PAN AMERICAN CENTER FOR SANITARY ENGINEERING
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water supply and sewerage programs in latin america and caribbean countries

1961 - 1980

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The report is also available in Spanish.

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TABLES

A. PROGRAM DEVELOPMENT DURING THE DECADE 1961-1970

In the Charter of Punta del Este, goals for water supply and sewerage programs during the decade 1961-1970 were proposed to the Latin American and Caribbean countries participating in the Special Meeting of the Inter-American Economic and Social Council at the Ministerial Level, held in August 1961. The proposal called for "provision of water and sewerage services to not less than 70 per cent of the urban population and 50 per cent of the rural population" during the decade.

These goals represented a considerable challenge for most of the countries. Nevertheless, despite the magnitude of the task at hand, the main aspects of the program were accomplished, thanks to the support of high government officials and the cooperation of national and international lending and technical assistance agencies.

Table 1, showing the status of urban water supply services in 1961 and 1970, offers a comparison of the situation in this sector at the beginning and end of the decade. It should be mentioned here that this report is based mainly on official statistics or estimates supplied by the countries to international organizations. However, when compiling the data, certain inconsistencies were found which could put the accuracy of the information in question. For this reason, some of the figures have been adjusted to make them compatible with the rest of the material contained in this document.

In Table 1, it can be seen that there was a notable increase during the decade in the percentage of the urban population served with water supply, which rose from 59 per cent in 1961 to 75 per cent in 1970. Seventeen countries surpassed the goal set for this sector in 1961, including one large country (Mexico), three medium-sized countries (Chile, Colombia and Venezuela), and thirteen small countries including all the Central American and Caribbean countries with the exception of Haiti.

It should be pointed out that not all the urban population served with water supply has house connections; approximately 13 per cent of the total urban population (about 17 per cent of the population served) is served through public standpipes or other means of easy access to the drinking water supply.

Special circumstances in some of the countries which reached the goals set for the past decade should be kept in mind in relation to current programs. For example, in Mexico and Colombia national water supply and sewerage plans were drawn up at the beginning of the decade which helped guide the activities in this area.

In most of the Central American countries, national institutions in charge of implementing water supply and sewerage projects and operating existing systems were also organized at the beginning of the decade. The following are examples: the National Water Supply and Sewerage Institute (IDAAN) in Panama, the National Water Supply and Sewerage Service (SNAA) in Costa Rica, the National Autonomous Water Supply and Sewerage Service (SANAA) in Honduras, the National Water Supply and Sewerage Authority (ANDA) in El Salvador, and the National Water Supply and Sewerage Department (DENACAL), organized in Nicaragua in the middle of 1967.

This confirms the importance of adequately planning sanitary engineering projects at the national level and the need for institutions capable of administering them in an efficient and responsible manner. Since these conditions had been met in most of the countries by the beginning of the Second Decade, it is reasonable to expect greater progress than during the previous one.

Although the target set for rural water supply was unrealistically high, a strong foundation for future progress was built during the decade. Very little information pertaining to this sector was available in 1961, when data could be obtained from only ten countries (see Table 2). Considering the fact that the missing data for 1961 includes two of the large countries and several of the medium-sized countries, it can be assumed that the rural population served at the beginning of the decade was approximately

Table 1

LATIN AMERICA AND CARIBBEAN COUNTRIES: URBAN WATER SUPPLY SERVICES
POPULATION SERVED IN 1961 AND 1970

(in thousands)

	1961			1970					
					Population served				
	Total	Population served	%	Total	House connections	%	Easy access	Total	%
Argentina	15,605	10,246	66	19,208	11,800	62	900	12,700	66
Barbados	12	...	...	* 116	103	89	13	116	100
Bolivia	1,130	507 */	45	1,652	513	31	463	976	59
Brazil	29,092	18,031	62	44,430	26,210	59	2,000	28,210	64
Chile	5,026	3,589	71	6,841	4,250	62	1,700	5,950	87
Colombia	7,708	4,955	64	12,785	7,800 a/	61	3,900	11,700	92
Costa Rica	* 421	412	97	* 859	799	93	60	859	100
Cuba	3,627	2,182	60	4,450	3,840 b/	86	610	4,450	100
Dominican Rep.	930	492	53	1,603	934	58	291	1,225	76
Ecuador	1,612	726	45	2,756	1,389	50	312	1,701	62
El Salvador	812	467	57	1,305	813	62	133	946	73
Guatemala	1,114	371	33	1,627	725	45	872	1,597	98
Guyana	90	...	..	* 240	224	93	7	231	96
Haiti	525	102	19	907	150	17	250	400	44
Honduras	397	212	53	716	475	66	241	716	100
Jamaica	388	...	...	741	537	72	6	543	73
Mexico	20,123	10,082	50	*27,851	19,490	70	4,000	23,490	84
Nicaragua	523	215	41	808	557	69	185	742	92
Panama	446	433	97	706	611	87	37	648	92
Paraguay	536	120 */	22	872	160	18	125	285	33
Peru	3,993	2,341 **/	58	6,690	2,900	43	1,300	4,200	63
Trinidad-Tobago	150	...	...	358	297	83	59	356	99
Uruguay	1,930	1,290	67	2,308	1,853	80	189	2,042	89
Venezuela	5,038	2,318	46	7,737	5,300	69	1,520	6,820	88
Totals	101,228	59,091	59	147,566	91,730	62	19,173	110,903	75

Sources: Total population: CELADE, Boletín Demográfico, Vols. III and X, United Nations Demographic Yearbook.

