimizing the use of existing institutions and technical expertise. Through these national facilities it should also be possible to develop suitable performance-oriented training and job manuals and other instructional materials as well as training courses.

Financial considerations

Developing water supply and sewerage services implies choices among alternatives--balances between urban and rural development, qualities of service, levels of funding, pricing policies, water rate structures, and the effects of programs on government revenues. These are largely political choices and so must be made by governments, but they should be made with full realization of their financial, economic, and social consequences.

Project financing requires careful review of the national funds needed, particularly in relation to how much should be borrowed from external sources and how to insure that adequate funds are available for service operation and maintenance and eventual expansion. The largest portion of project budgets will have to come from domestic sources. Rural water and sanitation installations will probably require special financing policies because in many cases the population to be served will not be able to pay adequately for services. Decisions must be made about whether subsidies, if any, will come from national or local funds or be borrowed abroad. Either way there are pros and cons. If funds are borrowed, systems can be installed immediately and benefits to public health realized in a short time. The alternative is to build fewer systems with the limited resources available and thus keep borrowing to a minimum.

In any case, it is well to remember that international finance and technical cooperation agencies act and define policies in response to

member governments' wishes and expressed priorities. Financial policies could therefore be oriented in consonance with the aims of the Water Decade.

System operation and maintenance financing is critical. If water quality is to be maintained, the cost of operation and maintenance, which is usually a good proportion of what it takes to produce the water, should be recovered through service charges to the users. The importance of a financially sound utility with adequate staff for operation and maintenance and enough spare parts cannot be overstressed. The full benefits of water and sanitation services can only be realized when they are available full time because intermittent service and other poor operation and maintenance practices usually result in poorly functioning systems which eventually become inoperable.

Budgets for operating utilities should also take into account the need to finance major repairs and replacements. If an agency responsible for providing water and sanitation services follows sound financial policies, it should be able to make occasional large expenditures from built-up reserves.

Revolving funds have shown themselves useful in extending water and sanitation services. They could be used to improve services, and charges paid by users could be returned to the fund over a period of years. They could also be used to finance projects. An example is in Brazil, where the National Housing Bank (BNH) supports state water and sanitation authorities which have established "water and sewerage funds" that operate as revolving funds and provide a permanent way of solving problems. Funds paid back to BNH may not necessarily be used for other water and sanitation projects, but instead may be applied to other sectors in which BNH is interested. At the state level, however, the mechanism is a revolving fund. There are examples in other countries as well.

Some of the multilateral banks have funds that they make available to least developed countries on concessionary terms. This makes it possible for countries to repay the loans at very low interest and over long periods. As the water agency repays them, the funds are placed in the countries' reserves for reinvestment in other projects, though not necessarily in the water or sanitation sector. Governments usually repay loans after 10 years and at lower interest rates than they charge to carry out projects and thus can create revolving funds.

Another possibility might be for a government to allow external credit to be used to establish revolving funds for water sanitation facilities and to permit water agencies to use repayments to establish such funds. Under this arrangement, an agency would take over the obligation of repaying the credit to the external bank when payments become due. The initiative for such an arrangement would have to come from the

country and certainly from the agency concerned with water and sanitation.

One major problem which confronts most revolving funds is the struggle to maintain fiscal soundness in the face of inflation. In Brazil this problem has been dealt with by applying the concept of "monetary correction," which insures constant value currency. Another is foreign currency exchange because community repayments are in local currency and the revolving fund may have to repay a loan in foreign currency. If a government cannot arrange the exchange, obtaining the foreign currency needed to buy imported equipment can become a major problem.

In viewing the overall financing situation, it appears that funds from donor countries and lending institutions for building water and sanitation facilities will meet most of the Region's needs. Unfortunately, the availability of funds for important complementary activities is not so certain. Among these activities are feasibility and project identification studies as well as the manpower and institutional development that is so important for proper system operation and maintenance.

