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LC/R.904  
11 July 1990

ORIGINAL: ENGLISH

E C L A C

Economic Commission for Latin America and the Caribbean

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LATIN AMERICA AND THE CARIBBEAN: FINANCING WATER-RELATED  
INVESTMENTS IN THE EIGHTIES \*/

\*/ This document has been prepared by the Water Resources  
Unit, Division of Natural Resources and Energy, Economic  
Commission for Latin America and the Caribbean (ECLAC).

Document not subjected to editorial revision.

90-7-1124

202.8-90LA-7800



ISN 7808  
202.8 90LA

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## INTRODUCTION

This paper critically examines the financing of investments in major water-related sectors of Latin American and Caribbean countries. The lack of financial resources has consistently been identified as one of the most serious constraints confronting many countries of the region in the development and utilization of their water resources. On the other hand, it is important to explore the possible relationship of the present system of financing to the generally lackluster performance of many water-related projects in the region during the last decade, to the low efficiency of water and energy utilization, and to the environmental problems associated with many water-related activities. In addition, doubt has been cast on their real economic viability because of low rates of return and dependence on State subsidies of many projects.

The rapid population growth and economic and social development experienced by Latin America and the Caribbean up to 1982 were accompanied by a notable intensification of the use of water resources. Since 1970, hydroelectricity production grew at an average annual rate of 8.5%, the area under irrigation at an annual rate of 2.4%, and considerable progress was made in the expansion of drinking water supply and sanitation services.<sup>1/</sup>

This intensification of water use was based on significant investment in the water-related infrastructure and in water-related productive projects. During the eighties, and particularly after the economic recession of 1982-1983, investment in water-related projects has been considerably lower in most countries both than had been expected at the beginning of the decade and in comparison with the seventies.

Finance for water-related investments is obtained from both the national public and private sectors of the countries of the region and from external investors and lenders. National sources of investment funds include the income of the companies providing the services, Government contributions or subsidies, credit from national commercial banks, supplier financing, and, to a minor extent, non-monetized user contributions. The main external sources include loans from the multilateral development banks, credit from commercial banks, supplier financing, foreign direct investment, and to a lesser extent, technical co-operation from the United Nations System and other multilateral and bilateral sources.

The levels of financing obtained and the share of each source has changed in recent years as the total amount available has declined.

Detailed estimates of the total magnitude of investments in water-related activities cannot be made on the basis of existing information. This paper attempts to bring together data from disperse sources as a first effort to better define both the historical investment levels and sources and to identify future needs. One easily available indicator is the proportion of the external debt of the countries of the region contracted for water-related projects. For example, the external debt incurred by electrical companies, almost totally for hydro-electric power generation, is currently estimated at US\$ 48 billion and, in 1989, accounted for some 11.5% of the total external debt of the region.2/



## I. THE INVESTMENT CLIMATE IN THE EIGHTIES \*/

The eighties began well for the countries of Latin America and the Caribbean. Incomes reached their highest historical levels in 1980 and 1981. These peaks were followed, however, by severe falls in economic activity between 1982 and 1983 (Table 1). As a result, over the 1980-1988 period, regional annual economic growth has averaged only some 1.3%, a rate below the growth in population, so that per capita income has declined.<sup>3/</sup> At the same time, government revenues have stagnated, and, in some countries, even declined in real terms.

The financial crisis and budgetary restraint that has prevailed in most Latin American and Caribbean countries, as a consequence of the economic recession, has led to a considerable reduction in the resources available for new investment. There has not only been a sharp reduction in foreign capital inflows, in most countries, but also a large increase in capital outflows due both to the payments on the external debt and to the lack of confidence in national economic policies. Net transfer of resources abroad increased from US\$ 18.7 billion in 1982, to US\$ 28.3 billion in 1988.<sup>4/</sup> The reversal of external capital flows, coupled with high interest rates and considerable increase in construction and equipment prices, have resulted in a significant reduction in the financing available for investment in general and, particularly, for capital-intensive projects typical of the water sector. In Mexico, for example, it has been estimated that investments in hydraulic infrastructure fell in real terms by approximately 82% between 1981 and 1989.<sup>5/</sup>

The decline in investment in the 1980's contrasts strongly with the experience between 1970 and 1980. In this period gross fixed capital formation increased in the region at an average annual rate of 7.5% per year (Figure 1). In 1980, capital formation reached its maximum, but then fell by more than 30% by the end of 1984.<sup>6/</sup> Levels of investment have experienced a decline which has been more than proportionate to the drop in gross domestic product. In 1988, gross fixed capital formation still remained below the level of the early eighties (Figure 1).

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\*/ All figures in the text, except where noted, are expressed in US dollars, at constant 1985 prices. For this purpose the corresponding amounts have been inflated/deflated by the United States Capital Equipment Price Index.

Investment in machinery and equipment decreased even more than investment in construction (Figure 1). If in 1980, for one US dollar invested in equipment and machinery an average of US\$ 1.47 was invested in construction, this ratio was already 1:2.06 by 1983.<sup>7</sup> This change indicates that the fall in capital investment has probably affected not only the construction of new projects, but also rehabilitation and maintenance of existing systems.

Table 1  
 LATIN AMERICA AND THE CARIBBEAN: PER CAPITA GROSS DOMESTIC  
 PRODUCT, AT CONSTANT MARKET PRICES, 1970-1988

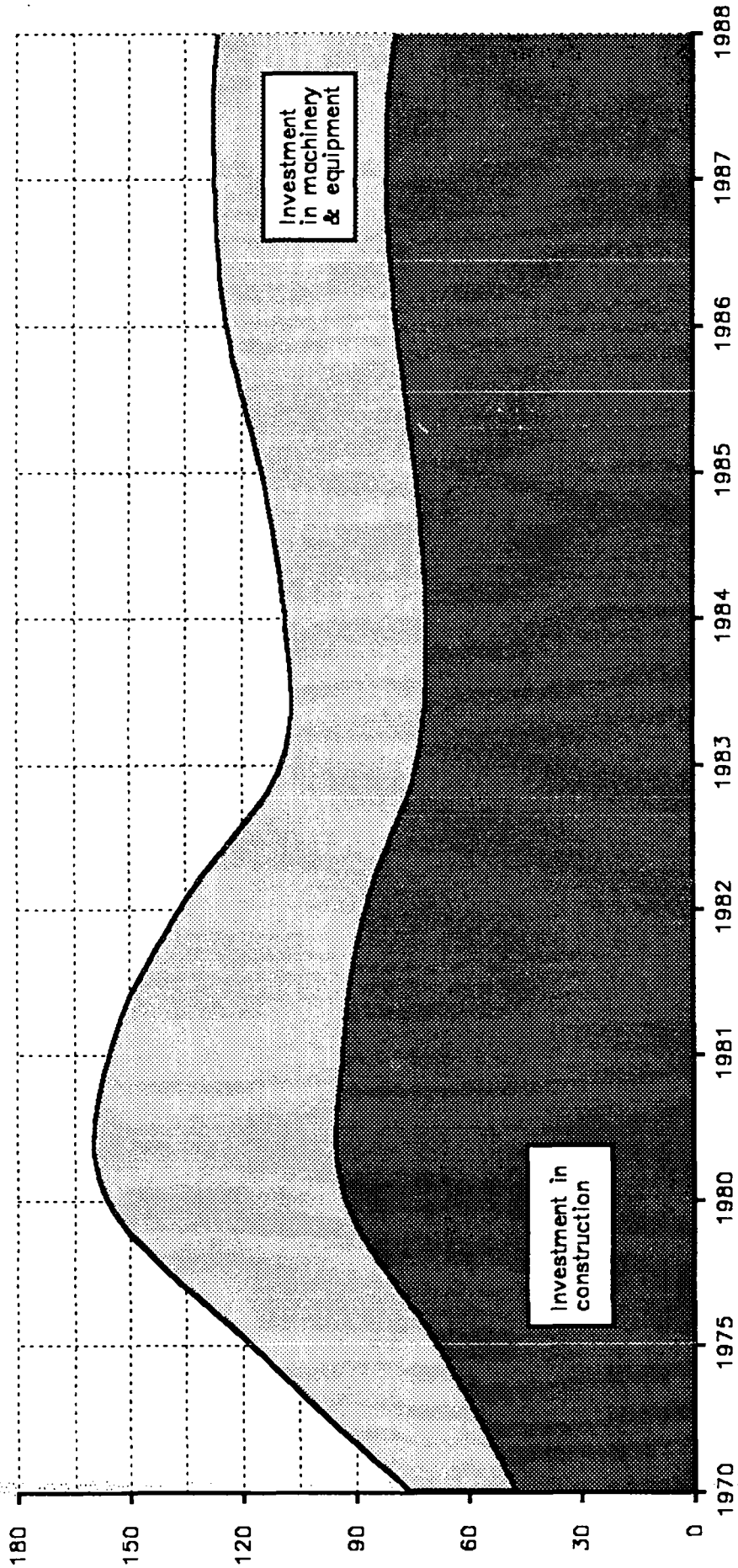
(US dollars at 1980 prices)

Country	1970	1975	1980	1985	1988
Argentina	2 748.5	2 905.9	3 009.8	2 456.9	2 465.9
Barbados	2 725.9	2 674.8	3 406.8	3 277.1	3 601.6
Bolivia	690.6	808.6	786.4	617.6	579.6
Brazil	1 111.8	1 595.8	2 010.5	1 903.2	1 983.9
Chile	2 120.4	1 769.6	2 314.2	2 101.7	2 376.6
Colombia	896.5	1 048.8	1 207.1	1 232.3	1 362.5
Costa Rica	1 200.8	1 403.0	1 552.1	1 354.6	1 423.9
Dominican Republic	748.4	1 011.0	1 130.2	1 092.2	1 144.9
Ecuador	754.7	1 200.5	1 414.5	1 403.6	1 427.6
El Salvador	719.6	821.0	772.8	663.2	658.2
Guatemala	856.3	978.4	1 127.9	924.6	914.4
Guyana	653.2	708.3	611.7	457.5	424.5
Haiti	193.2	211.5	253.7	220.7	209.7
Honduras	558.6	574.1	681.8	586.5	604.8
Jamaica	1 602.0	1 569.0	1 213.6	1 105.6	1 150.7
Mexico	1 778.8	2 066.3	2 498.3	2 439.5	2 250.9
Nicaragua	973.5	1 063.5	746.8	652.9	533.4
Panama	1 377.7	1 497.7	1 766.4	1 803.2	1 493.5
Paraguay	752.0	932.2	1 292.5	1 239.0	1 259.6
Peru	1 065.9	1 180.5	1 190.0	1 034.0	1 023.6
Trinidad and Tobago	3 690.8	4 529.4	5 318.2	3 984.1	3 320.9
Uruguay	1 854.7	1 991.0	2 411.7	1 981.5	2 238.6
Venezuela	4 694.7	3 597.9	3 377.2	2 714.4	2 844.2
Average	1 507.9	1 739.9	2 018.7	1 858.9	1 869.2

Source: United Nations, Economic Commission for Latin America and the Caribbean, Statistical yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, pp. 182-183.

Figure 1

Latin America and the Caribbean: Gross Fixed Capital Formation, 1970-1988 (billions of constant 1980 US dollars)



Source: Economic Commission for Latin America and the Caribbean.

## II. THE FINANCING OF INVESTMENTS IN THE EIGHTIES

### A. HYDROELECTRIC POWER GENERATION

Hydroelectricity is one of the major energy resources available to Latin America and the Caribbean. The usable hydroelectric potential of the region is currently estimated to be about 35% of the world's total or 805 800 MW, of which only 9.6% is actually being used.<sup>8/</sup> The successive increases in the price of oil during the seventies augmented the attractiveness of hydroelectricity and, as a result, many countries of the region have embarked upon intensive programmes of hydroelectricity development.

From 1980 to 1987, net installed hydroelectric generating capacity increased in Latin America and the Caribbean at an average annual rate of 6.5% (Table 2), a rate considerably lower, however, than the average of 10.2% a year during the late seventies.<sup>9/</sup> Installed capacity was expanded by some 27.6 million kW (Table 2). Brazil alone accounted for some 46% of the increase, and Argentina, Paraguay and Venezuela each between 10% and 12%.

#### 1. Expected future financial requirements

Following a study of the Latin American Energy Organization, if historical tendencies in the growth of electricity demand are projected until the year 2000, and assuming that 70% of the installed generating capacity to meet the demand would be hydroelectric, it will be necessary to install more than 13 000 MW of hydroelectric generating capacity annually. This will require annual investments exceeding US\$ 16.3 billion.<sup>10/</sup> The bulk of the increase is projected to be in Brazil where some 17 000 MW in installed hydroelectric capacity would be added between 1986 and 1996.<sup>11/</sup> Large increases in installed capacity are also projected for Argentina, Venezuela, Colombia and Paraguay.<sup>12/</sup> Such an enormous expansion in capacity would probably be accompanied by an increase in the cost of construction as more costly sites are developed and as more attention is paid to the environmental consequences of the water control structures associated with generating stations.

The average annual increase in the net installed capacity of hydroelectric generating plants in Latin America and the Caribbean in the eighties has been only slightly more than 3 900 MW. This is considerably less than that required to meet the ambitious goal.

Table 2  
 LATIN AMERICA AND THE CARIBBEAN: HYDROELECTRIC GENERATING  
 PLANTS. NET INSTALLED CAPACITY, 1980-1987

(Thousands of kW)

Country	1980	1987	Increase 1980/87	Average annual growth rate (%)
<u>Caribbean</u>				
- Cuba	46	49	3	0.9
- Dominica	4	4	-	-
- Dominican Republic	180	165	-15	-1.2
- Guyana	2	2	-	-
- Haiti	50	70	20	4.9
- Jamaica	20	25	5	3.2
- Saint Vincent and the Grenadines	2	2	-	-
- Suriname	189	189	-	-
Sub-total	493	506	13	0.4
<u>Central America and Mexico</u>				
- Costa Rica	457	736	279	7.0
- El Salvador	233	233	-	-
- Guatemala	99	445	346	23.9
- Honduras	109	130	21	2.5
- Mexico	6 063	7 780	1 717	3.6
- Nicaragua	103	103	-	-
- Panama	298	551	253	9.2
Sub-total	7 362	9 978	2 616	4.4
<u>South America</u>				
- Argentina	3 626	6 591	2 965	8.9
- Bolivia	265	295	30	1.5
- Brazil	27 522	40 106	12 584	5.5
- Chile	1 470	2 279	809	6.5
- Colombia	3 470	4 675	1 205	4.4
- Ecuador	226	917	691	22.2
- Paraguay	150	3 340	3 190	55.8
- Peru	1 861	2 150	289	2.1
- Uruguay	611	1 039	428	7.9
- Venezuela	2 728	5 500	2 772	10.5
Sub-total	41 929	66 892	24 963	6.9
Total	49 784	77 376	27 592	6.5

Source: United Nations, 1983 Energy Statistics Yearbook, New York, 1985, pp. 340-348; and 1987 Energy Statistics Yearbook, New York, 1989, pp. 338-346.

projected for the year 2000 described above, but similar to the annual increase between 1975 and 1980.<sup>13/</sup> The cost of this expansion is estimated to have been approximately US\$ 34.6 billion, or somewhat less than US\$ 5.0 billion annually.<sup>14/</sup> The level of investments is likely to have declined recently, however, after reaching a peak in the early eighties, but can be expected to increase from the currently low level in the nineties

## 2. Investment financing

Large capital requirements, long construction periods, a substantial foreign exchange component, and the fact that all revenues are generated in local currency, make hydroelectric power generation projects, as most water-related projects, challenging to finance. Over the last decade, the hydroelectric power generation sector has had to bear both the impact of changing economic conditions and the burden of an investment programme fixed at a time when expectations of growth were very optimistic, external financing was easily available, interest rates and external indebtedness were low, government contributions and transfers from other sectors resulted in adequate levels of financing, and oil prices were high and showed a steady tendency to further increase.