Population served in 1961: PAHO/WHO, Community water supply and sewage disposal programs in Latin America and Caribbean countries, Document N° ES.5, 1969, p. 3.

Population served in 1970: PAHO/WHO, Annual Report of the Director, 1970, p.50.

Exceptions:

a/ Data as of December 1969.
b/ Data as of June 1966.
*/ Data taken from "Health conditions in the Americas 1961-1964", PAHO Scientific Publication 138, p.120.
**/ Data taken from "Los recursos hidráulicos de América Latina - IV. PERU", ECLA, 31/VII/68, p.140.

Table 2

LATIN AMERICA AND CARIBBEAN COUNTRIES: RURAL WATER SUPPLY SERVICES
POPULATION SERVED IN 1961 AND 1970

(in thousands)

	1961			1970					
					Population served				
	Total	Population served	%	Total	House connections	%	Easy access	Total	%
Argentina	5,598	75	1.3	5,144	654	13.0	200	854	17.0
Barbados	223	...	...	* 138	27	19.0	111	138	100.0
Bolivia	2,648	...	...	3,006	65	2.0	18	83	3.0
Brazil	43,277	...	...	48,814	-	-	2,000	2,000	4.0
Chile	2,851	400	14.0	2,876	120	4.0	130	250	9.0
Colombia	8,692	3,492	40.0	9,375	1,500[a/]	16.0	2,600	4,100	48.0
Costa Rica	876	179	20.0	* 894	358	40.0	143	501	56.0
Cuba	3,335	...	...	3,891	1,770[b/]	45.0	-	1,770	45.0
Dominican Rep.	2,300	376	16.0	2,745	106	4.0	165	271	10.0
Ecuador	2,853	...	...	3,272	166	5.0	110	276	8.0
El Salvador	1,773	...	...	2,136	583	27.0	-	583	27.0
Guatemala	2,966	...	...	3,655	47	1.0	378	425	12.0
Guyana	490	...	...	525	176	34.0	21	197	38.0
Haiti	3,705	-	-	4,322	46	1.0	80	126	3.0
Honduras	1,513	103	6.8	1,867	118	6.0	72	190	10.0
Jamaica	1,271	...	...	1,255	112	9.0	256	368	29.0
Mexico	17,141	...	...	19,130	5,770	30.0	-	5,770	30.0
Nicaragua	1,024	3	0.3	1,213	60	5.0	60	120	10.0
Panama	607	...	...	700	49	7.0	18	67	10.0
Paraguay	1,257	-	-	1,547	-	-	88	88	6.0
Peru	6,326	...	...	6,896	80	1.0	760	840	12.0
Trinidad-Tobago	708	...	...	702	265	38.0	401	666	95.0
Uruguay	647	15	2.3	581	69	12.0	59	128	22.0
Venezuela	2,971	...	...	3,018	1,906	63.0	377	2,283	76.0
Totals	115,052	4,643	4.0	127,702	14,047	11.0	8,047	22,094	17.0

Sources: Total population: CELADE, Boletín Demográfico, Vols. III and X, United Nations Demographic Yearbook.

Population served in 1961: PAHO/WHO, Community water supply and sewage disposal programs in Latin America and Caribbean countries, Document N° ES.5, 1969, p.3.

Population served in 1970: PAHO/WHO, Annual Report of the Director, 1970, p.50.

Exceptions:

a/ Data as of December 1969.
b/ Data as of June 1966.
*/ Data taken from "Health conditions in the Americas 1961-1964", PAHO Scientific Publication 138, p. 120.

8 per cent. Therefore, during the period in question (1961-1970) coverage in this area was doubled, reaching 17 per cent of the population in 1970.

In Table 2, which shows the status of water supply services in rural areas in 1961 and 1970, it can also be seen that four countries (Barbados, Costa Rica, Trinidad-Tobago and Venezuela) surpassed the target set in 1961 of providing water supply to a minimum of 50 per cent of the rural population. Slightly more than half of this population does not have house connections, but is served instead by public standpipes, wells, and other means of easy access. This situation is completely justified in many places because of the great dispersion of dwellings in most rural areas.

For sewerage services in urban areas, the Charter of Punta del Este set the same goals as for water supply, but it was to be expected that these systems would be developed somewhat more slowly, since their operation depends on the availability of water.

Table 3 contains data on the urban population with sewerage service in 1961 and 1970. It can be seen that, in spite of the above-mentioned restrictions, substantial progress was also made in this sector. In 1961 only 29 million urban residents (28%) lived in houses with sewer connections, while in 1970, this service had been provided to 60 million urban dwellers (40%).

Although no country was able to reach the target set in the Charter of Punta del Este, two countries came quite close: Colombia with 67 per cent and Panama with 65 per cent of their respective urban populations served by sewerage systems.

At the end of the decade 1961-1970, it was still difficult to obtain statistical data on rural sanitation activities, especially those related to excreta and wastewater disposal. In 1961 there was no data available on the percentage of rural population provided with these services, while in 1970 ten countries supplied this information. Table 4 shows that only 1.7 per

Table 3

LATIN AMERICA AND CARIBBEAN COUNTRIES: URBAN SEWERAGE SERVICES
POPULATION SERVED IN 1961 AND 1970

(in thousands)