Some donor countries have made funds available for project identification and some lending institutions have included funds for institutional and manpower development in their loan agreements, but it can be anticipated that funds from these sources will not satisfy all the Region's needs.

Considering the limitations and constraints discussed earlier, some thought should therefore be given to creating a special water and sanitation development fund for the 1980s to which countries and financial institutions could contribute. Such a fund could be used to assist those countries that most need to define their manpower requirements, develop educational plans and programs, and prepare project proposals for new or strengthen existing institutions; to develop mechanisms to facilitate the preparation of project approval by lending agencies; to convene meetings of lending and donor agencies to establish criteria and guidelines for securing resources; and to develop responsible institutions technically and administratively.

Such a fund could also be used to establish subregional technical staffs to help diagnose and solve operational and maintenance problems and facilitate obtaining spare parts. A current problem is the lack of skilled diagnostic manpower and it is unlikely that training programs will fully overcome it in the foreseeable future. It is not uncommon for systems to be out of service for months because problems cannot be identified, delays occur in obtaining spare parts, or the parts cannot be obtained for lack of foreign currency. With PAHO assistance, a regional mechanism could be established to alleviate some of the problems of currency exchange and reduce the time required to obtain parts.

Primary health care

Few health programs are now integrated. There is generally little or no coordination between community water supply and sanitation programs and other components of primary health care or development efforts in other sectors.

Meeting the goals for the 1980s will require more community participation in determining needs and how they can be met. Many of the failures of the past can be traced to this lack of community involvement in decision-making, implementation, and evaluation. Lack of intersectoral coordination has also led to inefficient expenditure of valuable resources.

Translating the primary health care concept into action to further the extension of basic primary sanitary services will require overcoming these and other shortcomings such as better informing people of the benefits to be derived from having water and sanitation services and the training of community level workers. How this can be accomplished will vary among countries. It is likely that experience in carrying out projects will produce improved methods for guiding program activities in meeting these basic human needs.

PAHO Technical Cooperation Program

With regard to water supply and sanitation, PAHO is cooperating with Member Governments to further the global strategies for the 1980s by assisting in the rapid assessment of current national programs, the preparation of national plans, and the identification and development of specific projects. In connection with the latter, support has been secured from the Federal Republic of Germany for five countries in most need of assistance. In addition, and within the overall framework of the decade, the PAHO Technical Cooperation Program is oriented to the following specific program activities:

- (a) Sector studies and the collection of other pertinent data will be continued as part of the World Bank/WHO Cooperative Program. The highest priority will be given to utilizing this information to assist countries in identifying projects for financial support from lending and donor agencies.
- (b) Seeking extrabudgetary funds to be used for project identification to supplement funds already provided for this purpose by the World Bank and the Federal Republic of Germany.
- (c) Holding training courses for national and PAHO field staff to familiarize them with the cooperative program and the procedures which should be followed in developing project proposals. In

1979 courses will be held in Lima, Peru; Guatemala City, Guatemala; and Buenos Aires, Argentina. Others will be held in the Caribbean Area and Brazil.

- (d) Improvement of water quality through the development of lower cost technology, identifying and solving systems, and institutional development, including the establishment of surveillance and correction mechanisms.
- (e) Encourage identification of operation and maintenance related projects which might be supported by lending and donor agencies. These will be included among other projects related to leakage and unaccounted-for water, and demonstrating appropriate technology. Also lending agencies will be encouraged to continue the inclusion of funds for manpower and institutional development in all loan agreements.
- (f) Preparation of guidelines, manuals, and models for various components of institutional development to be used in implementing new projects.
- (g) Reviewing international drinking water standards to determine if modifications are necessary for possible adoption in countries of the AMRO region.
- (h) Development of manpower at all levels. Increases in fellowships and traineeships will be encouraged for the preparation of managers and to develop on-site training delivery systems to improve the skills of operators and other intermediate-level personnel.
- (i) Information exchange with emphasis on assisting countries in establishing their own systems as part of a network of collaborating institutions.
- (j) Extension of primary health services to the underserved populations of the Region, including water supply and sanitation services.