The financing of investments in the electricity sector in most Latin American and Caribbean countries has traditionally relied on external credit, government transfers, and transfers from other sectors, principally state oil companies (Table 3). The share of funds generated from revenues in investment financing has traditionally been very low (Table 3).<sup>15/</sup> With the economic recession, the flow of external credit came almost to a halt and transfers from general government revenues were reduced as a result of austerity measures. At the same time in many countries, high inflation substantially increased the costs of construction, whereas anti-inflation policies allowed tariff levels to deteriorate in real terms. Big losses in the distribution of electricity, deficient management and an inadequate infrastructure also contributed to a generalized fall in revenues.<sup>16/</sup> In addition, major devaluations of local currencies worsened the heavy debt service burden of the sector and added to the deterioration of its financial structure (Table 4). The recession also contributed to an increase in electricity theft and to a deterioration of financial discipline increasing payment arrears for the purchase of electricity. For example, the average collection periods of Hidroeléctrica Norpatagónica Sociedad Anónima, a federally owned electricity generation utility in Argentina, have ranged from 76 to 100 days in recent years.<sup>17/</sup>

Table 3

LATIN AMERICA AND THE CARIBBEAN: FINANCING OF INVESTMENTS  
IN THE ELECTRICITY SECTOR, 1983-1988

(Percentage)

Country	Net internal generation	Net transfers	Net credit	Contribution of internal funds <sup>a/</sup>
Argentina	-56.2	109.8	218.8	-13.0
Brazil	-10.8	28.6	152.9	74.5
Chile	49.6	-32.5	45.0	147.5
Colombia	15.0	18.3	51.7	59.0
Dominican Republic	-17.5	130.4	20.0	5.4
Ecuador	-29.7	65.3	-20.6	33.1
Honduras	44.6	21.6	48.7	67.4
Mexico	16.1	158.8	-68.3	62.8
Venezuela	8.6	86.8	5.1	20.9

Source: Latin American Energy Organization, Alternativas de financiamiento del sector energético de América Latina y el Caribe - Subsector eléctrico, Quito, Noviembre de 1989, pp. 10 and 13.

<sup>a/</sup> Investment self-financing index (gross internal fund generation to investment ratio).

The financial situation of many utilities has also been aggravated by subsidies to electricity rates, by special low tariffs designed to promote substitution of electricity generated by water power for energy generated by imported fuel, policies that promoted the export of electricity-intensive goods, and other similar policies.

As a result of these measures, revenues have tended to stagnate, or even to decline in real terms, just when the need for the self-financing of both existing debt and new investments has increased. In some cases, the cost of serving the utility's debt nearly equals or exceeds total operating revenues (Table 4).<sup>18/</sup> In consequence, the investment programmes of the hydroelectric power generation sector became, in the early eighties, even more dependent on subsidies and cash transfers from general government revenues and on external credits provided on ever more stringent terms (Table 5).

The financial position of the sector has been further worsened by the fact that, as a result of the economic recession and inadequate energy demand projections, among other factors, some countries have substantial excess generating capacity. For example, in Colombia, after 1980, installed generating capacity grew faster than electricity demand. The excess capacity is



Table 4  
 LATIN AMERICA AND THE CARIBBEAN: EXTERNAL DEBT OF THE ELECTRIC SECTOR  
 (Millions of US dollars)

Country	Year	Total disbursed debt	Electric sector debt	(%)	Debt Service as a percentage of Operating Revenues 1983/8
Argentina	1986	51 400	6 585	12.8	34.3
Bolivia	1986	3 636	144	4.0	n/a
Brazil	1986	111 045	17 016	15.3	53.8
Chile	1986	20 716	1 772	8.6	71.4
Colombia	1987	15 651	3 974	25.4	98.2
Costa Rica	1987	3 914	598	15.3	n/a
Dominican Republic	----	n/a	n/a	n/a	22.9
Ecuador	1987	9 900	507	5.1	339.7
El Salvador	1986	1 928	265	13.7	n/a
Grenada	1986	50	2	4.0	n/a
Guatemala	1987	2 718	495	18.2	n/a
Honduras	1987	3 101	722	23.3	63.1
Mexico	1987	102 350	9 624	9.4	80.9
Nicaragua	1986	5 760	101	1.8	n/a
Panama	1987	3 950	454	11.5	n/a
Peru	1987	15 441	840	5.4	n/a
Uruguay	1987	5 888	681	11.6	n/a
Venezuela	----	n/a	n/a	n/a	152.3
Total	----	357 448	43 780	12.2	n/a

Source: United Nations, Economic Commission for Latin America and the Caribbean, Statistical yearbook for Latin America and the Caribbean 1988 edition, LC/G.1550-P, 1989 February, p. 501; Latin American Energy Organization, La deuda externa del sector energético de América Latina y el Caribe Evaluación, perspectivas y opciones, Quito, November 1988, p. 57; and Latin American Energy Organization, Alternativas de financiamiento del sector energético de América Latina y el Caribe - Subsector eléctrico, Quito, November 1989, p. 20.

n/a = Information not available.

Table 5  
LATIN AMERICA AND THE CARIBBEAN: TERMS OF EXTERNAL PUBLIC BORROWING

Country	Average interest rate (%)		Average maturity (years)		Average grace period (years)		Variable interest rate loans (%) <sup>a/</sup>	
	1970	1987	1970	1987	1970	1987	1970	1987
Argentina	7.3	8.2	12	12	3	5	0	84.1
Bolivia	1.9	6.7	48	26	4	6	0	29.1
Brazil	6.8	8.3	14	14	3	4	11.8	67.5
Chile	6.8	7.9	12	14	4	4	0	79.1
Colombia	6.0	8.4	21	11	5	3	0	40.9
Costa Rica	5.6	6.7	28	20	6	5	7.5	53.8
Dominican Republic	2.4	7.3	28	19	5	4	0	25.8
Ecuador	6.2	7.3	20	17	4	4	0	68.9
El Salvador	4.7	5.1	23	26	6	7	0	5.7
Guatemala	3.7	4.7	26	27	6	7	10.3	30.9
Haiti	4.8	1.4	10	37	1	9	0	1.3
Honduras	4.1	5.5	30	23	7	6	0	18.2
Jamaica	6.0	6.8	16	15	3	3	0	25.3
Mexico	7.9	7.7	12	14	3	5	5.7	79.1
Nicaragua	7.1	4.1	18	17	4	4	0	22.1
Panama	6.1	7.2	15	15	4	4	0	59.1
Paraguay	5.7	5.9	25	21	6	5	0	13.7
Peru	7.4	6.6	14	16	4	4	0	33.3
Trinidad and Tobago	7.5	6.8	10	7	1	4	0	34.4
Uruguay	7.9	8.4	12	14	3	4	0.7	68.1
Venezuela	7.8	8.3	8	17	2	3	2.6	89.1

Source: International Bank for Reconstruction and Development, World Bank, World Development Report 1989, 1989, pp. 212-213.

<sup>a/</sup> Loans carrying variable interest rates, as a percentage of total public debt.

currently estimated to equal 22% of the total installed capacity, and is valued at approximately US\$ 1.8 billion or about 15% of the country's external debt. The share of electricity sector investments in total public investment increased from 24% in 1980, to 38% in 1985.<sup>19/</sup> It is estimated that Colombia has to pay some US\$ 180 millions annually in interest for works that although completed are of little use. Over capacity has negatively affected the financial position of several electricity utilities. The combined deficit of electricity companies in Colombia has been estimated to have reached US\$ 345 million or 1% of GDP in 1986. To make things worse, debt service has been increasing faster than operating revenues. From 20% of revenues in the seventies, debt service reached 55% in the mid-eighties with a tendency to further increase.<sup>20/</sup> It is not surprising, that Colombia has resorted to incentives to increase electricity consumption.<sup>21/</sup>

The shaky financial position of the sector and its high external indebtedness (Tables 3 and 4) have negatively affected the economies of many countries. According to a 1985 report of the United States Agency for International Development (USAID) on Central America, "the region's financial crisis, and its constraints on future development, is significantly the result of huge public power investments in nearly all of the countries."<sup>22/</sup>

In the composition of the investment programmes the bias towards large centralized power projects is evident in most countries. There is an imbalance between the funds devoted to new construction and the funds allocated for operation, maintenance and rehabilitation in investment programmes. There is a further imbalance in the distribution of funds among generation, transmission and distribution components in the investment programmes of some countries, with the generation component absorbing a disproportionate share. These imbalances have been aggravated by construction delays and cost overruns. It has been reported, for example, that in Peru the final cost of four energy projects was 167% higher than estimated in the final studies, which had been already 89% higher than the costs estimated in the feasibility studies.<sup>23/</sup>

In many Latin American and Caribbean countries attempts have been made to reverse the deteriorating trend in the electricity sector finances through a combination of decentralization of management, equity contributions, real increases in tariffs, cost reductions, and an increased role for the private sector. The objective of these changes is to reduce the heavy dependence on external borrowings and government subsidies by increasing the generation of funds from revenues and through increasing the capitalization of generation companies. As a result, revenues are beginning to play a more important role in the financing of sector investments. In current investment programmes, priority is given to investments which will provide electricity at minimum acceptable

reliability levels, and to investments in transmission and distribution systems in order to utilize more efficiently the existing generating capacity.

Another and perhaps even more important challenge, facing the financing of hydroelectric power generation, and the electricity sector in general, is the need to reduce investment requirements for new generation projects. One means of reducing demand is to provide incentives to reduce electricity consumption through increased efficiency of use. An indication of what might be achieved is suggested by a recent Brazilian study. The study shows that for a total investment of approximately US\$ 10 billion in more energy-efficient technologies, it would be feasible to defer construction of some 22 000 MW of generating capacity, resulting in a net capital savings of about US\$ 34 billion over the period 1986 to 2000.<sup>24/</sup>

#### B. DRINKING WATER SUPPLY AND SANITATION

By 1980, at the beginning of the International Drinking Water Supply and Sanitation Decade (IDWSSD), the population of Latin America and the Caribbean was relatively well provided with drinking water supply and sanitation facilities compared with the population of other regions of the developing world. There had been two decades of special programmes of investment in and general development of drinking water supply and excreta disposal services in the region. Relatively well organized water supply and sanitation institutions were operating in most countries. In urban areas, high levels of service had been achieved, particularly in drinking water supply where 71% of the population was served with house connections, but only 59% of the urban population was connected to sewerage systems or provided with other forms of sanitary excreta disposal.<sup>25/</sup> In rural areas less progress had been made although, in the larger rural settlements in many parts of the region piped drinking water supply systems were being installed. There were still, however, many people, particularly in rural areas, without access to a safe source of drinking water or to sanitary excreta disposal.

The level of provision of service in 1980 varied considerably among the countries of the region (Table 6), with the highest levels in the smaller countries of Central America and the Caribbean. Not surprisingly, the provision of services remained lowest in those countries with a higher proportion of rural population and lower incomes - Haiti, Paraguay, Bolivia and Nicaragua. Only in the island countries of the Caribbean were high levels of service to be found for the rural population.

In the eighties, the rate of improvement in the levels of service in the region has tended to slacken. Between 1980 and

1985, the proportion of the urban population with access to a protected drinking water supply rose only from 83% to 86%, and the proportion with access to sewerage services and excreta disposal facilities only from 59% to 60% (Table 6). In rural areas more was achieved, with access to water supply rising from 40% to 45%, and to sanitation services from 11% to 15%. If this trend continues, however, the targets established for the IDWSSD will not be met, except in a few countries.

### 1. Expected future financial requirements

The achievement of the goals of the IDWSSD implies that during the 1981-1990 period, Latin American and Caribbean countries would have to provide drinking water supply to some 120 million people, and sewerage or excreta disposal services to about 111 million.<sup>26/</sup> The cost of constructing new facilities to extend the coverage to meet the goals is currently estimated at approximately US\$ 25.6 billion (Table 7).<sup>27/</sup> On average, from 1981 to 1985, actual investments are estimated to have represented only about 71% of the annual investment required to meet the goals.<sup>28/</sup> The shortfall in investments has been highest for sewerage and excreta disposal facilities.

Average annual level of investments required in the region to achieve complete coverage by the year of 2000 are estimated at approximately US\$ 3.6 billion. Average annual investments required to maintain the level of coverage existing in 1985 are estimated to be some US\$ 2.1 billion.<sup>29/</sup> These estimates exclude the cost of maintaining and rehabilitating existing systems or of the new systems being built. Since the recurrent costs are usually put between 5% and 20% of the fixed costs, the total investment requirements are likely to be proportionately higher.<sup>30/</sup> Additional investments will also be required for sewage treatment.

The Pan American Health Organization (PAHO) has recently estimated, on the assumption that national sources of financing have accounted for 70% of the total volume of investments, that between 1981 and 1985 some US\$ 7.7 billion was invested in the sector.<sup>31/</sup> Estimates made on the basis of average unit per capita costs and the number of people provided with drinking water supply and sanitation services suggest that the cost of facilities built from 1981 to 1985 is larger, approximately US\$ 9.0 billion.<sup>32/</sup> In either case, the amounts of investment have been less than that needed to achieve complete provision for the region's population by the end of the century.

Table 6  
 LATIN AMERICA AND THE CARIBBEAN: COVERAGE WITH DRINKING  
 WATER SUPPLY AND SANITATION SERVICES, 1980-1985  
 (Percentage)

Country	Urban drinking water supply		Rural drinking water supply		Urban sewerage and excreta disposal		Rural sewerage and excreta disposal	
	1980	1985	1980	1985	1980	1985	1980	1985
Argentina	62	63	17	17	80	76	35	35
Bahamas	100	100	-	-	88	64	-	-
Barbados	99	100	98	99	-	40	-	-
Belize	99	-	36	-	62	-	75	-
Bolivia	69	75	10	13	37	33	4	10
Brazil	83	85	50	56	32	33	1	2
Chile	100	98	17	30	99	100	-	4
Colombia	93	100	73	76	92	96	4	13
Costa Rica	100	100	82	83	99	99	84	89
Dominican Republic	85	85	34	34	25	41	4	9
Ecuador	79	81	20	31	93	98	17	29
El Salvador	67	68	40	40	48	82	35	43
Guatemala	90	72	18	14	45	41	20	12
Guyana	100	100	60	65	73	100	80	80
Haiti	51	59	8	30	42	42	10	13
Honduras	93	47	40	45	49	24	26	34
Jamaica	55	99	46	93	12	92	2	90
Mexico	90	99	40	47	77	77	12	13
Nicaragua	67	76	6	11	34	35	-	16
Panama	100	100	61	64	83	99	59	61
Paraguay	39	53	8	8	95	89	80	83
Peru	68	73	18	17	57	67	-	12
Suriname	100	100	79	94	100	100	79	48
Trinidad and Tobago	100	99	93	95	96	100	88	95
Uruguay	96	95	2	27	59	59	6	-
Venezuela	93	88	53	65	71	57	12	-
Total	83	86	40	45	59	60	11	15

Source: Pan American Health Organization, World Health Organization, Environmental Health Program, International Drinking Water Supply and Sanitation Decade, Regional Progress Report, Environmental Series No. 6, pp. 18 and 24.

Table 7

LATIN AMERICA AND THE CARIBBEAN: INTERNATIONAL DRINKING WATER SUPPLY  
AND SANITATION DECADE, ESTIMATED INVESTMENT REQUIREMENTS

(Millions of US dollars, at 1985 per capita unit prices)

Sub-region	Drinking water supply		Sewerage and excreta disposal		Total investments
	Urban	Rural	Urban	Rural	
Caribbean	476.6	205.8	588.4	122.1	1 392.9
Central America and Mexico	4 354.3	727.0	2 391.8	95.8	7 569.0
South America	9 103.6	772.3	6 131.4	665.8	16 673.2
Latin America and the Caribbean	13 934.5	1 705.1	9 111.6	883.8	25 635.1

Source: Economic Commission for Latin America and the Caribbean estimates.

Note: The discrepancy in some totals is due to rounding.

## 2. Investment financing

Drinking water supply and sanitation services are operated in most Latin American and Caribbean countries by public sector institutions organized within the central government, states, or municipalities. Consequently, decisions related to investments, budget and tariffs are controlled to a large extent by the government. It is not surprising to find, therefore, that investment in the sector is determined, in great part, by macroeconomic policies.

The problems of investment financing in the sector are basically related, although not limited, to the lower priority given to capital investments under conditions of budget austerity. In addition to the difficult access to capital markets, the fact that a large proportion of the population to be served is poor, and that water and sanitation tariffs are usually low and politically controlled, acts as an obstacle to the raising of funds from operations.