	1961			1970		
	Total	Population served	%	Total	Population served	%
Argentina	15,605	5,000[a]	32.0	19,280	6,200	32.0
Barbados	12	...	...	* 116	-	-
Bolivia	1,130	360	32.0	1,652	320	19.0
Brazil	29,092	4,180	14.0	44,430	13,440	30.0
Chile	5,026	2,107[b]	42.0	6,841	2,430	36.0
Colombia	7,708	4,081	53.0	12,875	8,600[e]	67.0
Costa Rica	421	138[b]	33.0	* 859	206	24.0
Cuba	3,627	1,317[b]	37.0	4,450	1,700[f]	38.0
Dominican Rep.	930	345	37.0	1,603	258	16.0
Ecuador	1,612	886[b]	55.0	2,756	1,311	47.0
El Salvador	812	336[c]	41.0	1,305	731	56.0
Guatemala	1,114	256	23.0	1,627	728	45.0
Guyana	90	...	...	* 240	93	39.0
Haiti	525	-	-	907	75	8.0
Honduras	397	114	29.0	716	387	54.0
Jamaica	388	...	...	741	139	19.0
Mexico	20,123	4,270	21.0	*27,851	14,040	50.0
Nicaragua	523	115	22.0	808	342	42.0
Panama	446	272	61.0	706	460	65.0
Paraguay	536	80[d]	15.0	872	125	14.0
Peru	3,993	2,500	63.0	6,690	3,700	55.0
Trinidad-Tobago	150	...	...	358	181	51.0
Uruguay	1,930	868	45.0	2,308	1,200	52.0
Venezuela	5,038	1,571	31.0	7,737	3,272	42.0
Totals	101,228	28,796	28.0	147,728	59,938	40.0

Sources: Total population: CELADE, Boletín Demográfico, Vols. III and X, United Nations Demographic Yearbook (except those figures marked with *, which were taken from PAHO/WHO data).

Population served in 1961: PAHO/WHO, Community water supply and sewage disposal programs in Latin America and Caribbean countries, Document N° ES.5, 1969, p.3.

Population served in 1970: PAHO/WHO, Annual Report of the Director, 1970, p.50.

a/ ECLA, "Los recursos hidráulicos de Argentina", 1969, Vol. 3, p.15.
b/ PAHO/WHO, "Health conditions in the Americas, 1961-1964", p.122.
c/ ECLA, "Evaluación de recursos hidráulicos del istmo centroamericano. II. El Salvador", Annex B: Abastecimiento de agua y desagües, p.21.
d/ ECLA, "Estudio sobre los recursos hidráulicos del Paraguay", 1971, p.72.
e/ Data as of December 1969.
f/ Data as of June 1966.

cent of the rural population was served in 1970, a figure far below the goal set in the Charter of Punta del Este.

The limited number of sewerage systems constructed in rural areas is explained by the need for a constant supply of water in order to operate the sewers, and by the feasibility of using individual solutions for wastewater disposal in these areas, such as septic tanks or household drainage systems which empty into nearby bodies of water, even when a water supply system does exist. Despite these alternatives, provisions should be made for wastewater control when extending water supply systems in these areas.

Table 4

LATIN AMERICA AND CARIBBEAN COUNTRIES: RURAL SEWERAGE SERVICES
POPULATION SERVED IN 1970

(in thousands)

	Total	Population served	%
Chile	2,876	185	6.5
Colombia	9,375	1,800[a/]	19.2
Ecuador	3,272	40	1.2
El Salvador	2,136	4	0.2
Honduras	1,867	2	0.1
Jamaica	1,255	8	0.6
Panama	700	4	0.6
Peru	6,896	12	0.2
Trinidad-Tobago	702	2	0.3
Venezuela	3,018	100	3.3
Totals	32,097	2,157	1.7

Source: PAHO/WHO, Annual Report of the Director, 1970, p.50.

a/ Data as of December 1969.

B. FINANCING

One of the main reasons for the good results obtained in the urban water supply and sewerage programs during the decade 1961-1970 was the financial support provided by the national governments and international lending agencies. Table 5 shows the sources of the funds utilized during the period. Of the more than two billion dollars invested in these programs, 64 per cent came from national funds and 36 per cent from international organizations. Of the funds corresponding to international loans, 79 per cent was specifically allocated for water supply and 21 per cent for sewerage programs.

Table 6 contains a list of the loans approved by the international lending institutions during the last three years of the decade of the sixties for the construction of water supply and sewerage systems in Latin America and the Caribbean countries, and the corresponding matching funds pledged by the national governments. This information is presented here because the majority of the projects to be implemented in the first years of the Second United Nations Development Decade will be financed with these funds.

Table 5

LATIN AMERICA AND CARIBBEAN COUNTRIES: FUNDS ALLOCATED FOR CONSTRUCTION OF WATER SUPPLY AND SEWERAGE SYSTEMS, 1961-1970[a/]

(Amounts in thousands of U.S. dollars)