An important related activity will be the basic water and sanitation project in Peru to be financed by that country's government and the Inter-American Development Bank and coordinated by the Pan American Center for Sanitary Engineering and Environmental Sciences in Lima. This program will focus on research, training, and the development of training materials directed to improved operation and maintenance. To minimize duplication, these activities will be coordinated with those ongoing in the countries and by international organizations.

FIGURE 1

Number and Percentage of Urban and Rural Population Served by Water Supply and Sewerage Systems in Latin America
1961, 1970, 1974 and 1977

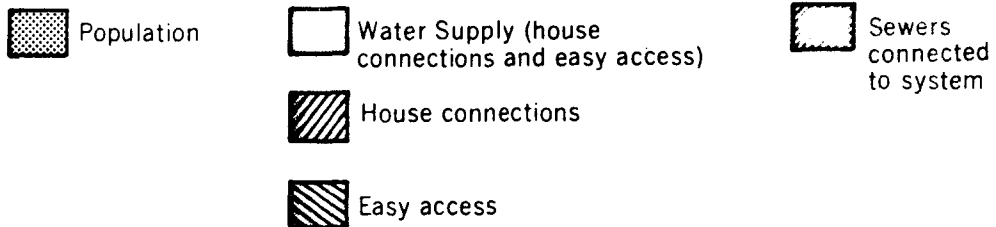
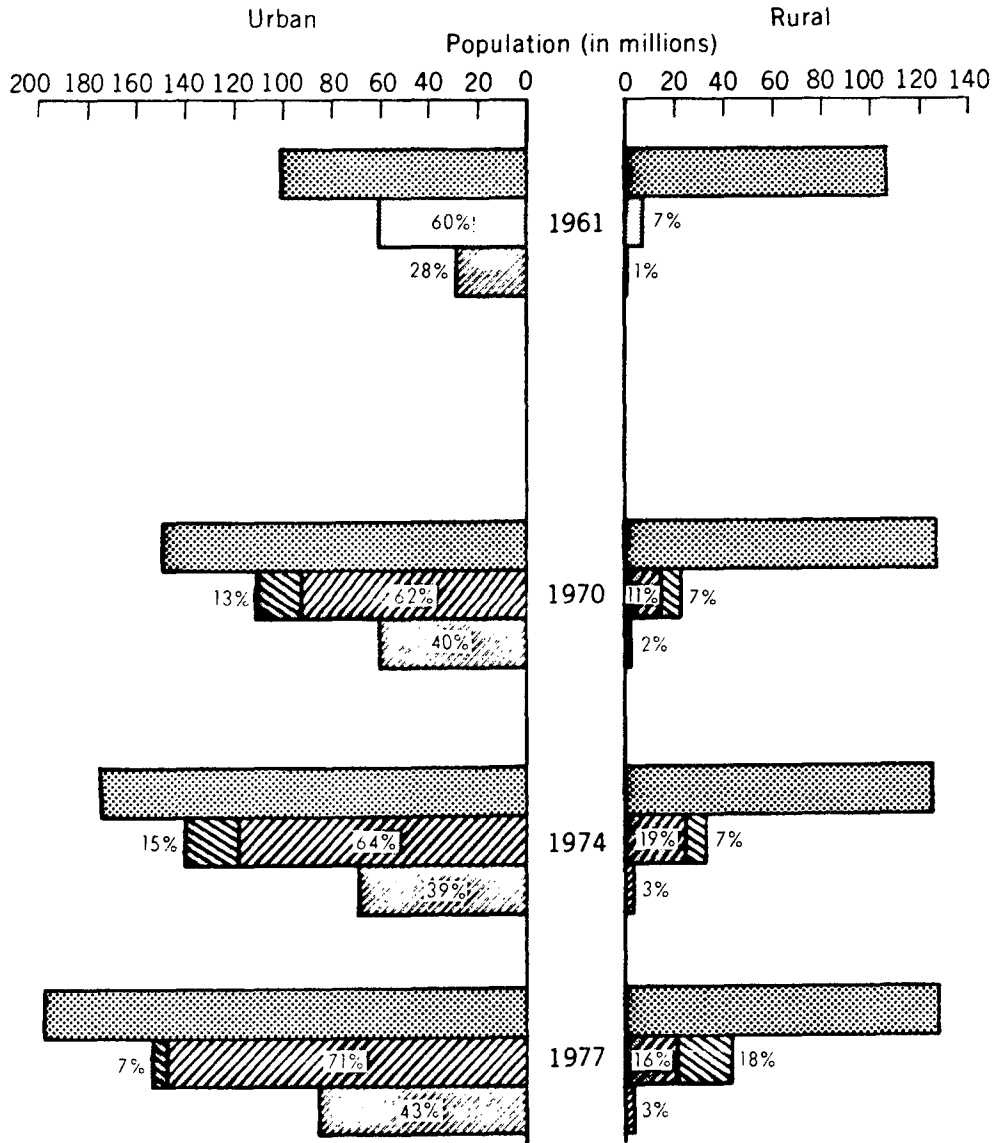
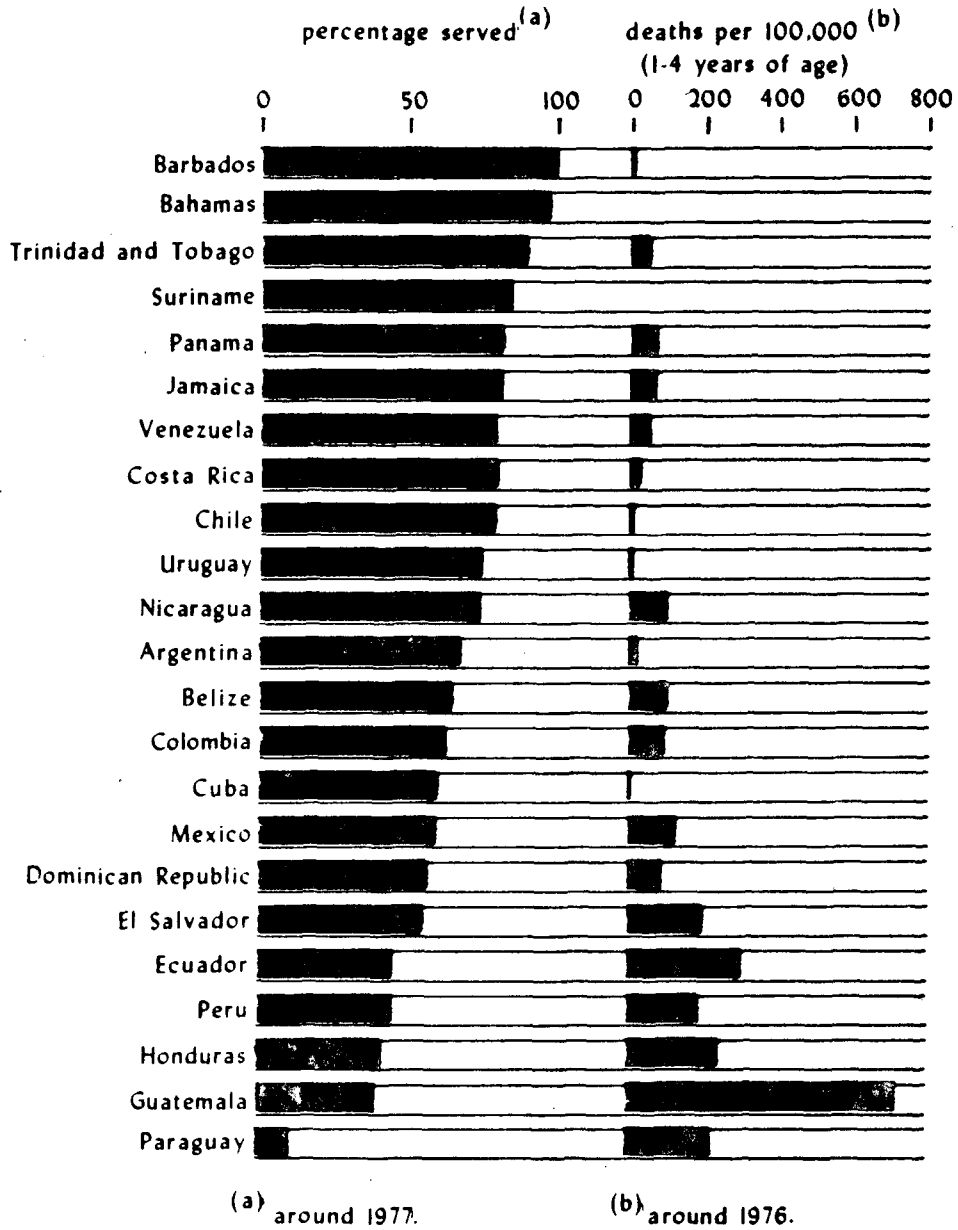