According to a recent PAHO estimate, the major part of capital funding, as much as 70%, has been provided from national sources, divided between some 39% of national matching funds for projects partially financed by external loans and 31% for other projects. The remaining 30% of funding comes from external sources.<sup>33/</sup> It is estimated that 90% of external financing is provided by the Inter-American Development Bank (IDB) and the World Bank (IBRD).<sup>34/</sup>

The proportion of capital financing derived from external sources has varied considerably increasing from 24.9% in 1980, to 40.0% in 1983, and decreasing again to 33.5% in 1985. In comparison with other developing regions, the share of external financing is low in Latin America and the Caribbean.<sup>35/</sup> Available information on the distribution of loans indicates that about 57% of their total volume has been channeled to drinking water supply in urban areas, some 33% to urban sewerage or excreta disposal, approximately 10% to water supply in rural areas, and less than 1% to rural sanitation.<sup>36/</sup>

In the past, the contribution to the funding of water supply and sanitation projects derived from the income of operating companies has been usually very small, a direct consequence of unrealistically low tariffs (Table 8). Cost recovery has been seldom applied as a policy even in urban areas. It is not surprising, therefore, that the bulk of capital funding in most parts of the region has come from direct contributions of general government revenues. These contributions have been considerably reduced as a result of the severe drop in economic activity between 1982 and 1983 in most countries (Figure 2). In part, the decline in funding from general revenues reflects the escalating competition for access to shrinking government resources. The inability to compensate for this reduction in government contributions, through increased internal generation of funds, has severely affected not only expansion programmes, but also the operation and maintenance of existing systems. The poor financial state of many utilities is, therefore, to a considerable extent self-imposed due to the general failure to set tariffs to recover costs.<sup>37/</sup> In Mexico, for example, the cost of drinking water has been recently estimated at about 240 peso/m<sup>3</sup>, whereas consumers were billed only some 40 peso/m<sup>3</sup>.<sup>38/</sup> Some countries have, however, managed to improve the financial situation of the sector by adopting sound tariff policies. In Chile, 56% of the funds invested in the sector by the Servicio Nacional de Obras Sanitarias (SENDOS) <sup>39/</sup> during the 1985-1989 period have been generated from revenues with the share of revenues in the funding mix increasing from less than 49% in 1985 to almost 68% in 1989.<sup>40/</sup>

Low tariffs, inadequate allocation of resources for operation and maintenance and other management deficiencies have led to a high level of unaccounted for water in many systems. Water pumped, but unaccounted, reduces revenues and can inflate the need for new investments.<sup>41/</sup> The experience of most water supply companies in the region indicates that high values of unaccounted for water are often the result of deficiencies in the commercial management, mainly billing and collection problems, as well as inadequate policies in dealing with overdue accounts, and not only due to high rates of leakage in the distribution system.<sup>42/</sup> For example, it has been estimated that in Mexico of each 100 litres pumped in a typical distribution network, the user receives 60, is billed for 40, finally only pays for 30. In addition, collection is usually



Table 8  
LATIN AMERICA AND THE CARIBBEAN: WATER SUPPLY. AVERAGE  
COST OF PRODUCTION AND AVERAGE TARIFF, 1985

(US dollars per cubic metre)

Country	Average cost of water production	Average water tariff	Progressive water tariffs
Argentina <sup>a/</sup>	0.08	0.11	n/a
Barbados	0.34	0.68	No
Bahamas	0.37	1.10	Yes
Bolivia	n/a	n/a	Some areas
Brazil <sup>a/</sup>	0.06	0.10	n/a
Chile	0.12	0.08	Yes
Colombia <sup>a/</sup>	0.30	0.24	n/a
Costa Rica	0.17	0.07	Yes
Dominican Republic	n/a	n/a	n/a
Ecuador	0.09	1.81	Yes
El Salvador	0.30	0.20	No
Guatemala	n/a	0.11	No
Guyana	0.08	0.03	Some areas
Haiti	0.18	0.28-1.00	Yes
Honduras	0.20	0.26	Yes
Mexico	1.50	0.12	Yes
Nicaragua	0.14	0.38	Yes
Panama	0.07	0.29	Yes
Paraguay	0.52	0.43	Yes
Peru <sup>b/</sup>	0.18	0.09	Some areas
Uruguay <sup>a/</sup>	n/a	0.26	n/a
Suriname	0.60	0.80	Some areas
Trinidad and Tobago	n/a	n/a	Yes (industry)
Venezuela <sup>a/</sup>	0.58	0.34	n/a

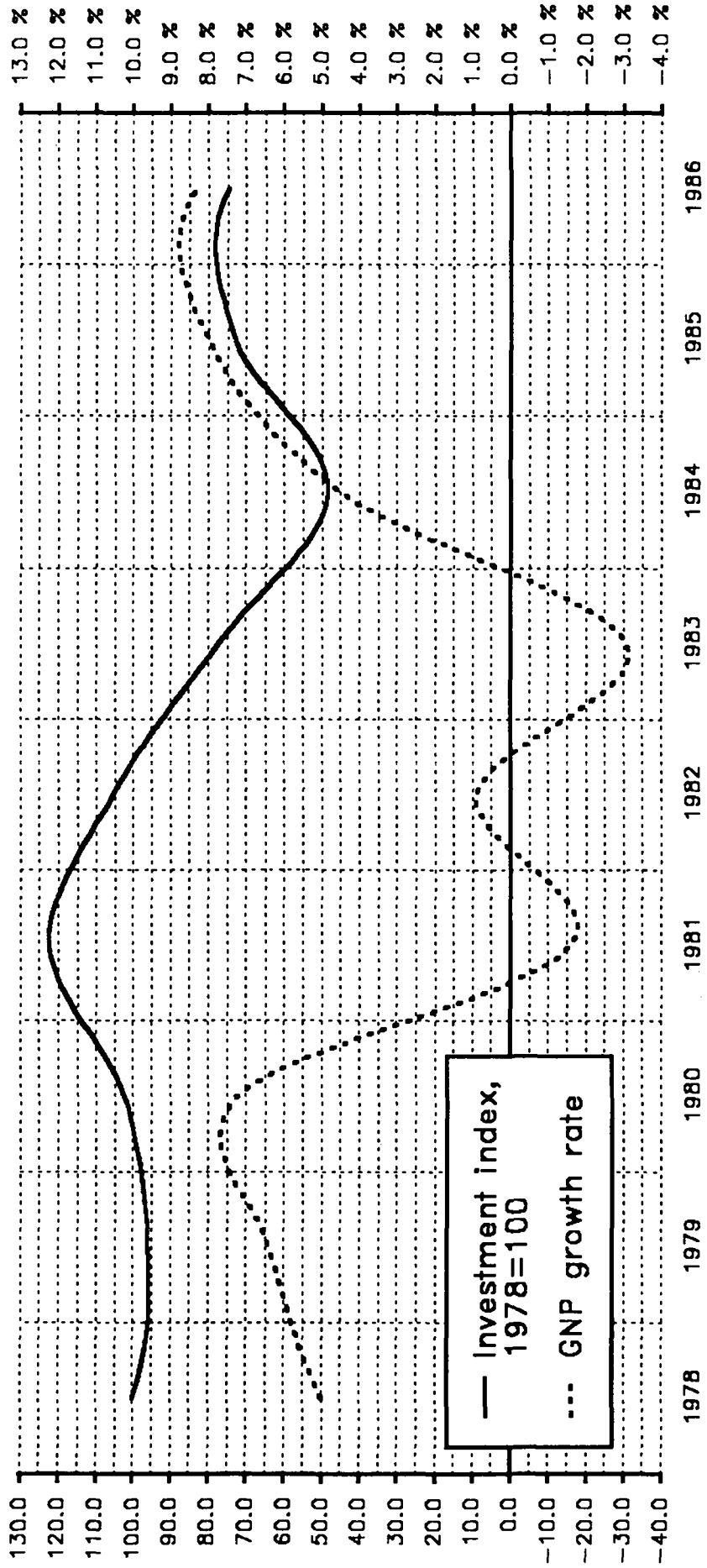
Source: CWS Unit, Division of Environmental Health, World Health Organization, The International Drinking Water Supply and Sanitation Decade Review of mid-Decade progress (as at December 1985), September 1987, CWS Series of Cooperative Action for the Decade, p. 84; and Organización Mundial de la Salud, El Decenio Internacional del Agua Potable y del Saneamiento Ambiental. Examen de la situación existente en los países al 31 de diciembre de 1980, Ginebra, 1985, p. 74.

<sup>a/</sup> 1980.

<sup>b/</sup> 1980, in 1985 average cost of water production was to US\$ 0.12 per cubic metre.

n/a = Information not available.

Figure 2  
Brazil, National Sanitation Plan (PLANASA): Water Supply and Sanitation Investment Index (constant market prices)



Source: Márcio Miller Santos and Luiz Fernando Rodrigues de Paula, Análise da política de saneamento no Brasil, in MPAS, CEPAL, Projeto: a política social em tempo de crise: articulação institucional e descentralização, Brasília, 1989.

characterized by delays of some 6-9 months.<sup>43/</sup> The reduction of commercial losses usually does not involve high capital expenses. Moreover, better commercial management can replace or postpone the need for new capital investments and also reduce production, pumping and treatment costs. For example, a reduction in the proportion of unaccounted for water from 60% to 30% in a city growing at 3.5% per year would postpone investments in new production facilities by up to 16 years.

In the region there are a small number of private water supply and sanitation companies. In these companies capital investments are financed almost entirely through their own revenues either directly or through borrowings.

There are considerable variations in the funding structure for investments in water supply and sanitation projects among the countries of the region. In Bolivia, for example, external sources have accounted for an estimated 77% of total sector funds. The share of internal funds has been relatively higher in the rural areas, whereas external sources of financing accounted for an estimated 79% of investment funds in urban areas.<sup>44/</sup> In Colombia, however, the main sources of funds for sector investments over the recent past have been generated internally. External borrowing only accounted for some 45% of funding, while 30% came from central government revenues, 15% from the revenues of operating companies, and the remaining 10% from other local sources. Companies in large cities relied mostly on external loans which accounted for about 50% of their total investment while operating revenues accounted for a further 35%. In contrast, the financing of drinking water supply and sanitation in medium and small cities and in rural areas depended more on contributions from the central government which accounted for 45% of the total funding while external loans provided 40%.<sup>45/</sup>

In Mexico, funds for drinking water supply and sanitation sector investments come largely from the Federal Government whose contributions are estimated to have accounted for almost 84% of the total. State governments have contributed with an additional 4% to investments and only 10% has been provided from external sources. Federal investments were reduced after 1984, as a result of the economic problems affecting the country. This reduction was accompanied by the increasing role of internal and external borrowings in investment funding. The dependence on borrowed funds and subsidies is now being reduced through a combination of policies, including the better targeting of priorities, the setting of tariffs in accordance with marginal costs, and other measures aimed at making operating companies financially independent. In addition, there is an effort to increase sector financing through a better and more flexible combination of federal and other resources and through the promotion of private investment and community participation.<sup>46/</sup>

In Peru, the contribution of national sources to investment funding has been around 69% in recent years. Due to the decrease in the volume of external funding, the share of financing provided from national sources increased from 51% in 1985 to some 80% in 1987.<sup>47/</sup> About 61% of the total investment was channelled to urban areas, including 30% for Lima, and only 10% to rural areas.<sup>48/</sup> An analysis of the 1986-1995 investment programme indicates that the financing of investments in urban areas comes mainly from operational revenues and community and user contributions, and only to a lesser extent from general government revenues and external borrowings. The financing of investments in rural areas, in contrast, comes predominantly from external borrowings and general government revenues.<sup>49/</sup>

In Uruguay, national funding has accounted for 63% of investment financing for water supply and sanitation between 1985 and 1989 with 32% coming from operating revenues, slightly more than 15% from the central government and 16% from miscellaneous sources including equipment suppliers and users.<sup>50/</sup> The remaining 37% of funding has been provided through IDB and World Bank loans.<sup>51/</sup>

### C. IRRIGATION

Irrigation agriculture has a long tradition in Latin America and the Caribbean. The ever-increasing pressure to step up agricultural production of both food and industrial raw materials, for internal consumption as well as for exports, has been reflected in recent decades in a considerable expansion of the area under irrigation and many countries have adopted ambitious plans for future increases. The area under irrigation grew at an average rate of 2.8% per year between 1961 and 1980. Since 1980, the annual rate of increase has fallen, however, averaging only less than 1.3% between 1980 and 1987 (Table 9).<sup>52/</sup> While about a third of the total irrigated area of the region is in Mexico, Brazil accounted for more than half of the total increase in this decade (Table 9).

The reduction in the expansion of the irrigated area can be explained both by the considerable reduction in the general availability of funding for large infrastructure projects and by the largely disappointing performance of many irrigation schemes in the region. For example, of seven projects evaluated by the World Bank only three could be considered to be successful. Even so their performance compared unfavourably with the success rates and economic rates of return for 58 irrigation projects evaluated by the Bank worldwide.<sup>53/</sup> While the average cost per person benefitted by irrigation projects worldwide was only US\$ 315, in the three projects in Latin America the average cost was US\$ 7 850.<sup>54/</sup>

### 1. Expected future financial requirements

The Food and Agriculture Organization of the United Nations (FAO) estimated in 1977 that gross annual investments required for new and improved irrigation and drainage in Latin America and the Caribbean for the period 1975-1990 would amount to about US\$ 660 million.<sup>55/</sup> In 1981 this estimate was revised upwards, on the basis of the economic growth objectives of the International Development Strategy, to be between US\$ 1.6 billion and US\$ 1.9 billion.<sup>56/</sup>

It is currently estimated that the land under irrigation in the region will expand by approximately 5.4 million hectares between 1982/1984 and the end of the century (Table 10). Most of the projected expansion, 3.7 million hectares, is expected to occur after 1990.<sup>57/</sup> Gross annual investment requirements for such an expansion are estimated to be about US\$ 1.9 billion, rising from an average of US\$ 1.7 billion during the eighties to US\$ 2.0 billion in the nineties.<sup>58/</sup> This projection may well prove to be an underestimation, particularly in the case of Brazil, where annual increase in irrigated area during the period 1990/1995 is expected to range from 200 to the ambitious 546 thousand hectares. The total estimated investment cost of the 1990/1995 irrigation programme is put at about US\$ 1.3 billion of government investments plus a further US\$ 1.5 billion of medium- and long-term credit for irrigators.<sup>59/</sup>

At the above values, gross investments in irrigation would represent about 8% of the total estimated investments in agriculture in the region, considerably less than the 19% share estimated for irrigation in other developing regions.<sup>60/</sup> In 15 of the 24 Latin American and Caribbean countries, the investments required for irrigation are estimated to account for around 10% or less of the total for the crop sector.<sup>61/</sup> There are some exceptions, however, as in the case of Peru, where the ongoing improvement and expansion of irrigation is expected to absorb 33% of the sector's investment. It will also be above the average in Bolivia, Chile, Ecuador, Guyana, Mexico, Nicaragua, Suriname and Venezuela.<sup>62/</sup>

The expansionary trend in irrigation, which accelerated in the seventies, slowed down in the eighties. Since 1980, the average annual increase in the area under irrigation in the region has been only 185 thousand hectares, only half of the average for the period 1975-1980.<sup>63/</sup> The net cost of this expansion programme is likely to have amounted to slightly more than US\$ 2.8 billion, about US\$ 400 million per year, whereas gross annual investments are likely to have reached some US\$ 700 million.<sup>64/</sup>

Table 9  
 LATIN AMERICA AND THE CARIBBEAN: LAND UNDER IRRIGATION, 1980-1987  
 (Thousands of hectares)

Country	1980	1987	Increase 1980/87	Average annual growth rate (%)
<u>Caribbean</u>				
- Belize	1	2	1	10.4
- Cuba	762	890	128	2.2
- Dominican Republic	165	206	41	3.2
- Guyana	125	128	3	0.3
- Haiti	70	70	0	-
- Jamaica	33	34	1	0.4
- Saint Lucia	1	1	0	-
- Saint Vincent and the Grenadines	1	1	0	-
- Suriname	42	60	18	5.2
- Trinidad and Tobago	21	22	1	0.7
Sub-total	1 221	1 414	193	2.1
<u>Central America and Mexico</u>				
- Costa Rica	61	118	57	9.9
- El Salvador	110	117	7	0.9
- Guatemala	68	79	11	2.2
- Honduras	82	88	6	1.0
- Mexico	4 980	4 900	-80	-0.2
- Nicaragua	80	84	4	0.7
- Panama	28	30	2	1.0
Sub-total	5 409	5 416	7	-
<u>South America</u>				
- Argentina	1 580	1 700	120	1.1
- Bolivia	140	165	25	2.4
- Brazil	1 800	2 500	700	4.8
- Chile	1 255	1 300	45	0.5
- Colombia	400	496	96	3.1
- Ecuador	520	546	26	0.7
- Paraguay	60	66	6	1.4
- Peru	1 160	1 200	40	0.5
- Uruguay	79	100	21	3.4
- Venezuela	315	328	13	0.6
Sub-total	7 309	8 401	1 092	2.0
Total	13 939	15 231	1 292	1.3

Source: United Nations, Economic Commission for Latin America and the Caribbean, Statistical yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, pp. 608-609.

Table 10

LATIN AMERICA AND THE CARIBBEAN: PROJECTED INCREASE  
IN IRRIGATED LAND FROM 1982/84 TO 2000

(Thousands of hectares)

Region	1 000 ha	(%)	Region	1 000 ha	(%)
Andean <sup>a/</sup>	1 104	20.5	Mexico	2 339	43.4
Brazil	301	5.6	Southern Cone <sup>c/</sup>	1 172	21.7
Caribbean <sup>b/</sup>	252	4.7			
Central America	225	4.2	Total	5 395	100.0

Source: Food and Agriculture Organization of the United Nations, Potentials for agricultural and rural development in Latin America and the Caribbean Annex IV Natural resources and the environment, LARC 88/3, Rome 1988, p. 67.

<sup>a/</sup> Bolivia, Colombia, Ecuador, Peru and Venezuela;

<sup>b/</sup> Cuba, Dominican Republic, Guyana, Haiti, Jamaica, Suriname and Trinidad and Tobago;

<sup>c/</sup> Argentina, Chile, Paraguay and Uruguay.