	International loans								Estimated national matching funds
	IDB		IBRD		AID		EXIMBANK		
	Water	Sewerage	Water	Sewerage	Water	Sewerage	Water	Sewerage	
Argentina	33,730	2,270	-	-	1,400	-	-	-	43,030
Bolivia	10,600	4,800	-	-	1,145	-	-	-	9,397
Brazil	113,060	14,650	-	-	30,695	33,900	-	-	236,164
Chile	27,945	1,700	-	-	2,000	840	188	-	23,654
Colombia	36,751	7,233	30,000	2,500	3,800	9,600	1,261	-	82,600
Costa Rica	3,900	3,940	-	-	4,900	-	4,000	-	6,524
Dominican Rep.	9.060	1.090	-	-	3,000	-	-	-	5,925
Ecuador	17,200	11,168	-	-	-	-	-	-	13,423
El Salvador	7,680	1,520	-	-	75	-	-	-	4,540
Guatemala	21,718	2,000	-	-	1,369	-	-	-	13,305
Guyana	-	-	-	-	2,650	-	-	-	1,200
Haiti	7,510	88	-	-	-	-	-	-	1,600
Honduras	2,650	-	-	-	1,050	-	-	-	670
Jamaica	-	-	5,000	-	3,700	-	-	-	5,900
Mexico	25,974	550	-	-	-	-	36	-	18,296
Nicaragua	2,000	4,885	3,000	-	143	-	-	-	8,128
Panama	5,842	370	-	-	21,140	10,851	-	-	15,007
Paraguay	3,895	4,670	-	-	-	-	-	-	3,550
Peru	25,024	10,836	-	-	5,700	2,900	5,123	1,500	43,079
Trinidad-Tobago	300	-	-	-	-	-	-	9,000	9,313
Uruguay	12,943	3,300	-	-	-	-	1,900	-	23,768
Venezuela	46,000	7,200	21,300	-	-	-	7,500	-	121,131
Totals	413,782	82,270	59,300	2,500	82,767	58,091	20,008	10,500	690,204

Source: PAHO/WHO, Annual Report of the Director, 1970, p.47.

a/ International loans..... $ 729,218
Water..... $ 575,857
Sewerage..... 153,361
National matching funds..... 690,204
Other national funds..... 606,520
Total funds $ 2'025,942

Table 6

LATIN AMERICA AND CARIBBEAN COUNTRIES: NATIONAL AND INTERNATIONAL FUNDS ALLOCATED DURING 1968, 1969 AND 1970 FOR COMMUNITY WATER SUPPLY AND SEWERAGE SYSTEMS

(in thousands of U.S. dollars)

	Lending agency	Year	Purpose	International loan	National matching funds
Bolivia	IDB	1968	Water systems for 60 small towns.	1,800	1,675
	IDB	1968	Improve water systems of Cochabamba, Potosi and Santa Cruz, and sewerage system of Santa Cruz.	11,000	6,640
Brazil	IDB	1968	Extend water system of matropolitan Sao Paulo.	16,500	65,500
	AID	1970	Loans for water and sewerage systems through the National Housing Bank.	15,400	12,500
	AID	1970	Municipal sewerage systems, principally in the northeast and less-developed parts of the country.	25,000	37,500
Chile	IDB	1970	Valparaiso and Viña water system.	3,000	2,550
Colombia	IBRD	1968	Conduction line and improve Bogota water system.	14,000	21,300
	IDB	1969	Third phase, extension of Medellin water system.	9,000	8,500
	IBRD	1970	Water and sewerage systems of Cali.	18,500	14,500
Costa Rica	IDB	1970	First phase, extension of San Jose sewerage system and water and sewerage systems for Limon, Liberia, Puntarenas and San Isidro del General.	6,300	3,700
Dominican Republic	IDB	1968	Construction of water systems in 89 small towns.	1,950	1,050
	IDB	1970	Second phase, water systems for 100 small cities.	4,100	2,625
Ecuador	IDB	1970	First phase, extension of Guayaquil sewerage system.	7,600	5,000
Guatemala	AID	1970	82 water systems for small towns and some sewerage systems; other funds for markets and slaughter-houses.	1,345	620
	IDB	1970	Improvement of Guatemala City water system.	15,500	8,500
Guyana	AID	1968	Feasibility studies for water systems	50	-
	AID	1968	Well-drilling and improvement of water systems.	2,600	1,200
Haiti	IDB	1969	Engineering services for 6 water systems	50	-
	IDB	1970	Second phase, water systems in Port-au-Prince and other communities.	5,100	1,250
	IDB	1970	Technical assistance for sewerage systems	88	-
Honduras	IDB	1970	Technical assistance for water systems and installation of some storm sewers in San Pedro Sula.	100	20
Jamaica	IBRD	1969	Extension and improvement of Kingston water system.	5,000	4,100
Mexico	IDB	1970	Deep wells and extension and improvement of Monterrey water and sewerage systems.	12,500	9,000
Nicaragua	IDB	1968	Water systems for 75 small towns	2,000	1,330
	AID	1968	Feasibility studies for water and sewerage systems for 6 towns.	143	-
	IDB	1970	Third phase, Managua sewerage system.	4,700	3,748
Panama	AID	1969	Extension and improvement of Panama City water system.	15,000	8,000
Paraguay	IDB	1969	Improve water system and construct sewerage system and storm sewers for Asuncion.	8,300	3,550
Peru	IDB	1970	Emergency relief including water and sewerage systems for small cities.	2,700	1,300
Uruguay	IDB	1968	Construct or improve water systems for 100 small towns.	4,400	2,711
Totals				213,726	228,369

Source: PAHO/WHO, Annual Report of the Director, 1968 (p.47); 1969 (p.39); and 1970 (p.48).

C. PROBLEMS ENCOUNTERED

The main problems encountered in developing and carrying out water supply and sewerage programs in some countries of the Region can be summarized as follows:

a) The lack of preinvestment studies and adequate stocks of project proposals fulfilling the requirement of the international lending agencies.

The majority of national plans prepared at the beginning of the decade gave only a general idea of the total investment needed, site distribution and cost per project, but were not based on preinvestment studies of alternative solutions. They were even farther from being a final project proposal containing engineering design plans of the solution selected on the basis of a feasibility analysis. There was a notable shortage of professionals capable of carrying out preliminary project studies and the purely technical aspects (without considering detailed economic analysis) required in the preparation of a final project document.

b) The lack of a clearly-defined standard procedure for handling technical, financial and administrative matters between national entities and international lending agencies.