TABLE 1
 SUMMARY DATA ON THE FINANCING OF WATER SUPPLY AND SEWERAGE PROGRAMS
 IN THE AMERICAS, 1961 - 1977
 (In US dollars)

International loans	<u>1961 - 1970</u>	<u>1971 - 1977</u>	<u>1961 - 1977</u>
Inter-American Development Bank (IDB)	485,570,000	658,922,000	1,144,492,000
International Bank for Reconstruction and Development (IBRD)	61,800,000	449,725,000	511,525,000
U.S. Agency for International Development (AID)	140,850,000	26,963,000	167,813,000
Export-Import Bank (EXIMBANK)	30,510,000	-	30,510,000
Canadian International Development Agency (CIDA)		20,616,000	20,616,000
Total	718,730,000	1,156,224,000	1,874,956,000
National funds, including counterpart funds to support international loans and grants	1,290,400,000	3,916,910,000	5,207,310,000
Grand Total	2,009,130,000	5,073,134,000	7,082,266,000

FIGURE 2

Percentage of the population served by potable water and deaths from enteritis and other diarrheal diseases per 100,000 children aged 1-4 years, by country, 1977 or latest year



SOURCES

1. Dr. Abel Wolman, "Potable Water Supply and Excreta Disposal Services During the 1980s". Washington, D.C. (Document prepared for the Technical Discussions of the XXVI Meeting of the Directing Council of PAHO, 1979)
2. Eng. Harold Shipman, "Strategies for Financing Water and Sanitation Projects." *
3. Eng. Eduardo Yassuda "Strategies for the Planning and Management of the Programs Necessary for the Expansion and Improvement of the Water Supply and Sanitation Services in the Decade of the 80's." *
4. Eng. Charles Pineo, "Manpower Needs and Development." *
5. Dr. Antonio Ordonez Plaja, "Promotion and Motivation for Water Supply and Sewerage Programs." *
6. Eng. Wesley E. Gilbertson, "Water Supply and Sanitation Services During the Decade of the 1980s - International Policies and Strategies." *
7. Village Water Supply. Washington, D.C., World Bank, March 1976.
8. Frank A. Butrico, "Environmental Health and TCDC." Document presented at the XVI AIDIS Congress, Dominican Republic, February 19-24, 1978.
9. UNICEF/WHO Joint Study on Water Supply and Sanitation Components of Primary Health Care. JC22/UNICEF-WHO/79.
10. Report of the United Nations Water Conference, Mar del Plata, 14-25 March 1977. New York, United Nations, 1977.
11. Reported Cases of Notifiable Diseases in the Americas, Pan American Health Organization, Scientific Publication No. 315, 1976.
12. A Joint Report by the Director-General of the World Health Organization and the Executive Director of the United Nations Children's Fund to the International Conference on Primary Health Care, Alma-Ata, USSR, 6-12 September 1978, Geneva, New York.

* Documents prepared for a PAHO Working Group on Strategies for the 1980s.