Note: The discrepancy in some totals is due to rounding.

The decline in investments in irrigation is partly a result of a generalized sharp decline in agricultural investments and partly a consequence of a long-term declining trend in the prices of many traditional irrigated crops, increased costs and higher energy prices.<sup>65/</sup> There is little indication that the investment panorama for irrigation will change in the near future.<sup>66/</sup>

In recent years, there have been important changes in both the structure and direction of irrigation investments, particularly in the countries with the longest histories of irrigated agriculture, Argentina, Chile, Mexico and Peru. In these countries changing investment priorities have resulted in a more balanced territorial allocation of resources, avoiding the excessive benefit of certain regions, as was the case in the past, for example, the north of Mexico and the costal areas of Peru. There is now a more equitable distribution of irrigation investments among regions and more resources are allocated to the operation and maintenance of existing irrigation systems and to the conservation of water and soil resources.<sup>67/</sup> A new emphasis is also being placed on smaller farmer-managed irrigation systems rather than large bureaucratically run projects.<sup>68/</sup>

## 2. Investment financing

Much of the investment in the development of irrigation in Latin America and the Caribbean is made directly through the private sector. To a large degree, each farm unit finances its own irrigation works, from its own revenues or by borrowing from national financial institutions. The public sector plays an important role, however, both when it is necessary to make a large initial capital investment and in providing loans and other assistance to farmers.69/

In Bolivia, Chile, Ecuador and most of the Central American countries, irrigated areas developed by farmers, individually or in associations, exceed 30% of the total irrigated area.70/ In Colombia, the private sector accounts for some 57% of the total area under irrigation.71/ Private irrigation projects may be financed cooperatively, if on a large scale, but many are the result of individual farmer investments. On occasion, long-term credit is provided through public funds.

Aggregate data on public capital expenditures in irrigation in Latin America and the Caribbean are not available, but the evolution of government expenditures in agriculture (Table 11) and their share in total expenditures may serve as an indicator. The share of agricultural expenditures in total government expenditures fell for the region as a whole from an average of 6.7% in 1980 to 4.5% in 1984.72/ This decrease undeniably reflects a fall in government outlays in capital investment, but it may also reflect the increasing role of the private sector in irrigation development.

The general decline in government expenditures in irrigation and in the loans of multilateral development banks to the sector, has been accompanied by a change in the origin of loans from national development finance institutions to agriculture with more coming from private institutions. There has been an overall decline in the proportion of such loans going to the agricultural sector, from 33% to 23% between 1975-1977 and 1982-1984.73/ However, during the last two decades, the number of development banks and of rural co-operative banks providing agricultural credit has grown. Access to finance is largely limited to large farmers. Smaller farmers are still without adequate access to credit.74/ The share of agriculture in medium and long-term lending by development finance institutions remains high, however, in comparison to the sector's contribution to domestic product.75/

The analysis of national public irrigation investment programmes (Table 11) shows several common characteristics among the countries of Latin America and the Caribbean. The outstanding



Table 11

LATIN AMERICA AND THE CARIBBEAN: ESTIMATED PERCENTAGE COMPOSITION OF  
GOVERNMENT EXPENDITURES ON AGRICULTURE, SELECTED COUNTRIES, 1980

Country	Research and extension	Irrigation	Land reform	Education and health	Other or unspecified
Argentina	8.6	11.1	n/a	31.8	48.5
Bolivia	1.6	85.2	13.1	n/a	n/a
Brazil	11.6	37.8	n/a	5.6	45.0
Chile	67.7	32.3	n/a	n/a	n/a
Colombia	1.1	5.1	1.8	10.0	81.9
Costa Rica	4.5	0.6	5.9	49.0	39.9
Mexico	1.9	35.7	11.6	43.8	7.1
Peru	6.9	80.8	12.2	n/a	n/a
Venezuela	11.5	10.2	n/a	n/a	78.3

Source: Victor J. Elias, Government expenditures on agriculture and agricultural growth in Latin America, Research Report 50, International Food Policy Research Institute, October 1985, pp. 30-31.

n/a = Information not available.

Note: The discrepancy in some totals is due to rounding.

characteristic is the powerful political impact of new irrigation schemes and a tendency, therefore, to favour irrigation development over other agricultural investments. A second common characteristic is a tendency to start new infrastructure development at the cost of adequate maintenance, or even completion, of existing projects.

In a number of countries, especially the poorer countries, new irrigation projects absorb a disproportionate share of total public investment in agriculture. In Peru, for example, between 1975 and 1982, 96% of public investment in agriculture was in irrigation, with almost the entire amount used for the construction of large, long-term projects, such as the Chira-Piura, Tinajones, Majes, etc. Little investment was made in the operation and maintenance of the existing irrigation districts.<sup>76/</sup>

Low charges for irrigation water and inadequate taxes on agricultural incomes increase the burden of irrigation investment on the general budget. Water charges rarely cover capital cost and, not always, operation and maintenance costs. Individual irrigation projects sometimes have no direct access to the funds collected through tariffs as these are transferred directly to general government revenues. The resulting lack of financial autonomy means that allocations for operation and maintenance are determined by an often erratic central budgetary process and not by either actual project performance or investment requirements.

The favouring of the construction of large projects has been gradually changing due to the sharply reduced availability of funding and to the increased role of the private sector. Many countries are also finding that higher, quicker, and, perhaps, longer-lasting returns can be achieved by the more efficient use of existing infrastructure through better maintenance and conservation, as well as through the completion of unfinished works.77/

### III. SOURCES OF INVESTMENT FINANCING FOR WATER RESOURCE PROJECTS

Gross domestic savings are the major source of investment financing in Latin America and the Caribbean. In 1970, they represented about 88% of total investment financing. After 1973, with cheap financing available worldwide, this proportion fell to 81% in 1975, and 72% in 1982. The economic crisis of the early eighties brought about a widespread decline in the availability of external funds with a subsequent increase in the share of gross domestic savings to an average of 94% between 1983 and 1988. There are important differences among the countries, however, in the share of gross domestic savings in total investment financing (Table 12).

In the case of water-related projects, the major national sources of investment funding are the revenues of operating companies, general government revenues, credit from national financial institutions, domestic supplier financing, and, to a minor extent, non-monetized user contributions. External sources of funds play a major supporting role. The main external sources are loans from the multilateral development banks, loans from foreign commercial banks, foreign supplier financing, foreign direct investments, and, to a lesser extent, loans and donations from the United Nations system and other multilateral and bilateral assistance institutions.

Apart from a minor part of the funds provided in the form of grants, other non-reimbursable assistance, and direct foreign investment, the total cost of water resource development projects is always ultimately borne by national funds. External financing in the form of loans only provides an additional means to shift investment costs to the future.

#### A. NATIONAL FUNDING SOURCES

##### 1. Operational revenues

The contribution to investment financing derived from the revenues of public utility companies depends on the tariffs charged. In the Latin American and Caribbean countries, it is not difficult to find provisions in legislation governing public utilities stipulating that tariff levels should cover costs and provide a return on capital sufficient to facilitate the financing of investments.

Table 12  
 LATIN AMERICA AND THE CARIBBEAN: SHARE OF GROSS DOMESTIC  
 SAVING IN INVESTMENT FINANCING, 1970-1988

(Percentage of gross domestic investment at constant market prices)

Country	1970	1975	1980	1985	1988
Argentina	96.3	86.4	75.3	87.4	85.9
Bolivia	100.8	82.7	91.7	37.1	4.4
Brazil	85.0	72.6	77.4	99.2	109.5
Chile	92.1	62.8	62.7	52.1	94.3
Colombia	74.8	92.9	96.6	71.2	94.0
Costa Rica	43.7	34.4	30.2	57.7	65.7
Dominican Republic	50.9	90.8	54.7	82.6	89.9
Ecuador	68.1	83.7	76.7	103.5	66.3
El Salvador	105.8	71.8	99.8	39.4	66.9
Guatemala	97.1	89.0	86.7	70.8	57.2
Haiti	82.6	61.9	46.8	42.0	42.7
Honduras	34.0	37.7	45.9	43.1	32.0
Mexico	85.1	79.1	82.6	101.2	90.8
Nicaragua	63.7	17.4	-53.7	-80.4	-51.6
Panama	76.2	74.4	77.7	111.2	277.7
Paraguay	69.4	71.4	76.3	75.4	82.9
Peru	118.6	49.1	95.6	99.7	74.3
Uruguay	54.8	27.2	41.3	70.0	102.2
Venezuela	96.9	125.5	137.9	148.1	63.8
Total	88.0	80.7	83.0	97.5	93.2

Source: United Nations, Economic Commission for Latin America and the Caribbean, Statistical yearbook for Latin American and the Caribbean 1988 edition, LC/G.1550-P, 1989 February, p. 103; Statistical yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, p. 105.

Unfortunately, such policies have not been pursued in practice and the ability of public utility companies to finance their investment programmes has been considerably reduced. The main reason for the persistence of inadequate tariffs is the tendency of governments, and sometimes operating companies, to consider tariff increases inopportune due to political or macroeconomic policy reasons. Consequently, tariff levels have been usually kept low bearing little or no relationship to the cost of the services provided, the financial needs of the utility or of the consumer's capacity to pay. In addition, attempts to accommodate various special interest groups have sometimes led to complex and distorted pricing policies, taxation and regulations, which coupled with frequent tariff and policy revisions provided little incentive to save water or energy and to reduce costs, but a strong incentive to exert political pressure.

a) Hydroelectric power generation. Electric power utilities generally have the soundest pricing policies. In many cases, however, electricity tariffs are only sufficient to cover operation costs and a small proportion of capital costs. In the countries with persistent inflation, tariff generated funds are even less significant in the structure of capital funding.<sup>78/</sup> For example, the tariffs charged by HIDRONOR S.A. in Argentina have been considerably lower, than those calculated according to provisions stipulated in the Concession Contract.<sup>79/</sup> In Brazil, losses of tariff income, arising from limits on increases imposed for macroeconomic reasons, led to Centrais Elétricas Brasileiras S.A., a federally-owned electric utility holding company, to lose 28% of its potential income between 1980 and 1985.<sup>80/</sup>

As a result of changing macroeconomic policies, the tariffs are beginning to generate a larger share of capital funding in most of the region. This trend is particularly noticeable in Chile, Honduras, Trinidad and Tobago, Brazil, Colombia and Mexico.<sup>81/</sup> In Chile, most tariffs are set on the basis of marginal cost pricing principles. The tariffs charged are a function of both the short-run marginal cost of energy and of the long-term marginal cost of new generating capacity required to cover peak demand calculated on the basis of a least-cost investment programme. Tariffs for large consumers and for exchanges of energy among generating companies are set through competitive bargaining. This policy for electricity pricing in Chile has led to a steady improvement in the finances of the energy sector and is considered to have permitted the achievement of an adequate investment funding mix. The solid economic and legislative basis of the scheme has brought forth the stability required for the private sector to resume its preponderant role within the sector.<sup>82/</sup>

b) Drinking water supply and sanitation. The income of water supply and sanitation companies has been both small and variable. Cost recovery is, however, an accepted principle in the urban areas, although in practice it is seldom fully applied. In poorer

areas the only realistic possibility is likely to be partial recovery of capital and payment of operation and maintenance costs.<sup>83/</sup> In 1985, in nine of fifteen countries surveyed, tariffs more than covered costs and of the nineteen countries providing information on tariff structures fifteen had progressive systems operating either nationally or in some areas (Table 8).<sup>84/</sup>

Low tariffs for drinking water supply and sewerage do not, as a rule, benefit those who most need them. The poor usually do not have adequate access to drinking water supply and, as a result, must buy water from private water sellers at prices far exceeding those charged by water supply companies. It has been estimated that the cost of water brought from water sellers is 17 times higher in Lima, Peru; 17 to 100 times in Port-au-Prince, Haiti, and 16 to 34 times higher in Tegucigalpa, Honduras than the price charged by the utility.<sup>85/</sup> Water utilities, in part, because of insufficient revenues, are unable to extend their services to the periphery areas where the poor live.

Tariffs represent, however, a potentially significant source of capital financing for water utilities. In Chile, approximately 56% of the funds invested in the sector during the period 1985-1989 were generated from tariff income. The share of tariff generated resources in capital funding increased from less than 49% in 1985 to almost 68% in 1989. The remaining funds were provided through general government revenues and through external loans mainly from the IDB and the World Bank. The sector in turn contributed an important share of its gross revenues to general public finances through a value-added tax. A sound tariff policy has played a key role in achieving this generally healthy funding situation. In 1974, the share of own revenues in total funding was less than 5%.<sup>86/</sup>

c) Irrigation. In Latin America and the Caribbean, it has been common practice to heavily subsidize the price of irrigation water. This policy has led to a redistribution of income in favour of irrigation farmers, but also to the wasteful use of water. Subsidies have had a negative effect on project operation, reducing the area irrigated in many instances, on the maintenance of systems, as well as the ability to finance new investments. Low tariffs, inadequate collection schedules and delays in payments in an unstable economy with high inflation, result in the real value paid by users for water to be negligible. Tariffs may be considered purely symbolic, as for example in the Tinajones project in Peru.<sup>87/</sup> In Colombia total water charges covered only 34.9% of operation and maintenance costs in 1980 and 28.5% in 1987 and only a few districts approach self-sufficiency for operation and maintenance.<sup>88/</sup> In Mexico it has been estimated that user payments cover only a quarter of the conservation and administration costs in most irrigation districts. This represents, on average, only slightly more than 1% of their production costs.<sup>89/</sup>

Many existing irrigation projects are characterized by a wasteful use of water.<sup>90/</sup> Pricing for irrigation water close to its marginal value, apart from providing adequate funds for investments, maintenance and operation, is also likely to improve on-farm water management efficiency. For example, in Mexico, water use efficiency has been reported to be substantially greater in irrigated areas where charges vary with the volume of water consumed, than where farmers pay fixed rates regardless how much water they actually used.<sup>91/</sup>

Low water tariffs also encourage farmers to grow low value crops on irrigated lands, thus reducing their rate of return and increasing competition with rainfed producers as has been observed, for example, in Mexico and Peru.<sup>92/</sup>

It is frequent that much water and electricity is wasted or lost because of low distribution efficiency, illegal connections to the distribution network, as well as other factors. For example, the electricity distribution networks in Latin America and the Caribbean have average losses of 25%, whereas 15% is generally regarded as the norm.<sup>93/</sup> On the whole, energy use in the region is estimated to be now less efficient than in 1980.<sup>94/</sup> Many drinking water supply systems are also characterized by high distribution and operation losses. Unaccounted for water, defined as the difference between metered production and metered consumption expressed as a ratio to metered production, averages between 40% and 60%, compared with 34% in the best managed systems.<sup>95/</sup> High losses, in either electricity or water distribution systems, mean low revenues and a greater need for new investments as well as a lower standard of service and higher tariffs for consumers. The economic recession has contributed to an increase in electricity and water theft, of unregistered and illegal connections, and to a deterioration of financial discipline in billing and collection thereby increasing utility revenue arrears.

Governments sometimes have no effective regulatory mechanisms at their disposal for enforcing the introduction of adequate tariffs and their timely collection by utility companies. Some companies, in turn, are not permitted to introduce adequate tariffs and have inadequate policies for handling overdue accounts, including low or no penalties for late payment. Even when there are penalties, in conditions of high inflation, these are frequently of little importance to consumers since few companies index penalties.

## 2. Government contributions

On the whole, central government capital expenditures have been generally low in most Latin American and Caribbean countries and have decreased over the last decade (Table 13). Government contributions have, however, played an important role in financing investments in most water-related sectors of the economy. This is particularly true for most drinking water supply and sanitation and large public irrigation and hydroelectricity generation projects.

Information on the share of water-related expenditures in central government expenditures is not directly available. An impression of trends in expenditure can be obtained, however, from data on expenditures on housing and community amenities, agriculture, and fuel and energy (Table 14). Expenditures on the first two areas decreased from 1.85% and 5.71% in 1981, to 1.42% and 3.40% in 1985 whereas the share of fuel and energy increased from 2.00% to 3.26%.<sup>96/</sup> The reduction of government capital expenditures reflects the results of budgetary restraint and austerity. It may also show both the increased role of the private sector, particularly in irrigation and electricity generation, and a general loss of priority for water-related projects. The level of expenditure seems to have begun to recuperate in a number of countries in line with improvement in their economies.

Many utilities contribute an important part of their revenues to general public finances through value-added or other taxes (Table 15). Funding contributions from general government revenues represent, therefore, at least in part, a reimbursement of resources transferred previously from the operation of projects through taxes.