In some cases, diversity of criteria in handling similar problems caused confusion and discouragement on the part of the loan applicant and delays in obtaining needed credit.

c) Inadequate organic structure and inefficient administrative procedures (both financial and operational) in the national entities responsible for the programs.

The case of a national institution that, in 1962, arranged to borrow funds from an international bank over a two-year period for water and

sewerage system construction can serve as an example. The two years came to an end before the institution had received a single cent, due to organizational, managerial and administrative problems which plagued the institution during the period. However, when normal relations between the bank and the borrower were reestablished at the end of 1964, it was very difficult to implement the long-delayed program, because of the problems mentioned in (b).

Another case which can be mentioned is that of a country which, in spite of having created an entity responsible for water supply and sewerage services in the capital city and the rest of the country, made no progress at all during the decade.

d) Legal red-tape involved in contracting and purchasing which impedes project execution.

e) Delays in releasing national matching funds pledged in the agreement with the international financing agency.

Executives of national institutions have had to spend large amounts of time trying to obtain the release of the limited funds allocated to sanitary engineering projects, even though these funds had already been pledged in the respective loan agreement. In certain cases, entities have had to resort to taking out short-term domestic loans and to using surplus funds from other international credit operations.

f) Lack of well-defined national policies and plans to guide the activities of executing agencies. Fortunately, this problem is not very widespread.

The notable progress which has been made is the result of the meritorious efforts of professionals working to overcome countless problems and difficulties. The above-mentioned aspects and others that may be found upon making a more detailed study of these endeavors, should be kept in mind in order to improve sanitary engineering activities in this Second United Nations Development Decade.

D. OUTLOOK FOR THE DECADE 1971-1980

1. Goals and strategies

The III Special Meeting of Ministers of Health of the Americas, held in Santiago, Chile, 2-9 October 1972, approved the following targets for water supply and excreta disposal services as part of the Ten-Year Health Plan for the Americas for the period 1971-1980:[1]

"2. Environmental Sanitation Programs

2.1 Water Supply and Excreta Disposal Services

Provide water services with house connections for 80 per cent of the urban population, or as a minimum, supply half the population at present without services.

Provide water for 50 per cent of the rural population, or as a minimum, supply 30 per cent of the population at present without services.

Install sewerage to serve 70 per cent of the urban population, or as a minimum, reduce by 30 per cent the proportion of the population at present lacking such services.

Install sewerage systems and other sanitary facilities for the disposal of excreta for 50 per cent of the rural population, or as a minimum, reduce by 30 per cent the number of inhabitants not possessing any adequate facilities."

In the same meeting, the Ministers of Health of the Americas made the following suggestions regarding the strategy to be used to reach these targets:[2]

"Classify potable water supply services according to the grade of compliance with the norms of quality and efficiency of operation with the object of giving the best services to the population.

1 Ten-Year Health Plan for the Americas. Final Report of the III Special Meeting of the Ministers of Health of the Americas. Official Document PAHO 118 (1973) p.103.

2 Ibid., pp. 50-51.

"Develop national or regional programs for supplying water and sewerage services that are compatible with economic development plans and accelerate institutional development in order to strengthen the responsible agencies and assure sound administrative policies.

Develop human resources required to carry out the plans and achieve the goals set by regular and intensive education programs.

Prepare preinvestment studies and compile information needed to obtain domestic and foreign financing; draft loan applications; and develop methods based on adequate rates policies and sound administrative procedures.

Develop programs with a view to setting standards for water quality control.

Utilize techniques of 'mass approach' and concepts of community self-help to provide water in rural areas and use of revolving funds to finance rural water supply programs.

Establish a common denominator definition of urban and rural populations in order to facilitate comparability of data between countries and on a regional basis.

Include preventive planning and training of personnel responsible for providing potable water supply and sewerage services in the routine activities of the corresponding agencies, in order to be able to meet emergencies created by catastrophies and national disasters.

Ensure that programs of rural housing, agrarian reform, etc. emphasize as a primary objective the provision of potable water and excreta disposal.

Promote and intensify health education programs through the whole educational system, especially primary and secondary schools, in order to achieve the maximum effective use from water supply services and sanitary means of waste disposal."

2. The first biennium of the Second Decade

At the beginning of 1974, some data is already available concerning the progress being made in the installation of water supply and sewerage services, both urban and rural, and the number of international loans (with corresponding national matching funds) signed or approved in 1971 and 1972. This data is reported in Tables 7, 8, 9 and 10 to help the countries analyze

their potential for reaching the goals set in the Ten-Year Health Plan for the Americas, in terms of the availability and distribution of their resources.

Table 7 shows the status of urban water supply services at the end of 1971 and 1972. It can be observed that six of the 25 countries (Barbados, Costa Rica, Guyana, Panama, Trinidad-Tobago and Uruguay) had already surpassed, by the end of 1972, the target set for 1980 to "provide water services with house connections for 80 per cent of the urban population."

It should be mentioned that the percentages given for Barbados, Guyana and Trinidad-Tobago correspond to 1971, the most recent information supplied by these countries to the Department of Engineering and Environmental Sciences of the Pan American Health Organization, and that the data on Brazil was taken from WHO questionnaires for 1970.

Table 8 gives information related to rural water supply services at the end of 1971 and 1972. It can be observed that six of the same 25 countries previously considered (Barbados, Costa Rica, Cuba, Jamaica, Trinidad-Tobago and Venezuela) had already met, at the end of 1971, the goal set for 1980 to "provide water for 50 per cent of the rural population." Panama, which reports 50 per cent of the population served in 1972, can be added to the above-mentioned countries. No data is given for Barbados, Trinidad-Tobago and Venezuela for 1972.

It should be pointed out that, in Table 8, the data for Cuba corresponds to June 1966 and the information on Brazil was taken from the WHO questionnaire for 1970.

It should also be kept in mind that these tables are based only on the latest estimates of coverage received by the PAHO Department of Engineering and Environmental Sciences.

Table 7

LATIN AMERICA AND CARIBBEAN COUNTRIES: URBAN WATER SUPPLY SERVICES
POPULATION SERVED IN 1971 AND 1972

(in thousands)

	Urban population									
	TOTAL (CELADE and PAHO*)		Population served							
			House connections			Easy access		TOTAL		
	1971	1972	1971	1972	% 1972	1971	1972	1971	1972	% 1972
Argentina	19,510	19,809	12,000	13,200	67	1,000	1,000	13,000	14,200	72
Barbados	* 110	-	105	-	95**	5	-	110	-	100
Bolivia	1,694	1,736	563	790	46	478	485	1,041	1,275	73
Brazil	45,666	46,982	26,047	28,700	61	12,109	12,600	38,156	41,300	88
Chile	6,966	7,084	4,500	4,750	67	1,800	1,800	6,300	6,550	92
Colombia	13,240	13,712	6,800	9,293[c]	68	2,600	2,000	9,400	11,293	82
Costa Rica	* 878	* 635	817	603	95	61	32	878	635	100
Cuba [a]	*5,020	-	3,840	-	76	650	-	4,490	-	89
Dominican Republic	1,611	1,720	1,017	1,064	62	322	450	1,339	1,514	88
Ecuador	2,849	2,946	1,500	1,550	53	350	150	1,850	1,700	58
El Salvador	1,349	1,397	700	581	42	123	479	823	1,060	76
Guatemala	1,674	1,722	739	-	44**	897	-	1,636	-	97**
Guyana	226	232	206	-	92**	15	-	221	-	98**
Haiti	927	951	155	160	17	257	264	412	424	44
Honduras	* 813	* 805	498	522	65	257	268	755	790	98
Jamaica	756	771	500	500[b]	65	8	9[b]	508	509[b]	66
Mexico	32,709	33,856	19,940	21,810[d]	64	4,000	1,700	23,940	23,510	69
Nicaragua	* 942	-	663	-	70**	192	-	855	-	91**
Panama	729	752	645	662	88	68	70	713	732	97
Paraguay	902	934	170	180	19	130	135	300	315	34
Peru	6,895	7,112	3,200	3,470	49	1,300	1,200	4,500	4,670	66
Surinam	* 215	* 201	139	147	73	76	54	215	201	100?
Trinidad-Tobago	* 358	-	297	-	83**	59	-	356	-	99**
Uruguay	2,336	2,364	1,988	2,065	87	132	222	2,120	2,287	97
Venezuela	7,999	8,276	5,570	-	70**	1,730	-	7,300	-	92**
Totals	156,374	153,997	92,599	90,047	e/	28,619	22,918	121,218	112,965	e/

Sources: Total population: CELADE, Boletín Demográfico, Vols. III and X, United Nations Demographic Yearbook (except those figures marked with *, which were taken from PAHO/WHO data).

Population served: PAHO/WHO, Annual Report of the Director, 1971 (p.54) and 1972 (p.50).

- No data available for 19
a/ Data as of June 1966
b/ Data as of March 1972
** % for 1971
c/ Data as of May 1972
d/ Data as of March 1972
e/ No overall percentage is given for 1972 because complete data for all countries is not available.

Table 8

LATIN AMERICA AND CARIBBEAN COUNTRIES: RURAL WATER SUPPLY SERVICES
POPULATION SERVED IN 1971[a/] AND 1972

(in thousands)

	Total (CELADE and PAHO*)		Population served									
			House connections				Easy access		Total			
	1971	1972	1971	1972	% 71	% 72	1971	1972	1971	1972	% 71	% 72
Argentina	5,217	5,297	742	900	14	17	200	200	942	1,100	18	21
Barbados	* 131	-	30	-	23	-	101	-	131	-	100	-
Bolivia	3,079	3,155	96	104	3	3	27	30	123	134	4	4
Brazil	50,270	51,719	9,574	9,800	13	19	2,000	2,200	11,574	12,000	23	23
Chile	2,929	2,978	130	140	4	5	130	130	260	270	9	9
Colombia (mayo/72)	9,706	10.052	2,000	2,000	21	20	600	680	2,600	2,680	27	27
Costa Rica	908	1,201	371	690	41	57	145	111	516	801	57	67
Cuba	3,485	-	1,770	-	51	-	-	-	1,770	-	51	-
Dominican Republic	2,841	2,942	155	162	5	5	196	205	351	367	12	12
Ecuador	3,385	3,500	180	200	5	6	120	150	300	350	9	10
El Salvador	2,211	2,288	101	134	5	6	615	647	716	781	32	34
Guatemala	3,760	3,868	56	-	1	-	393	-	449	-	12	-
Guyana	540	555	168	-	31	-	25	-	193	-	36	-
Haiti	4,430	4,545	46	-	1	-	80	-	126	-	3	-
Honduras	1,860	1,962	123	126	7	6	73	86	196	212	11	11
Jamaica	1,281	1,308	280	280	22	21	415	860	695	1,140	54	87
Mexico (mar.72)	19,793	20,847	5,780	6,550	29	31	-	-	5,780	6,550	29	31
Nicaragua	1,143	-	118	-	10	-	60	-	178	-	16	-
Panama	723	747	55	60	8	8	302	315	357	375	49	50
Paraguay	1,603	1,661	-	-	-	-	90	91	90	91	6	5
Peru	7,119	7,344	100	160	1	2	800	835	900	995	13	14
Surinam	* 199	* 192	14	16	7	8	48	50	62	66	31	34
Trinidad-Tobago	* 702	-	265	-	38	-	401	-	666	-	95	-
Uruguay	588	595	69	90	12	15	61	70	130	160	22	27
Venezuela	3,126	3,234	1,323	-	42	-	233	-	1,556	-	50	-
Totals	131,029	129,990	23,546	21,412	18	b/	9,115	6,660	32,661	28,072	25	b/