It is common for governments to impose surcharges on consumption or on the revenues of utility companies to finance electricity development funds which then return to the sector as government equity contributions. Such forms of financing are found in Argentina, where they include the Fondo Nacional de la Energía (FNE), the Fondo Nacional de la Energía Eléctrica (FNEE), the Fondo Chocón-Cerros Colorados-Alicopá (FCCC), the Fondo Nacional de Grandes Obras Eléctricas (FNGOE) and the Fondo Nacional para el Desarrollo Eléctrico del Interior (FEDEI) (Figure 3),<sup>97/</sup> and in Uruguay, the National Energy Fund. This practice offers two main advantages, first, through the adoption of higher tariffs it may encourage an increase in the efficiency of electricity use, and second, it provides a means for cost recovery and resource mobilization.<sup>98/</sup> At the same time, surcharges may reduce incentives for the state companies to be financially self-sufficient and can distort costs in the energy production process and misdirect the selection of investment priorities.



Table 13  
 LATIN AMERICA AND THE CARIBBEAN: CENTRAL GOVERNMENT CAPITAL EXPENDITURES, 1980-1988  
 (As a percentage of gross domestic product)

Country	1980	1984	1985	1986	1987	1988
Argentina	2.5	1.4	0.9	1.4	1.5	0.9
Bahamas	1.5	0.7	1.8	1.8	1.4	1.5
Barbados	3.9	3.6	4.1	5.2	4.2	3.7
Bolivia	0.9	0.6	10.7	0.7	n/a	n/a
Brazil	1.6	1.1	13.0	n/a	n/a	n/a
Chile	2.6	2.6	3.1	3.2	3.0	3.5
Colombia	2.6	0.2	0.2	0.2	0.2	0.2
Costa Rica	2.8	2.3	1.7	1.4	0.9	0.8
Dominican Republic	3.3	1.1	1.3	1.4	4.5	4.9
Ecuador	2.3	n/a	1.2	0.5	1.1	0.7
El Salvador	4.3	3.0	2.6	2.5	2.3	1.6
Guatemala	4.8	2.7	1.1	0.8	2.2	2.5
Guyana	12.1	12.1	18.3	12.6	14.9	10.2
Haiti	4.8	2.3	2.2	1.6	2.3	n/a
Honduras	4.0	3.0	2.9	2.7	2.6	2.7
Jamaica	4.8	3.1	2.7	5.4	5.2	6.9
Mexico	2.2	1.3	1.4	1.0	1.0	n/a
Nicaragua	4.7	9.0	3.0	5.8	5.3	5.2
Panama	3.5	6.0	4.0	4.7	5.1	1.5
Paraguay	1.9	2.7	2.1	0.6	1.6	1.2
Peru	3.0	2.9	2.3	1.4	0.4	0.3
Suriname	8.1	4.3	3.1	1.9	0.9	0.3
Trinidad and Tobago	15.3	10.6	9.1	5.7	8.0	6.5
Uruguay	1.5	1.1	0.7	1.0	1.8	n/a
Venezuela	7.3	1.0	0.7	1.9	1.7	1.9

Source: Calculated on the basis of information in Banco Interamericano de Desarrollo, Progreso económico y social en América Latina Informe 1989.

n/a = Information not available.

Table 14  
 LATIN AMERICA AND THE CARIBBEAN: THE SHARE OF WATER-RELATED  
 EXPENDITURES IN TOTAL CENTRAL GOVERNMENT EXPENDITURES

(Percentage)

Country	Year	Housing and Community (including water supply)	Fuel and Energy	Agriculture, Forestry, Fishing, and Hunting	Total water-related expenditures
Argentina	1986	0.41	6.51	0.94	7.86
Bahamas	1986	0.35	2.64	1.02	4.01
Barbados	1986	2.97	0.11	4.90	7.98
Belize	1985	2.89	3.69	9.76	16.34
Bolivia	1984	0.20	0.07	0.53	0.80
Brazil	1985	0.32	0.16	4.17	4.65
Cayman Islands	1987	9.13	3.33	1.58	14.04
Chile	1986	4.54	0.02	1.78	6.34
Colombia	1983	4.51	5.31	1.76	11.58
Costa Rica	1986	7.45	0.09	3.60	11.14
Dominica	1979	3.24	0.30	3.97	7.51
Dominican Republic	1985	5.95	7.42	19.64	33.01
El Salvador	1987	1.65	0.03	3.69	5.37
Grenada	1977	1.24	0.00	5.00	6.24
Honduras	1976	2.57	0.00	3.10	5.67
Jamaica	1977	5.84	1.77	6.72	14.33
Mexico	1988	1.00	1.48	2.64	5.12
Netherland Antilles	1987	4.10	0.00	0.27	4.37
Panama	1986	4.00	0.26	3.12	7.38
Paraguay	1986	2.68	0.00	1.82	4.50
Peru	1981	0.93	n/a	4.08	5.01
Saint Kitts and Nevis	1985	3.89	1.07	16.72	21.68
Saint Vincent	1987	3.70	0.00	3.42	7.12
Suriname	1986	1.23	0.41	4.46	6.10
Trinidad and Tobago	1981	11.40	3.00	4.43	18.83
Uruguay	1986	0.05	0.17	1.37	1.59
Venezuela	1986	4.76	1.78	3.02	9.56

Source: International Monetary Fund, Government finance statistics yearbook, Volume XII, 1988.

n/a = information not available. Both current and capital expenditures.

Table 15

LATIN AMERICA AND THE CARIBBEAN: CONSOLIDATED CENTRAL GOVERNMENT ELECTRICITY-RELATED TAXES AS A PERCENTAGE OF CAPITAL EXPENDITURES ON FUEL AND ENERGY, 1980-1986

(Percentage)

Country	1980	1981	1982	1983	1984	1985	1986
Argentina	26	n/a	26	21	11	19	36
Brazil	n/a	n/a	>100	>100	>100	>100	>100
Mexico	n/a	0	0	55	9	0	0

Source: International Monetary Fund, Government finance statistics yearbook, Volume XII, 1988, pp. 118, 121, 213, 216, 669 and 671.

n/a = Information not available.

### 3. Internal credit

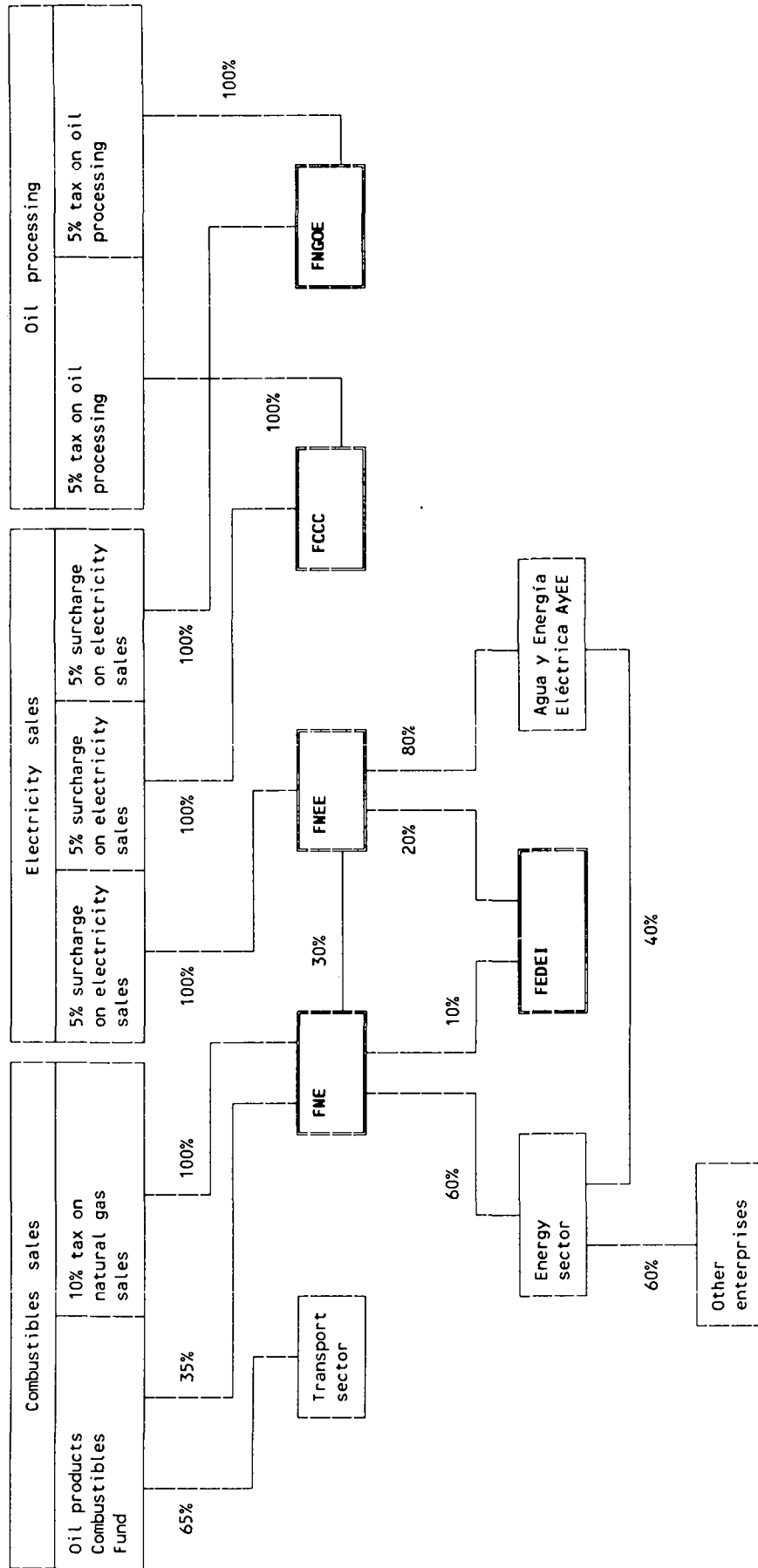
Little information is available on the contribution of loans from national financial institutions to the financing of investments in water-related projects. Some indication is provided, however, by the composition of the loans of national development finance institutions (Table 16). In general, however, such loans are only a minor source of capital funding.

Loans from domestic credit institutions for hydroelectric power generation are restricted to small facilities or industrial self-producers. This limitation is due to the relatively small and undeveloped capital markets in most countries of the region. In consequence, many local banks centre their activities on short-term credits.

In a few countries, however, private banks actively participate in hydroelectricity investment financing. This is particularly true for short-term documentary credit for the purchase of imported equipment and for credits to cover minor cash requirements until long-term financing, usually from external credit sources, is provided.<sup>99/</sup>

The share of internal credit in overall funding is also low in the drinking water supply and sanitation sector. There are exceptions. For example, in Mexico, the reduction of fiscal investments in the sector after 1984 was accompanied by an increase in internal and external borrowings.<sup>100/</sup> In Peru, loans from domestic institutions will account for about 12% of the investment in new sector infrastructure and 1% for the cost of rehabilitation of existing systems during the period 1986-1995.<sup>101/</sup>

Figure 3  
 ARGENTINA: ELECTRICITY AND ENERGY FUNDS



Source: Alieto Aldo Guadagni, *La programación de las inversiones eléctricas y las actuales prioridades energéticas*, Desarrollo Económico, July-September 1985, No. 98, p. 214.

Table 16

LATIN AMERICA AND THE CARIBBEAN:  
LENDING OF DOMESTIC DEVELOPMENT FINANCE INSTITUTIONS, 1975-1984  
(Percentage)

Sector	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
<u>Share in Total Lending:</u>										
Agriculture	29.9	30.1	31.3	24.7	38.8	35.9	21.0	17.9	23.9	24.1
Energy <sup>a/</sup>	17.2	22.4	23.1	25.3	18.4	20.0	18.9	14.3	n/a	n/a
<u>Index of Total Lending:</u>										
Current Prices	100	121	130	155	103	125	173	150	74	65
Constant Prices <sup>b/</sup>	100	113	115	126	78	85	107	87	42	36

Source: Asociación Latinoamericana de Instituciones Financieras de Desarrollo (ALIDE), La banca de fomento y el financiamiento del desarrollo en América Latina: tendencias y perspectivas, September 1986, quoted from Food and Agriculture Organization of the United Nations, Potentials for agricultural and rural development in Latin America and the Caribbean Annex 1 Economic and social development, LARC 88/3, Rome 1988, p. 46; and Asociación Latinoamericana de Instituciones Financieras de Desarrollo (ALIDE), La banca de fomento y el financiamiento del desarrollo en América Latina: evolución, situación actual y perspectivas, 1984, p. 39.

<sup>a/</sup> Includes energy, services and "others".

<sup>b/</sup> The volume of lending has been inflated/deflated by the US Capital Equipment Price Index.

n/a = Information not available.

The role of credit from national sources in investment financing is relatively more important in irrigation development. In order to stimulate agricultural investments the governments of many Latin American and Caribbean countries have frequently resorted to the reduction of the cost of capital for agriculture through subsidized interest rates. One of the consequences of fiscal austerity, however, has been the gradual reduction of public-sponsored credit programmes, with highly subsidized rural credit programmes the most affected. Preferential interest rates for agriculture have been abandoned, except for certain producers, areas and products. Interest rate deregulation has made local credit expensive in real terms. Indebtedness in agriculture has considerably increased with this rise in interest rates. For example, largely because of high interest rates, credit is considered to be a major limiting factor affecting the performance of irrigated agriculture in Brazil.<sup>102/</sup> In countries which continued to apply preferential interest rates in agriculture for example, Colombia, Ecuador, El Salvador and Peru, real interest rates have become negative.<sup>103/</sup> On the whole, internal loans remain a viable option for large privately owned commercial

enterprises dedicated to the production of high value crops, particularly, for export. The access of the small farmer to credit remains limited.

#### 4. Non-monetized user contributions

Non-monetized user contributions to the financing of investments are only significant sources of investment funds in drinking water supply and sanitation projects and in irrigation projects. In drinking water supply and sanitation projects, non-monetized user or community contributions are heavily concentrated in rural and peri-urban areas amongst those groups most deprived of adequate service. In some countries user contributions to the construction of drinking water supply and sanitation systems are an important source of financing. For example, in Costa Rica, community participation in the construction of aqueducts amounts on average from 30% to 40% of total cost.<sup>104/</sup> In Guatemala, rural communities are expected to finance up to 20% of the total cost of the investment programme during the next decade through the provision of materials and labour.<sup>105/</sup> In Colombia, community contributions in materials, labour or funds, are required to finance 15% or more of the project cost in rural areas and small cities.<sup>106/</sup> In areas of denser population and higher income any direct user contributions are as a rule restricted to the payment of connection charges.

Much private investment in irrigation, and in agriculture in general, is in the form of own-labour in such activities as land improvement. Typically, this may account for up to a third of total agricultural investment.<sup>107/</sup> In many irrigation projects, water users either individually or through their organizations participate in the development, preservation, and conservation of water and soil resources. This participation has been particularly important in smaller irrigation schemes. For example, strong farmer participation in the construction of several small irrigation programmes in the Andean Valleys has reduced material and equipment costs,<sup>108/</sup> and community contributions have been reported to have covered an average of 40% of costs in several irrigation projects in the Department of Apurímac in Peru.<sup>109/</sup> The share corresponding to user contributions is frequently increased as a result of government policies requiring that public direct involvement in the construction of irrigation infrastructure should terminate at the farm intake. Given that internal credit is often unavailable for a small farmer, most of his contribution is in the form of his and his family's labour or in the provision of locally available materials.

In hydroelectric power generation, user participation is limited to small community-owned hydropower programmes. These programmes require a significant amount of technical supervision and skilled workers, and the contribution of the work of the

community tends to be confined to the supply of unskilled labour for digging, hauling and construction.

### 5. Supplier financing

Financing from domestic suppliers is another source of funds for many hydroelectric power generation, irrigation and drainage, drinking water supply and sanitation projects. Hydraulic and related equipment is manufactured in many Latin American and Caribbean countries. Supplier financing is available in connection with the sale of hydraulic as well as other domestically produced equipment and is a minor source of investment funding. It is worth noting that the share of procurement in convertible currencies in respect of the IDB loans secured by Latin American countries increased from an average of 43% during the 1977-1980 period to 57% during the 1985-1988 period.110/

#### B. EXTERNAL SOURCES OF FINANCING

The contribution of net external financing to gross domestic investment in the region has averaged around 6% in recent years, but has varied considerably among countries (Table 17).111/ External sources of financing have been generally more important in water-related projects. In drinking water supply and sanitation projects, external sources of financing are estimated to account for 30% to 34% of total investment.112/ In several countries, their share is even higher, for example, 59% in Guatemala, 77% in Bolivia and 94% in Haiti.113/

The net inflow of long-term external financial resources to Latin American and Caribbean countries reached its maximum in 1982 and decreased considerably after that year (Figure 4).114/ The major share of external funding is provided by private banks, but their share, as well as that corresponding to other private sources, including direct private investments, has registered a sharp decline in the eighties. Multilateral financing agencies represent the other important source of external funds. Their share of total external funding has increased as borrowings from commercial banks have declined. The smaller share of official bilateral assistance has also registered a slight increase.

Available information does not show funding by sector for water-related projects. It is not possible, therefore, to know the structure of the flow of external funds to water-related investments. According to the IDB estimates during the 1974-1982 period some 71% of all energy projects in the region have been financed by loans from international private banks, 21% by loans from multilateral credit agencies, and the remaining 8% from bilateral sources. The structure of the financing of energy projects has not changed significantly since then.115/ In other

Table 17

LATIN AMERICA AND THE CARIBBEAN: CONTRIBUTION OF NET EXTERNAL  
FINANCING TO GROSS DOMESTIC INVESTMENT, 1970-1988

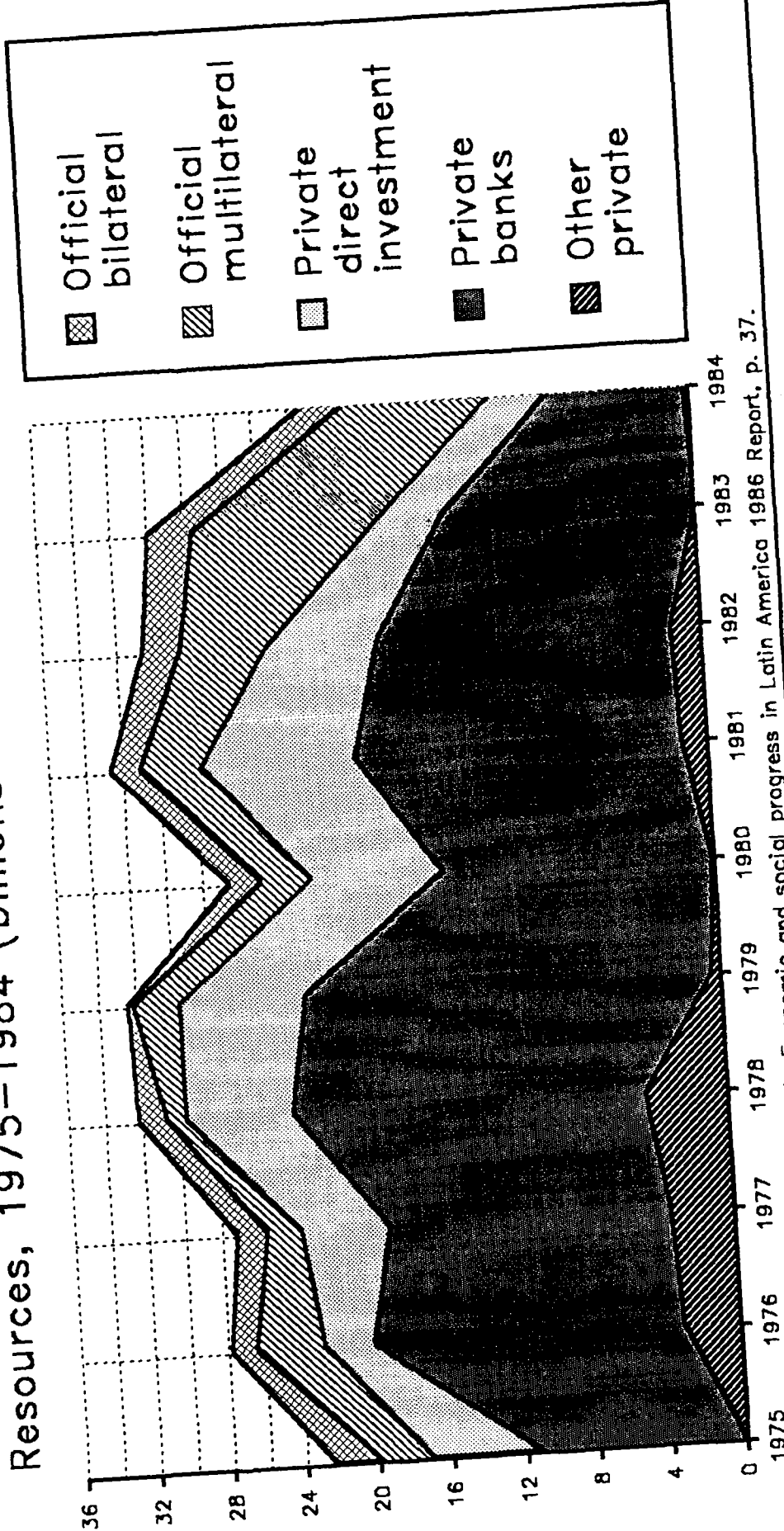
(Percentage of gross domestic investment, at constant 1980 prices)

Country	1970	1975	1980	1985	1988
Argentina	3.7	13.6	24.7	12.6	14.1
Bolivia	-0.8	17.3	8.3	62.9	95.6
Brazil	15.0	27.4	22.6	0.8	-9.5
Chile	7.9	37.2	37.3	47.9	5.7
Colombia	25.2	7.1	3.4	28.8	6.0
Costa Rica	56.3	65.6	69.8	42.3	34.3
Dominican Republic	49.1	9.2	45.3	17.4	10.1
Ecuador	31.9	16.3	23.3	-3.5	33.7
El Salvador	-5.8	28.2	0.2	60.6	33.1
Guatemala	2.9	11.0	13.3	29.2	42.8
Haiti	17.4	38.1	53.2	58.0	57.3
Honduras	66.0	62.3	54.1	56.9	68.0
Mexico	14.9	20.9	17.4	-1.2	9.2
Nicaragua	36.3	82.6	153.7	180.4	151.6
Panama	23.8	25.6	22.3	-11.2	-177.7
Paraguay	30.6	28.8	23.7	24.6	17.1
Peru	-18.6	50.9	4.4	0.3	25.7
Uruguay	45.2	72.8	58.7	30.0	-2.2
Venezuela	3.1	-25.5	-37.9	-48.1	36.2
Total	12.0	19.3	17.0	2.5	6.8

Source: United Nations, Economic Commission for Latin America and the Caribbean, Statistical yearbook for Latin American and the Caribbean 1988 edition, LC/G.1550-P, 1989 February, p. 159; and United Nations, Economic Commission for Latin America and the Caribbean, Statistical yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, p. 156.



Figure 4  
 Latin America and the Caribbean: Net Inflow of Long-term Financial Resources, 1975-1984 (billions of constant 1985 US dollars)



Source: Inter-American Development Bank, Economic and social progress in Latin America 1986 Report, p. 37.

water-related sectors, the available information indicates that the flow of investment resources to them is characterized by a higher proportion of multilateral and bilateral credits and assistance in comparison with productive sectors as a whole.

The terms governing external financing have deteriorated over the last decade for almost all Latin American and Caribbean countries. Since 1980, interest rates have risen, maturity periods have become shorter, although grace periods have remained virtually unchanged, and a larger proportion of loans are issued at variable interest rates (Table 5).

#### 1. Loans from the multilateral development banks

The multilateral banks, the World Bank, the IDB, and on a smaller scale, the Caribbean Development Bank (CDB) and the Central American Bank for Economic Integration (CABEI), are a major source of external funds for water resource development.

The World Bank and the International Development Association (IDA), although legally and financially independent, are administered by the same staff. The mandate of the World Bank is to help raise standards of living in developing countries by channeling financial resources to them from developed countries. It lends only for productive purposes and each loan must be made to, or guaranteed by, the government of the recipient country. Its lending decisions are based entirely on economic considerations and due regard must be given to the prospects of repayment. Loans carry a variable interest rate which is adjusted semi-annually. The average interest rate on undisbursed and outstanding loans in 1989 was 7.86%.<sup>116/</sup> Loans usually have a three to five year grace period, are repayable over 15 to 20 years, and there is usually a grant element of between 7% and 9%.<sup>117/</sup>

The activities of the IDA are concentrated on those developing countries with an annual per capita gross national product not exceeding US\$ 835 in 1986 values, as of 1st July 1987.<sup>118/</sup> Consequently, its loans are available only for a small number of Latin American and Caribbean countries. IDA loans normally have a ten year grace period and are repayable over 40 years in the case of the least developed countries and over 35 years in the case of other eligible countries.<sup>119/</sup> The loans are free of interest, although they carry an annual service charge of 0.75% and a commitment charge of 0.5% on the unwithdrawn balance.<sup>120/</sup> In recent years, the IDA has made loans to Bolivia, Haiti and Honduras for water-related projects. They represent only less than 2% of the total World Bank water-related loans to the region and have been made mainly for hydroelectric power generation projects.

The purpose of the Inter-American Development Bank is to promote and accelerate the economic and social development of Latin

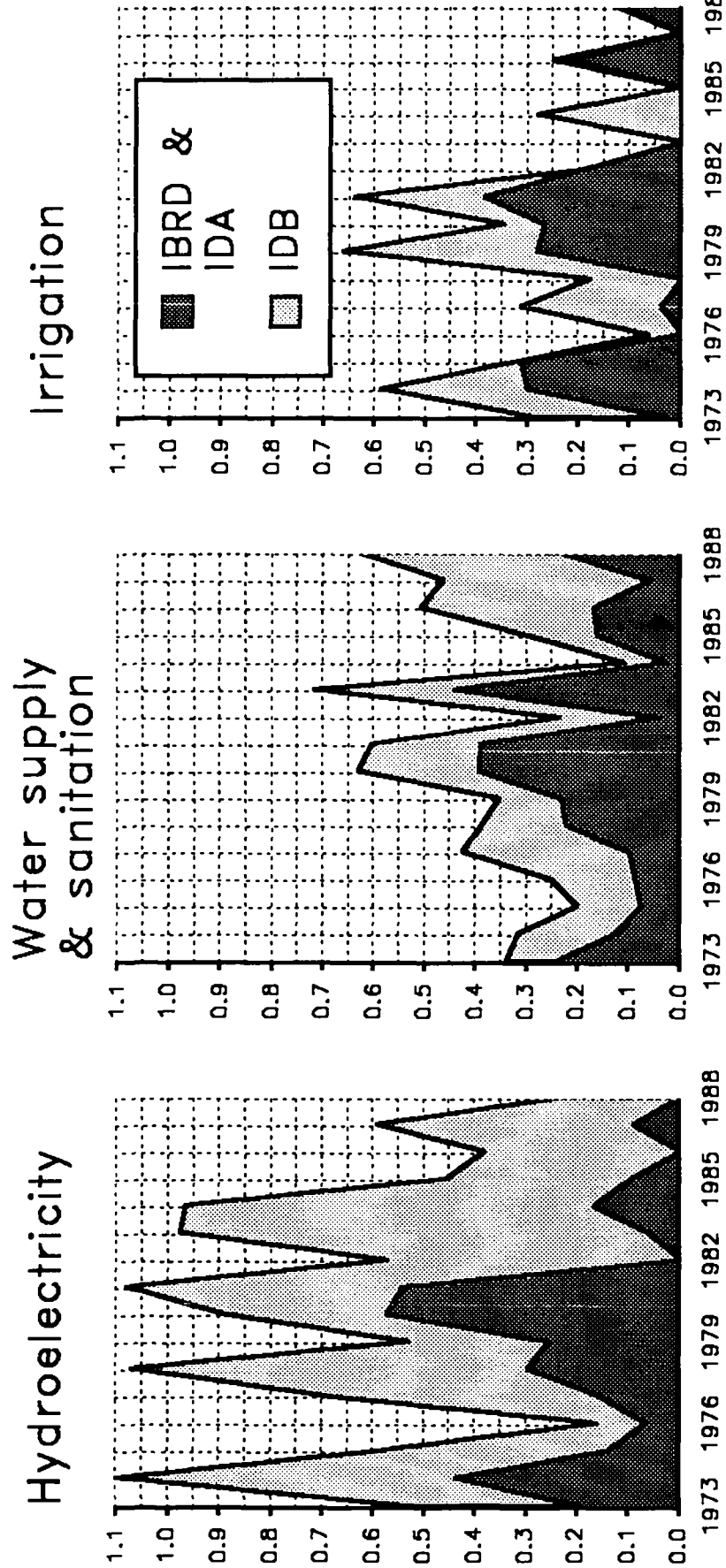
American and Caribbean member countries. Normally, its loans cover no more than 50% of the project cost and are amortized over periods of between 15 and 25 years, including a grace period.121/ Interest rates are variable. The average interest rate on outstanding loans, including special commissions, was 8.14% in 1988.122/ The Bank also charges a credit commission of 1.25% per annum on the undisbursed convertible currency portion of loans and an inspection and supervision fee of 1% on their principle amount.123/ Apart from loans granted from ordinary capital resources, the Bank also has a special facility, the Fund for Special Operations (FSO), to grant "soft" loans to the lesser developed members. These loans are amortized at periods between 25 and 40 years, may finance up to 90% of the project cost and their interest rates normally range between 1 and 4%.124/ The IDB also administers several special funds, including the Social Progress Trust Fund,125/ the Venezuelan Trust Fund, Canadian Funds, Swiss Funds and a Norwegian Fund. Loans from these special funds carry a much lower interest rate than loans from ordinary capital resources.126/

In the period between 1980 and 1988, the World Bank and IDB have granted loans to drinking water supply and sanitation, irrigation and drainage, and hydroelectric power generation projects in Latin America and the Caribbean amounting to some US\$ 12.3 billion (Figure 5).127/ Half the total was for hydroelectric power generation, about 35% for drinking water supply and sanitation, and some 15% for irrigation and drainage. These loans represent about 20% of the two banks total lending to the region. Some 62% or US\$ 7.6 billion of the total, was provided by the IDB. Approximately 70% of the loans were given to just five countries, Colombia, Brazil, Mexico, Argentina and Chile.

Both the volume of water-related lending and its share have declined in the eighties (Figure 5). In 1980-1981 the share of water-related loans in total lending was about one third, but it declined to 14% in the period 1985 to 1988. In the case of the World Bank, the decline in the resources available for investment in the region coincided with the considerably increased commitments on its part for adjustment lending, quick-disbursing loans aimed at supporting policy reforms. In 1987, almost one third of the Bank's commitments to the region took the form of such quick-disbursing loans.128/ Likewise, in 1986 about one third of new loan commitments to Latin America and the Caribbean involved either policy-based operations or had a strong policy content.129/ In comparison, in 1981 and 1982 the share of structural-adjustment loans was 0.7% and 5.0%, respectively.130/ The amounts devoted to these loans restrict the funds available for traditional project lending, including those for water-related projects.

The decrease in lending of the IDB is both a consequence of the economic recession and of the lack of agreement on the Seventh General Increase of the Bank's resources.131/ The Sixth General Increase of Resources approved in 1983 for the amount of US\$ 15.7

Figure 5  
 Latin America and the Caribbean:  
 World Bank and IDB Loans for Water-Related Projects  
 (billions of constant 1985 US dollars)



Source: on the basis of information in the World Bank and IDB Annual Reports.

billion, has also been characterized by delays in the timetable of subscriptions to capital and of contributions to the FSO. By the end of 1987, some subscriptions were still unpaid.<sup>132/</sup> The Bank, once the biggest single source of development finance for the region, is currently estimated to receive more money in repayments from many countries than it provides in new loans.<sup>133/</sup>

The sectoral distribution of lending from the two banks varies from year to year and among institutions (Figure 5). The volumes contributed to each sector have fluctuated considerably in the last decade with loans for hydroelectric projects declining sharply after 1984 and for irrigation development after 1981. The IDB accounted for the major share of loans for hydroelectric power generation and drinking water supply and sanitation projects, whereas the World Bank accounted for the bulk of funds for irrigation.

Loans tend to be concentrated geographically with loans for hydroelectricity projects concentrated in Argentina, Chile and Colombia, those for drinking water supply and sanitation in Brazil, Argentina, Chile, Colombia and Mexico, and for irrigation in Mexico, Brazil, Colombia and Ecuador.

On average loans from the two banks financed about 37% of project costs in water supply and sanitation projects, 15% in hydroelectric projects and 38% in irrigation projects.

The Caribbean Development Bank was established in 1969 to contribute to the harmonic growth and development of the member countries and to promote economic co-operation and integration among them, giving special regard to the needs of the less developed member-countries.<sup>134/</sup> Loans from Ordinary Capital Resources (OCR) have a variable interest rate, including a 1% commission. The interest rate on OCR loans currently is 9.5%.<sup>135/</sup> The CDB also has a facility for "soft loans", the Special Development Fund (SDF), to finance the needs of the lesser developed members. Loans from this fund have a maximum grace period from 5 to 10 years, and are repayable over 20 to 40 years, including a grace period, with interest rates ranging between 4% and 6% depending upon the borrowers and projects involved.<sup>136/</sup> There are also other special funds.

During the 1980-1988 period, the CDB has made loans for drinking water supply and sanitation and hydroelectric power generation projects to Caribbean countries amounting to slightly more than US\$ 33 million.<sup>137/</sup> Of the total water-related loans almost 90% have been for drinking water supply and sanitation. They represent about 7% of its total lending over this period. Almost three quarters of the loans were made to just three countries, the Cayman Islands, Bahamas and Saint Lucia. The volume of water-related loans has increased in recent years. Loans

finance on average about 53% of project costs, 64% in drinking water supply and sanitation projects, but only 22% in hydroelectricity projects.