Sources: Total population: CELADE, Boletín Demográfico, Vols. III and X; United Nations Demographic Yearbook (except those figures marked with *, which were taken from PAHO/WHO data).

Population served: PAHO/WHO, Annual Report of the Director, 1971 (p.54) and 1972 (p.50).

a/ Except Brazil (December 1970) and Cuba (June 1966).
b/ No overall percentage is given for 1972 because complete data for all countries is not available.

Table 9 contains data on the urban population with sewerage services at the end of 1971 and 1972. As it can be observed, no country had yet reached the goal set at Punta del Este for this sector (70%). Panama came the closest to the target with 66 per cent of its urban inhabitants possessing sewer connections.

For the rural areas, Uruguay, which did not submit data for 1970 or 1971, reports a notably high percentage (44%) of its rural population served by sewerage systems in 1972. This figure is very close to the goal set for 1980 in the Ten-Year Health Plan for the Americas, if it is kept in mind that the Plan also accepts the installation of "other sanitary facilities for the disposal of excreta" as an alternative to sewerage systems in meeting the goal for rural areas - a logical solution given the characteristics of rural areas in Latin America. With the exception of Colombia, which also shows a fairly high percentage of coverage (30%), it can be said that in general the proportion of the rural population served by sewerage systems is still very low. The data, however, should be adjusted to take into account the modification made in the goal at the III Special Meeting of Ministers of Health of the Americas in 1972.

Table 9

LATIN AMERICA AND CARIBBEAN COUNTRIES: SEWERAGE SERVICES
POPULATION SERVED IN 1971 a/ AND 1972

(in thousands)

	URBAN b/				RURAL c/			
	1971	1972	% 1971	% 1972	1971	1972	% 1971	% 1972
Argentina	6,300	6,560	32	33	-	-	-	-
Barbados	-	-	-	-	-	-	-	-
Bolivia	365	390	22	22	-	68	-	2
Brazil	13,440	15,600	29	33	-	1,384	-	3
Chile	2,530	2,630	36	37	185	185	9	6
Colombia	7,700	7,817	58	57	2,750	3,060	28	30
Costa Rica	211	255	24	40	-	-	-	-
Cuba	1,700	-	34	-	-	-	-	-
Dominican Republic	307	307	19	18	-	-	-	-
Ecuador	1,500	1,560	53	53	40	40	1	1
El Salvador	507	450	38	32	-	11	-	0.5
Guatemala	769	-	46	-	-	-	-	-
Guyana	67	-	41	-	-	-	-	-
Haiti	75	-	8	-	-	-	-	-
Honduras	404	367	50	46	2	1	0.1	-
Jamaica	139	139	18	18	14	29	1	2
Mexico	12,700	15,600	39	46	-	32	-	0.2
Nicaragua	398	-	42	-	-	-	-	-
Panama	482	497	66	66	4	5	0.6	0.7
Paraguay	127	129	14	14	-	-	-	-
Peru	4,000	4,170	58	59	12	12	0.2	0.2
Surinam	85	85	39	42	-	-	-	-
Trinidad-Tobago	181	-	51	-	2	-	0.3	-
Uruguay	1,215	960	52	41	-	262	-	44
Venezuela	3,400	-	43	-	121	-	4	-
Totals	58,602	57,516	37	d/	3,130	5,089	2	d/

Source: PAHO/WHO, Annual Report of the Director, 1971 (p.54) and 1972 (p.50).

a/ Except Brazil (December 1970) and Cuba (June 1966).
b/ See Table 7 for total urban population.
c/ See Table 8 for total rural population.
d/ No overall percentage is given for 1972 because complete data for all countries is not available.

3. Financing

Table 5 shows that approximately two billion dollars were allocated for the construction of water supply and sewerage services during the past decade (1961-1970), representing an average of 200 million per year. During the first two years of this decade, over one billion dollars have been allocated for these programs,[3] an increase of 250 per cent in the annual average, which is a promising sign for the development of water supply and sewerage construction programs.

As shown in Table 10, international loans and the respective national matching funds are the source of part of this amount (approximately US$ 565,033,000), but the remainder (approximately US$ 580,499,000) corresponds to funds allocated for projects completely financed with national funds.

As it can be seen in Table 10, 27 loan contracts were signed or approved during 1971-1972 (17 in 1971 and 10 in 1972) to finance an equal number of projects in 15 Latin American and Caribbean countries. These loans total more than 284 million dollars (external financing only), which when added to the 280 million dollars to be provided by the countries as national matching funds, gives a grand total of more than 565 million in cooperative financing for this sector during the first two years of the present decade.

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3 Total funds as of December 1972: US$ 3,071,474,000 a/
Total funds as of December 1970: — 2,025,942,000 b/
Funds allocated during 1971-1972: US$ 1,045,532,000

a/ Source: PAHO/WHO, Annual Report of the Director, 1972, p.46.
b/ From Table 5.