The Central American Bank for Economic Integration was created in 1960 and started its operations in 1961.<sup>138/</sup> The Bank's resources are channelled through four main funds. These are the Ordinary Fund to finance preinvestment requirements, the Central American Fund for Economic Integration to provide financing for the implementation of projects in the field of energy, natural resource evaluation, irrigation, agricultural development, etc., the Housing Fund, and the Social Development Fund which finances, among others, health and sanitation projects.<sup>139/</sup> The volume of CABEI net loan approvals declined sharply beginning with 1982/1983 fiscal year, but recuperated in 1986/1987 although remained below the level of the late seventies. The Bank's liquidity crisis derived from the inability of the Central American countries to provide increased capital funding, and the considerable reduction of the availability of fresh external resources.<sup>140/</sup> The water-related lending of CABEI has centred in recent years on electricity generation, including geothermal and hydroelectric, and water supply projects. The volume of lending has been relatively low, about US\$ 52 million in water-related projects since 1961.<sup>141/</sup>

## 2. Foreign direct investments

The flow of foreign direct investments to Latin America and the Caribbean has sharply declined during the eighties (Figure 4). For most countries, foreign direct investments are estimated to be not much higher at present than in the first half of the seventies. Little information is available on the sectoral composition of foreign direct investment and, particularly, on its role in the financing of water-related projects. It can be assumed, however, that there was little or no foreign direct investment in the drinking water supply and sanitation sector.

Private direct investment in agriculture is very small. For example, of the total stock of British private direct investment in the region, agriculture accounted for 12.9% in 1975 and only 1.0% in 1980, while for Japanese investment agriculture accounted for 3.0% in 1975 and 2.0% for 1984.<sup>142/</sup>

Private direct investment in agriculture has also fallen in recent years, for example, the share of agriculture in total registered foreign investment in Colombia declined from around 1.0% of the total during the 1970-1979 period to 0.7% during the 1980-1987 period.<sup>143/</sup> In Mexico, less than 0.1% of total foreign direct investments was invested in agriculture during the period 1980-1987.<sup>144/</sup>

More interest has been shown by private foreign investors in hydroelectric power generation, particularly in recent years, in Chile. Several foreign banks have purchased shares in operating companies or invested in the building of new projects. These transactions have mainly taken the form of debt-for-equity swaps.<sup>145/</sup>

### 3. Supplier financing

Supplier credits from foreign manufacturers are largely limited to the hydroelectric power generation sector, where they have financed, on average, from 10% to 15% of the foreign currency requirements in those projects for which information is available. Financing from suppliers is provided on the basis of equipment purchases, usually up to between 80% and 95% of the total value. Such financing is normally characterized by fixed interest rates, reduced terms with maturities between 2 and 10 years and short grace periods. Supplier financing agreements usually includes restrictive clauses on the acquisition of equipment and on the contracting of transport. The prices paid for equipment obtained this way may sometimes exceed those achieved through international competitive bidding.<sup>146/</sup>

Outside hydroelectric power projects, the share of supplier credits in external financing has been low. Supplier credits are used in drinking water supply and sanitation projects, and in irrigation projects, particularly where there is an important foreign exchange component. One example is the Barbará-Ferro Brasileiro Consortium and the Industrial Bank of Japan credits to SENDOS, the Chilean drinking water supply and sanitation agency.<sup>147/</sup>

### 4. Technical co-operation of the United Nations System

The United Nations System provides technical assistance mainly through the United Nations Development Programme (UNDP), the Capital Development Fund (CDF), the World Food Programme (WFP), and the United Nations Children's Emergency Fund (UNICEF). Its assistance includes a large range of activities, but normally does not encompass capital funding for projects.

The total disbursements of the United Nations System for water resources projects in Latin America and the Caribbean are estimated to be about US\$ 8.5 million annually.<sup>148/</sup> The lion's share of disbursements for technical co-operation, approximately 54%, has gone to drinking water supply and sanitation.<sup>149/</sup> Technical co-operation in this sector grew at an average annual rate of 17.8% from 1973 to 1985, mostly due to increases in UNICEF and WFP programmes. The major part, over 40%, has been provided by UNICEF whose programmes focus on the development of low-cost drinking water supply and sanitation services in rural areas. Disbursements

for irrigation projects, accounting for 38% of the total, constitute the second largest category. Expenditures for irrigation have been growing at an average annual rate of 12.2%. The major share of irrigation expenditures has been provided by the UNDP, followed by the WFP. Disbursements for hydropower projects account for about 8% of the total funding. Technical co-operation in hydroelectricity has been decreasing. All financing for hydropower projects is provided by UNDP. In total, Latin America and the Caribbean received slightly more than 26% of the global disbursements of the United Nations System related to hydroelectric projects in the eighties.

UNDP funds are usually channelled through other agencies of the United Nations which serve as the executing agencies for individual projects. Resources are typically provided in the form of grants for pre-investment technical assistance. The funds are most frequently used for the services of international experts, specialized contract services, imported technical equipment, and fellowship costs. Projects in the field of water resources financed by the UNDP range from general reconnaissance and assessment of resources to feasibility studies.

UNICEF, within the context of child and family welfare, provides assistance for drinking water supply in rural and urban fringe areas. It typically assists with surveys and programming, including advisory services, with training, by supplying required equipment and materials, supporting health education and water quality control and by providing technical support. Most assistance is provided in the form of grants in equipment and personnel, with a minor portion in cash.

The CDF provides grants mainly to lesser developed countries and with an emphasis on community involvement. CDF projects that are expected to produce revenue are also expected to repay the grant at the current interest rate with repayments being fed back into domestic revolving funds.150/

Its water-related activities focus on the improvement of rural drinking water supply and sanitation.

Finally, the WFP gives assistance to drinking water supply in rural areas, irrigation and drainage, erosion control, watershed management and flood control.151/ An interesting characteristic of the WFP projects is the reduction of labour costs through food grants as a substitute for wages.152/



## 5. Bilateral assistance

Detailed information is not available on the financial flows to water resources projects in Latin America and the Caribbean from bilateral sources. It has been estimated, however, that in the drinking water supply and sanitation sector, bilateral and other multilateral assistance (except that of the IBRD and IDB) account for approximately 10% of all external funds going to the sector.<sup>153/</sup> The major bilateral external donors in recent years have included the United States Agency for International Development (USAID), similar agencies in the Federal Republic of Germany and the Netherlands, and the European Development Fund (EDF).<sup>154/</sup>

The operations of USAID, which has responsibilities for implementing the United States development assistance programmes, may be taken as typical. Its resources are provided in the form of grants and loans. The mode of funding is determined on a project-by-project basis. Minimum terms for loans are a 40-year maturity period, with 1% and 2% interest over a 10-year grace period and 3% thereafter. Some loans are negotiated on an immediate-term basis, with a 25-year maturity and 5% rate of interest.<sup>155/</sup>

USAID assistance in the field of drinking water supply and sanitation has focussed on the provision of water supply for small rural and peri-urban communities. Institutions of the recipient countries usually act as executing agencies. The total funds provided by the USAID for drinking water supply and sanitation projects in the region during the 1981-1989 period have been estimated at approximately US\$ 63.8 million, or about US\$ 7.1 million annually. Annual disbursements have been stable in the eighties, except during the 1983 and 1985 financial years when they increased to US\$ 14.7 and US\$ 20.8 million, respectively. The major countries benefitted include Bolivia, the Dominican Republic, El Salvador, Guatemala, Haiti, Honduras and Peru.<sup>156/</sup>

The technical assistance programmes of the Federal Republic of Germany usually provided grants for the advisory services of individual experts or of consulting firms. The Federal Ministry of Economic Cooperation (BMZ) has the basic responsibility for co-operation with developing countries. It entrusts the implementation of projects and related activities to several executing agencies, including the German Agency for Technical Co-operation (GTZ), which is responsible for the implementation of technical cooperation, and the Reconstruction Loan Corporation (KfW), which acts as a development bank.<sup>157/</sup> The Financial Cooperation Funds primarily serve to finance investment projects either on a grant basis for the least developed countries or as soft loans to other developing countries. The recipient country undertakes to assume the continuing costs of the projects required after termination of the assistance.<sup>158/</sup> The Federal Republic of

Germany provided, for example, five loans totalling DM 150 million for the first stage of the Tinajones irrigation project in Peru, over the years 1967 to 1984.159/

The Canadian International Development Agency (CIDA) also provides assistance to the least developed countries in the form of grants and to other developing countries in the form of loans at times at zero interest, a 10-year grace period, and a 50-year maturity period. In the case of relatively more developed countries loans usually carry a 3% to 5% interest rate, a 5 to 7 year grace period, and a 20 to 30 year maturity period.160/ Canada's development cooperation programme has increasingly centered in the eighties on agriculture, rural development and energy. Considerable assistance is also provided to drinking water supply, resource surveys and environmental protection projects.161/ CIDA assistance disbursements to major water-related sectors in Latin America and the Caribbean has increased from US\$ 28.6 million in 1985/1986 to US\$ 38.5 million in 1987/1988.162/ Examples of CIDA assistance are afforded by a Can\$ 18.3 million loan for the purchase of Canadian equipment for the 292 MW El Cajon hydroelectric power station in Honduras, and a Can\$ 7 million line of credit for the rehabilitation and construction of potable water systems in the rural areas of Nicaragua.163/

#### IV. CONCLUSIONS

This survey shows clearly that, in the countries of Latin America and the Caribbean, the funding of capital investments in water-related projects is largely provided directly from national sources. External sources of funds are a significant, but minor, adjunct. The major part of external financing is provided from multilateral development banks. Only a very limited amount of financing is obtained on concessional terms.

During the eighties, investments in hydroelectric power generation, drinking water supply and sanitation, and irrigation can be estimated to have constituted between 0.8% and 0.9% of the regional GDP, or from 4% to 5% of gross fixed capital formation.<sup>164/</sup> In most countries, investment in water-related projects was less than or, at best, similar to the levels reached in the seventies.

The level of investment in water-related projects has been seriously affected by the general economic recession prevailing in the region. The effect of the reduced availability of resources has been to curtail both new capital investment and the maintenance of existing systems. The recession has also contributed to the unstable financial situation of many water resource projects and public utilities and underlined their inability to ensure an adequate tariff base. This situation has led to an increased dependence on the use of general government revenues to fund water-related investments. Where long-term objectives and priorities have not been clearly established, all too often, this has meant that scarce budget resources have become increasingly thinly spread across a growing number of projects, failing to address the critical constraints on the sectors' development.

The increased dependence on general government revenues for investment funding is due, in part, to a decline in the flow of external resources to most Latin American and Caribbean countries. Loans from the multilateral banks to the region for water-related investments have declined in real terms and in the water resources sector payments on past loans exceed new commitments. At the same time, loans from commercial banks have virtually disappeared as a significant source of funding except for short-term credits.

The economic recession, budgetary restraint, and high interest rates have been accompanied by a general decline in the level of

financing available for public investment in large infrastructure projects. The decline has been intensified by a loss of priority for new capital investment, including most water-related projects, particularly water supply, sanitation, and irrigation projects, compared with other expenditure options in a period of increasing competition for access to falling Government outlays.

The reduction of investment resources has been felt most severely by the rural population and lower income groups in urban areas. For example, rural electrification has come to a virtual standstill in several countries,<sup>165/</sup> and there is indirect evidence indicating that the lower income groups have borne the blunt of the slowdown in the expansion of drinking water supply and sanitation in recent years.<sup>166/</sup>

The widespread failure among the public utilities of the region to cover both the cost of service and to provide a return sufficient to finance investments has added to their inability to attract funding. The correction of this failure is, perhaps, the key to the solution of the present difficult financial situation of many water-related projects. Tariffs should provide a competitive return on the invested capital, a rehabilitation capacity, and cover the associated costs of adhering to existing environmental standards. They should also give the realistic price signals to the consumers as to the actual cost of water and electricity production and of its transmission and distribution. The marginal cost concept has been widely employed to establish rational prices, particularly in the electricity sector, and has demonstrated its validity and efficiency. Under certain circumstances, however, the pursuit of certain social and other objectives, including equity considerations, may override, in part, efficiency criteria in respect of particular groups of consumers. Notwithstanding such considerations, prices should be allowed to change over time in response to changes in the underlying conditions affecting the social costs and benefits of the services in question.

Under the conditions prevailing in the region with the availability of public and international funds for most water-related projects severely curtailed, it is crucial to increase the income derived from the sale of services. Moreover, in the absence of external sources of capital and domestic private sources of investment financing should be drawn upon as much as possible, and this cannot occur unless public utilities are made financially viable. Experience indicates that much can be achieved if governments provide adequate incentives to the private sector. The role of the private sector in the financing of water-related projects is still, however, very limited in most countries.

External sources of investment financing will continue to be important, particularly in the lesser developed countries and in the form of grants and soft-term lending. It is clear, however,

that concessional external financing will remain marginal in most Latin American and Caribbean countries, and that the bulk of financing will have to be found within the countries themselves either directly or to amortize external borrowings. There is a need, therefore, to strengthen the internal capacity of the countries of the region both to generate larger amounts of investment resources internally and to use them more efficiently.

Notes

1/ United Nations, Economic Commission for Latin America and the Caribbean, Statistical Yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, pp. 608-609 and 686. The growth in hydroelectricity production and in irrigated land is for the period 1970-1987.

2/ Latin America: Energy Problems to Persist in 1990's, Special United Nations Service, No. 2308, February 2, 1990, p. 7; and United Nations, Economic Commission for Latin America and the Caribbean, Preliminary Overview of the Economy of Latin America and the Caribbean 1989, LC/G.1586, 29 December 1989, p. 25.

3/ Average annual increase in gross domestic product, at constant market prices, during the 1980-1988 period. Calculated on the basis of information in United Nations, Economic Commission for Latin America and the Caribbean, Statistical Yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, pp. 180-181.

4/ Current US dollars. Economic Commission for Latin America and the Caribbean, Statistical Yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, p. 478.

5/ Mexico, Comisión Nacional del Agua, El Programa Nacional de Aprovechamiento del Agua 1989-1994, Unpublished Draft, 1989, p. 177.

6/ United Nations, Economic Commission for Latin America and the Caribbean, Statistical Yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, pp. 194-195.

7/ US dollars at 1980 prices. Calculated on the basis of information in United Nations, Economic Commission for Latin America and the Caribbean, Statistical Yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, pp. 198 and 200.

8/ Latin American Energy Organization, Regional Hydroenergy Programme, "Evaluation of regional hydroenergy potential. Preliminary report", Revista Energética, No. 6, November-December 1984, pp. 61 and 78; and United Nations, 1987 Energy Statistics Yearbook, New York, 1989.

9/ Calculated on the basis of information in United Nations, Energy Statistics Yearbook, New York, various years.

10/ Latin American Energy Organization, Regional Hydroenergy Programme, "Evaluation of regional hydroenergy potential. Preliminary report", Revista Energética, No. 6, November-December

1984, p. 61; and Latin American Energy Organization, Conclusions of the regional technical meeting on hydroenergy, February 2-6, 1981, Quito, Ecuador, pp. 1-2.

11/ Secretaría General del Comisión de Integración Eléctrica Regional (CIER), "Eventuales transferencias de industrias tradicionales consumidoras intensivas de energía hacia los países en desarrollo. La oferta de recursos energéticos en el área de CIER en relación con dichas transferencias", Boletín de la Comisión de Integración Eléctrica Regional, Año XXV, No. 217, October 1989, p. 7.

12/ United Nations, Economic Commission for Latin America and the Caribbean, "The water resources of Latin America and the Caribbean and their utilization", Estudios e informes de la CEPAL No. 53, LC/G.1358, October 1985, pp. 40 and 42.

13/ Calculated on the basis of information in United Nations, Energy Statistics Yearbook, New York, various years.

14/ Estimated on the basis of the unit prices in the Latin American Energy Organization projection.

15/ On the basis of information in Latin American Energy Organization, Alternativas de financiamiento del sector energético de América Latina y el Caribe - Subsector eléctrico, Quito, November 1989, pp. 10 and 13.

16/ Latin America: Energy Problems to Persist in 1990's, Special United Nations Service, No. 2308, February 2, 1990, p. 7.

17/ Hidroeléctrica Norpatagónica Sociedad Anónima (HIDRONOR S.A.), Memoria y Balance, various years.

18/ Christopher Flavin, "Electricity for a Developing World: New Directions", Worldwatch Paper 70, June 1986, p. 21.

19/ This situation has been reported to be changing as investment policy places an emphasis on education, sanitation, urban development and agriculture rather than large infrastructure projects. The energy sector's share in fiscal expenditures has declined from some 50% in 1986 to about 33.5% in 1989. See Colombia modifica sus planes de inversión, Desarrollo Nacional, América Latina, August/September 1989, p. 6.