Table 10

LATIN AMERICA AND CARIBBEAN COUNTRIES: COMMUNITY WATER SUPPLY AND SEWERAGE SYSTEMS INTERNATIONAL LOANS AND NATIONAL MATCHING FUNDS APPROVED OR SIGNED DURING 1971 AND 1972

(in thousands of U.S. dollars)

	Lending agency	Year	Purpose	International loan	National matching funds	Total
Argentina	IDB	1971	Rural water supply, second stage.	12,000	13,000	25,000
Barbados	IDB	1971	Technical assistance for sewerage system master plan.	150	70	220
	CIDA[a/]	1972	Water supply system.	2,600	70	2,670
Brazil	IDB	1971	Water and sewerage systems for 50 cities.	30,000	70,000	100,000
	IBRD	1971	Sao Paulo water supply system.	22,000	38,000	60,000
	IBRD	1971	Sao Paulo, wastewater treatment and pollution control.	15,000	67,000	82,000
	IDB	1972	Rio de Janeiro, water supply system improvement.	10,000	12,000	22,000
Colombia	IBRD	1971	Bogota, expansion of water system.	88,000	30,000	118,000
	IDB	1972	Bogota, expansion of sewerage system.	3,500	3,970	7,470
	IBRD	1971	Palmira, expansion of water system	2,000	1,800	3,800
	IBRD	1972	Water and sewerage systems, medium-sized cities.	9,100	6,300	15,400
Costa Rica	IDB	1971	San Jose, sewerage system; Limon, Liberia, Puntarenas and San Isidro, water and sewerage systems.	6,300	3,700	10,000
	AID	1971	Municipal loans, including water and sewerage systems.[b/]	1,500	1,500	3,000
Dominican Rep.	IDB	1971	Second stage of water systems for 100 small communities.	4,100	2,625	6,725
Ecuador	IDB	1972	Water supply and sewerage systems, 16 cities.	10,900	3,800	14,700
	IDB	1972	Quito, expansion of water system.	18,800	4,800	23,600
El Salvador	IDB	1972	Rural water systems, 85 small towns.	1,500	800	2,300
Guatemala	IDB	1972	Rural water systems.	2,600	1,320	3,920
Haiti	IDB	1971	Technical assistance for sewerage systems.	88	-	88
Honduras	IDB	1971	Integral urban development, including water and sewerage systems.[b/]	700	700	1,400
	IDB	1971	Study of expansion of Tegucigalpa sewerage system.	350	100	450
Mexico	IDB	1971	Promotion of tourism, including water and sewerage systems.[b/]	4,000	2,000	6,000
Nicaragua	IDB	1972	Water and sewerage systems, various cities.	12,500	3,400	15,900
	IBRD	1972	Expansion of Managua water system.	6,900	3,100	10,000
Panama	AID	1971	Panama City, supplement to previous loans.	5,000	640	5,640
	IDB	1972	Water and sewerage systems, 60 small cities, and extensions for 20 cities.	7,500	3,950	11,450
Trinidad-Tobago	IDB	1971	Water system interconnections throughout the island.	7,600	5,700	13,300
Totals				284,688	280,345	565,033

Source: PAHO/WHO, Annual Report of the Director, 1971 (p.52) and 1972 (p.46).

a/ Canadian International Development Agency.

b/ Not exclusively for water supply and sewerage systems.

E. CONCLUSIONS AND RECOMMENDATIONS

The task for the seventies is a large one, since predictions for 1980 indicate that there will be about 225 million people living in the cities and 145 million in the rural areas. It seems reasonable to expect that most of the countries will be able to reach the goals of the Ten-Year Health Plan for the Americas, but the present rate of sewerage construction, in spite of its intensity, will probably not be able to keep up with the population growth. Special efforts will also have to be made in order to increase water supply coverage by house connections and improve the quality of both water supply and sewerage services.

To maximize the benefits obtained from sanitary engineering programs, it may be necessary to study the possibility of concentrating technical and financial assistance in those countries that came the farthest from meeting the goals set in the Charter of Punta del Este for the previous decade. These studies should analyze the causes of this situation, recommend feasible ways of overcoming the problems, and plan the implementation of such measures. In order for a country to receive preferential treatment, it could be asked to meet certain minimum requirements, such as: suitable structural organization of the sector, inventory of investment projects, guaranteed national matching funds, and other conditions based on the characteristics and possibilities of each country.

Another aspect which deserves special attention is the need to develop administrative, operational and maintenance competence in water supply and sewerage agencies. In terms of its effect on public health, improving the operation of existing installations would be just as beneficial as extending the present quality of service to the entire population. Both better operational practices and quality control, and wider coverage (particularly the expansion of water distribution and sewage collection systems) are urgently needed to improve health and living conditions in Latin America and the Caribbean countries.

In addition to the strategies suggested in the Ten-Year Health Plan for the Americas, it could be helpful to consider the following aspects:

- Improvement of information systems for water supply, excreta disposal, quality control, and other related programs.
- Development, adaptation and implementation of technology to reduce costs and increase effectiveness and efficiency in both technical and administrative areas.
- Development of programs and new methods of wastes management for small communities and fringe settlements.
- Formulation of national environmental sanitation plans, in which each country should adapt the goals and recommendations for 1980 contained in the Ten-Year Health Plan for the Americas to its own conditions and capabilities. These plans should also demonstrate the viability of the adopted goals.

In any case, significant progress in water supply and excreta and wastewater disposal programs in Latin America and the Caribbean countries can be expected during this Second United Nations Development Decade.