20/ Calculated in current prices on the basis of information in Eduardo Sarmiento Palacio, "Las finanzas del sector público y la reorientación del gasto", Estrategia económica y financiera, September 1986, No. 103, p. 34; and International Bank for Reconstruction and Development, World Bank, World Development Report 1988.

21/ In Colombia, for example, there exist tariff incentives (Resolution 149, October 1987) for industries which increase their electricity consumption with higher discounts for higher consumption (Empresa de Energía Eléctrica de Bogotá, Informe de actividades y financiero Año 1987, pp. 12 and 85).

22/ Quoted from Christopher Flavin, "Electricity for a Developing World: New Directions", Worldwatch Paper 70, June 1986, p. 19.

23/ Calculated on the basis of information provided in Jorge Bustamante D., "Desarrollo eléctrico en El Perú: Una aproximación nacional", in Recursos energéticos para el desarrollo nacional, DESCO, Centro de Estudios y Promoción del Desarrollo, 1989, pp. 76-77.

24/ José Goldemberg and Jacques Marcovitch, "Energy Policy in Brazil and the Latin American Countries", INTERCIENCIA, September-October 1989, Volume 14, No. 5, pp. 260-261. Values are expressed in current prices.

25/ Pan American Health Organization, World Health Organization, Environmental Health Program, "International Drinking Water Supply and Sanitation Decade, Regional Progress Report", Environmental Series No. 6, p. 18.

26/ Ibid, p. 5.

27/ This estimate has been made on the basis of the population provided with service in 1980 and to be provided in 1990, and 1985 per capita unit costs. In those cases where information was not available, information for the nearest year was used. In several cases estimates have been used. It should be noted, that there are several other estimates of the IDWSSD costs. The World Health Organization, the Pan American Health Organization and the World Bank have all estimated that the Decade will require a total investments of about US\$ 40-60 billion at 1978 prices, excluding costs required to rehabilitate existing systems or to combat water pollution (Pan American Health Organization, "Drinking Water Supply and Sanitation Decade: The International Decade in the Americas", Environmental Series No. 3, 1983, p. 59); The Pan American Health Organization has recently put the IDWSSD cost at US\$ 30.113 billion (Pan American Health Organization, World Health Organization, Environmental Health Program, "International Drinking Water Supply and Sanitation Decade, Regional Progress Report" Environmental Series No. 6, p. 6); see also United Nations, Economic Commission for Latin America and the Caribbean, "Drinking water supply and sanitation in Latin America, 1981-1990", Estudios e Informes de la CEPAL, No. 25, June 1983.



28/ According to another recent estimate average annual investments were only some 50% of estimated requirements. See, United Nations, Department of Technical Co-operation for Development, Factores legales e institucionales que afectan la implementación del Decenio Internacional de Agua Potable y Saneamiento en América Latina y el Caribe, Regional Seminar on Water Supply and Sanitation for Low-Income Groups in Rural and Peri-urban Communities, Recife, Brazil, 28 September-6 October 1988, Document No. 20, p. 3.

29/ This estimate has been made on the basis of the population expected to be provided with services and 1985 per capita unit costs. In the cases where information was not available, information for the nearest available year was used. In several cases estimates have been used.

30/ Pan American Health Organization, World Health Organization, Environmental Health Program, "International Drinking Water Supply and Sanitation Decade, Regional Progress Report", Environmental Series No. 6, p. 6.

31/ Calculated on the basis of information in Pan American Health Organization, World Health Organization, Environmental Health Program, "International Drinking Water Supply and Sanitation Decade, Regional Progress Report", Environmental Series No. 6, p. 25. Since only the aggregate volume of other national funds is available, it has been assumed that their annual distribution is proportional to the distribution of external and national matching funds.

32/ Estimated on the basis of information on the population provided with drinking water supply and sewerage or excreta disposal services in 1980 and 1985 and per capita unit costs. In the cases where information was not available estimates or data for another year were used.

33/ Calculated on the basis of information in Pan American Health Organization, World Health Organization, Environmental Health Program, "International Drinking Water Supply and Sanitation Decade, Regional Progress Report", Environmental Series No. 6, p. 25. Since only the aggregate volume of other national funds is available, for the purpose of recalculation in constant US dollars, it is assumed that their annual distribution is proportional to the distribution of external and national matching funds. If another estimate of investments - US\$ 9.0 billion - is correct, the structure of financing would change so that national sources would account for less than three quarters, and external sources for more than one quarter of the total.

34/ Pan American Health Organization, World Health Organization, Environmental Health Program, "International Drinking

Water Supply and Sanitation Decade, Regional Progress Report", Environmental Series No. 6, p. 7.

35/ CWS Unit, Division of Environmental Health, World Health Organization, "The International Drinking Water Supply and Sanitation Decade Review of mid-Decade progress (as at December 1985)", CWS Series of Cooperative Action for the Decade, September 1987, p. 13.

36/ On the basis of information on the IDB drinking water supply and sanitation loans approved between 1981 and 1988, IDB, "Situation of the Basic Environmental Sanitation Sector in Latin America and the Caribbean and the International Development Bank participation (1961-1988)", letter dated 04-14-89.

37/ United Nations, Economic Commission for Latin America and the Caribbean, Progress towards Achievement of the Goals of the International Drinking Water Supply and Sanitation Decade (IDWSSD) 1980-1983, Twentieth Session Committee on Water, Lima, Peru, 29 March-6 April 1984, p. 7.

38/ Mexico, Comisión Nacional del Agua, op.cit., 1989, p. 183.

39/ SENDOS had been responsible for the planning, design, construction, conservation and operation of drinking water supply and sewerage infrastructure in Chile up to the beginning of 1990.

40/ On the basis of information provided in Presentación de Chile en la Reunión del Grupo de Trabajo de Gerentes de Servicios de Abastecimiento de Agua y Saneamiento en la América Latina - Revisión de los Progresos del Decenio Internacional del Abastecimiento de Agua y del Saneamiento, PAHO, World Bank, IDB, Washington, D.C., May 10-12, 1989, pp. 16-21 and 25.

41/ Unaccounted for water is defined as the difference between metered production and metered consumption.

42/ Guillermo Yepes, "Management and Operational Practices of Municipal and Regional Water and Sewerage Companies in Latin America and the Caribbean", The World Bank, Policy Planning and Research Staff, Infrastructure and Urban Development Department, Report INU 61, January 1990, Discussion Paper, p. 13.

43/ Mexico, Comisión Nacional del Agua, op.cit., p. 183.

44/ Ministerio de Asuntos Urbanos, Dirección Nacional de Infraestructura Urbana, Corporación de Agua Potable y Alcantarillado, Dirección de Saneamiento Ambiental del Ministerio de Previsión Social y Salud Pública, Perfil de movilización de recursos, Reunión Consultiva del Decenio (Del 29 de agosto al 1 de septiembre de 1988), La Paz, Bolivia, p. 243-244 and 254. This

information is for the 1970-1987 period and is in current US dollars.

45/ Departamento Nacional de Planeación, El sector de agua potable y saneamiento en Colombia, Regional Seminar on Water Supply and Sanitation for Low-Income Groups in Rural and Peri-urban Communities, Recife, Brazil, 28 September-6 October 1988, Document No. 06.

46/ On the basis of information provided in Mexico, Comisión Nacional del Agua, op.cit., 1989, pp. 179-180; and Alfonso Camarena Larriva, Apreciación de la situación al final de Decenio Internacional de Abastecimiento de Agua y Saneamiento en México y perspectivas para el futuro, Reunión del Grupo de Trabajo de Gerentes de Servicios de Abastecimiento de Agua y Saneamiento en la América Latina, Revisión de los Progresos del Decenio Internacional del Abastecimiento de Agua y del Saneamiento, PAHO, World Bank, IDB, Washington, D.C., May 10-12, 1989, pp. 1-2, 11-12 and 15. The information on the sources of investment financing is for the period 1981-1986. The share of external sources in investment financing also includes unspecified other sources.

47/ Sonia León Mendoza, Polo Aguero Sánchez, Sistema de agua y saneamiento: Perú, Regional Seminar on Water Supply and Sanitation for Low-Income Groups in Rural and Peri-urban Communities, Recife, Brazil, 28 September 6 October 1988, Document No. 17.

48/ Alfonso Priale Jaime, Revisión de los progresos del Decenio Internacional del Abastecimiento de Agua y del Saneamiento 1981-1990 en Perú, Reunión del Grupo de Trabajo de Gerentes de Servicios de Abastecimiento de Agua y Saneamiento en la América Latina, Revisión de los Progresos del Decenio Internacional del Abastecimiento de Agua y del Saneamiento, PAHO, World Bank, IDB, Washington, D.C., May 10-12, 1989, pp. 1-2, 11-12 and 15. This information refers to the period 1983-1988.

49/ Sonia León Mendoza, Polo Aguero Sánchez, op.cit.

50/ Current prices. Exact composition of financing provided by other sources has not been available. Its certain part, therefore, might have come from external sources of financing, for example, grants.

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55/ United Nations, Department of International Economic and Social Affairs, "The Role of International Agencies in Financing Water Resource Development Projects", Natural Resources Forum, Volume 11, Number 4, November 1987, pp. 337 and 351. The amounts of investments have been adjusted to 1985 US dollars on the basis of the dollar unit cost of manufactured exports from the industrial to the developing countries, according to the information provided in Food and Agriculture Organization of the United Nations, Agriculture: Toward 2000, Conference, Twenty-fourth Session, Rome, 7-26 November 1987, C 87/27, July 1987, p. 151.

56/ United Nations Secretariat, Department of International Economic and Social Affairs, "The Role of International Agencies in Financing Water Resource Development Projects", Natural Resources Forum, Volume 11, Number 4, November 1987, pp. 337 and 351. The amounts of investments have been adjusted to 1985 US dollars on the basis of the dollar unit cost of manufactured exports from the industrial to the developing countries, according to the information provided in Food and Agriculture Organization of the United Nations, Agriculture: Toward 2000, Conference, Twenty-fourth Session, Rome, 7-26 November 1987, C 87/27, July 1987, p. 151.

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of the United Nations, Potentials for Agricultural and Rural Development in Latin America and the Caribbean Annex IV Natural Resources and the Environment, LARC 88/3, Rome 1988, pp. 67-68. Gross investment requirements include both the investments necessary to increase the total capital stock and those required for replacement purposes.

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61/ Food and Agriculture Organization of the United Nations, Potentials for Agricultural and Rural Development in Latin America and the Caribbean Annex V Crops, Livestock, Fisheries and Forestry, LARC 88/3, Rome 1988, p. 17.

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125/ One of the principal purposes of the Social Progress Trust Fund has been the financing of sanitation projects, Inter-American Development Bank, 1987 Annual Report, p. 28.

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127/ All figures given in the text refer to the period between 1980 and 1988 fiscal years. They have been calculated on the basis of amounts of approved loans stated in the annual reports of the respective banks. They refer to approvals and not to actual disbursements. The annual reports of the World Bank provide aggregate figures of the IBRD and IDA lending for irrigation and drainage, and water supply and sanitation. Figures on the IBRD and IDA loans related to hydroelectric power generation and on IDB loans have been calculated on the basis of descriptions and/or names of individual projects approved for financing. All projects have been classified by their main purpose. There may exist other loans which might have been partially devoted to drinking water supply and sanitation, irrigation, or hydroelectric power generation. The loans included here might have been devoted in part

to other purposes. All other operations of the banks (financing, grants, contingent loans, etc.), have not been considered. The data for hydroelectric power generation include geothermal energy generation. Water supply and sewerage data include storm drainage. Cancellations, amendments, changes in the project cost, etc. have been ignored. It has been assumed that all loans were granted when approved. The word "year" usually refers to the fiscal year of the respective bank.

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133/ Samantha Sparks, Finance: Need for IDB Changes by New Chief, Special United Nations Service, No. 1938, May 17 1988, p. 11.

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135/ Caribbean Development Bank, Annual Report 1988, p. 48.

136/ Caribbean Development Bank, Annual Report 1987, p. 44.

137/ All figures given in the text refer to fiscal years between 1980 and 1988. They have been calculated on the basis of the amounts of approved loans in the annual reports. They refer to approvals and not to actual disbursements. The figures have been calculated on the basis of descriptions and/or names of individual projects approved for financing. All projects have been classified by their main purpose. There may exist other loans which might have been partially devoted to drinking water supply and sanitation, or hydroelectric power generation. The loans included might be devoted in part to other purposes. All other operations (financing, grants, contingent loans, etc.), including those related to sectors under review, have not been taken into

consideration. The data for hydroelectric power generation include geothermal energy. Data for water supply and sewerage include storm drainage. Cancellations, amendments, changes in the project cost, etc. have not been taken into consideration. It has been assumed that all loans were granted when approved. The word "year" usually refers to fiscal year.

138/ Its member countries are: Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua.

139/ In addition to these four funds, there is the Central American Common Market Fund (CACMF) which functions independently. In 1985, the Fund for the Economic and Social Development of Central America (FONDESCA) was created. FONDESCA is a temporary mechanism to allow extrarregional countries to participate in CABEI. Its resources are a part of CABEI's net worth.

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141/ Central American Bank for Economic Integration, XXVI 1986-1987 Annual Report, p. 81. The volume of lending for hydraulic and water supply projects is given in current prices.

142/ United Nations Centre on Transnational Corporations, Foreign Direct Investment in Latin America: Recent Trends, Prospects and Policy issues, ST/CTC/SER.A/3, UNCTC Current Studies, Series A, No. 3, New York, August 1986, pp. 1 and 4. The share of agriculture in the total stock of private direct investment includes forestry and fishing.

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144/ Including fishing. United Nations, Economic Commission for Latin America and the Caribbean, La inversión extranjera directa y el desarrollo económico de México, LC/R.847, 27 de diciembre de 1989, p. 28.

145/ Interview: Sebastian Bernstein L., Chile Foreign Investment Report, September-October 1989, No. 10.

146/ Latin American Energy Organization (OLADE), Hydro Power: Energy Alternative and Industrial and Financial Challenge for Latin America, p. 30; and Eduardo Petazze, Consideraciones sobre la financiación de proyectos hidroeléctricos, Comisión Técnica Mixta de Salto Grande, Seminario Interamericano de Hidroelectricidad, November 26-30, 1979. p. 10.

147/ Presentación de Chile en la Reunión del Grupo de Trabajo de Gerentes de Servicios de Abastecimiento de Agua y Saneamiento en la América Latina - Revisión de los Progresos del Decenio Internacional del Abastecimiento de Agua y del Saneamiento, PAHO, World Bank, IDB, Washington, D.C., May 10-12, 1989, p. 19.

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150/ United Nations, Report of the Secretary-General, "Financing Arrangements for International Co-operation in the Development of Water Resources", Natural Resources Forum, Number 4, 1980, p. 52.

151/ On the basis of information provided in United Nations, Report of the Secretary-General, "Financing Arrangements for International Co-operation in the Development of Water Resources", Natural Resources Forum, Number 4, 1980, pp. 49-50, 52-53; and Ralph C. Palange and Alfonso Zavala, "Water Pollution Control Guidelines for Project Planning and Financing", World Bank Technical Paper Number 73, The World Bank, Washington, D.C., 1987, pp. 100-101.

152/ United Nations, Report of the Secretary-General, "Financing Arrangements for International Co-operation in the Development of Water Resources", Natural Resources Forum, Number 4, 1980, p. 52.

153/ Pan American Health Organization, World Health Organization, Environmental Health Program, "International Drinking Water Supply and Sanitation Decade, Regional Progress Report", Environmental Series No. 6, p. 7.

154/ Pan American Health Organization, Secretariat for the Regional External Support Consultations, Americas Regional Resource Mobilization Profile, Regional External Support Consultations, 21-24 April 1986, Washington, D.C. (Resource mobilization for drinking water and sanitation in the Americas), April 1986, table 18. This estimate refers to the drinking water supply and sanitation sector only. Information for other water-related sectors is not available.

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159/ ECLAC, A study of the Tinajones water system, Lambayeque -Peru, LC/R.568, 27 October 1987, p. 14. The volume of loans is given in current prices.

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163/ Canadian International Development Agency, Annual Report 1985-86, pp. 31-32. The volume of loans is given in current prices.

164/ Calculated on the basis of the estimates given in the text and information in United Nations, Economic Commission for Latin America and the Caribbean, Statistical Yearbook for Latin American and the Caribbean 1989 edition, LC/G.1606-P, 1990 February, pp. 180-181 and 194-195.

165/ Christopher Flavin, "Electricity for a Developing World: New Directions", Worldwatch Paper 70, June 1986, pp. 6-7.

166/ A detailed review of the problems affecting the provision of drinking water supply and sanitation services for the poor in Latin America and the Caribbean is to be found in United Nations, Economic Commission for Latin America and the Caribbean, Water Supply and Sanitation for the Poor: The Achievements of the International Drinking Water Supply and Sanitation Decade in Latin America and the Caribbean, LC/L.481, 8 November 1988.