FIELD REPORT

PLANNING FOR WATER AND SANITATION PROGRAMS IN BOLIVIA, ECUADOR, AND PERU

Field Report No. 302
June 1990

WATER AND SANITATION for HEALTH PROJECT

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WASH Field Report No. 302

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Prepared for the Bureau for Latin America and the Caribbean,
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by

David Ey

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RELATED WASH REPORTS

Water Supply and Sanitation in the Health Sector of the Asia Region: Information Needs and Program Priorities. Technical Report No. 36, February 1986.

LAC Bureau: Planning for Central America Water Supply and Sanitation Programs. Field Report No. 209, May 1987.

Planning for Central America Water Supply and Sanitation Programs: Update. Field Report No. 253, May 1989.

Water and Sanitation Sector Profiles of Twenty African Countries. Field Report No. 291, June 1989.

Planning for Central America Water and Sanitation Programs. Field Report No. 301, June 1990.

Planning for Water and Sanitation Programs in the Caribbean. Field Report No. 303, June 1990.

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ACRONYMS

A.I.D.	Agency for International Development (United States)
ANESAPA	*Asociación Nacional de Empresas de Servicios de Agua Potable y Alcantarillado* (National Association of Potable Water and Sanitation Agencies—Bolivia)
BEDE	Ecuadorian Development Bank
CARE	An international private voluntary organization
CIDA	Canadian International Development Agency
CIHI	Center for International Health Information
CONADE	Ecuador's National Development Council
CONCOSA	*Comité Nacional de Saneamiento Básico* (National Committee for Basic Sanitation—Peru)
CORPAGUAS	*Corporaciones de Agua* (Association of Bolivian Water Companies and Cooperatives)
COTEAS	*Comité Técnico de Asesoramiento de Agua Potable y Saneamiento* (Technical Advisory Committee on Potable Water and Sanitation—Bolivia)
DA	Development Assistance
DIGEMA	Division of Peru's Ministry of Health
EMAP-G	*Empresa Municipal de Agua Potable—Guayaquil* (Guayaquil Water Company)
EMAP-Q	*Empresa Municipal de Agua Potable—Quito* (Quito Water Company)
ESF	Economic Support Funds
FONASA	*Fondo Nacional de Saneamiento Ambiental* (National Fund for Environmental Sanitation—Ecuador)
GDP	Gross Domestic Product
GNP	Gross National Product
GOB	Government of Bolivia
GOE	Government of Ecuador

GOP	Government of Peru
GTZ	German Agency for Technical Cooperation
IBRD	International Bank for Reconstruction and Development (World Bank)
IDB	Inter-American Development Bank
IEOS	*Instituto Ecuatoriano de Obras Sanitarias* (Ecuadorian Institute of Sanitary Works)
IMF	International Monetary Fund
INE	*Instituto Nacional de Estadística* (National Institute of Statistics—Bolivia)
JICA	Japanese International Cooperation Agency
KfW	Reconstruction Loan Corporation (Federal Republic of Germany)
LAC	Bureau for Latin America and the Caribbean (A.I.D.)
MOH	Ministry of Health
NGO	Nongovernmental Organization
ODA	Overseas Development Agency (United Kingdom)
PAHO	Pan American Health Organization (unit of World Health Organization
PVO	Private Voluntary Organization
RHUDO	Regional Housing and Urban Development Office (A.I.D.)
SENAPA	*Servicio Nacional de Abastecimiento de Agua Potable y Alcantarillado* (Peru—National Drinking Water and Sanitation Agency)
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development/overseas missions
WASH	Water and Sanitation for Health Project (A.I.D. funded)

EXECUTIVE SUMMARY

Background

Since 1987, the Water and Sanitation for Health (WASH) Project has, at the request of the Latin America and Caribbean (LAC) Bureau of the U.S. Agency for International Development (A.I.D.), conducted an annual analysis of water supply and sanitation coverage levels and funding needs in Central America. In 1989, the LAC Bureau expanded its study to include, for the first time, selected Andean and Caribbean nations. This report is the first on the water and sanitation sector of the Andean countries of Bolivia, Ecuador. and Peru.

The objectives of this study are similar to those of the Central America and Caribbean reports: (1) to determine existing levels of coverage (the number of people with access to basic water and sanitation services), (2) to assess levels of investment currently committed by external support agencies and local governments to increase the availability of water and sanitation services, and (3) to develop target goals for 1995 as a means of focusing attention on the need to expand coverage in the region and on the level of investment which will be needed to meet these goals.

Water and Sanitation Coverage (1980-1989)

In 1980, less than 50 percent of the people living in the Andean countries in this study had access to a potable water system and only a third had access to sanitation facilities. In the rural areas of the three countries, however, coverage levels were far below these averages—just 17 percent had access to a water system and 6 percent had access to some form of sanitary excreta disposal facility.

Since 1980, gains have been recorded in each of the four subsectors of this study: urban water, urban sanitation, rural water, and rural sanitation. For the three countries as a whole, urban water coverage increased by 6.90 million persons to 79 percent of the population. Urban sanitation increased more slowly; 4.9 million persons gained coverage and 61 percent of the urban population had access to some form of sanitation facility. Despite these gains in coverage, it should be noted that during the same period the urban population of these countries increased by 7.03 million persons, an increase larger than the increase in water or sanitation coverage. In rural communities, where population growth has been much slower, gains made in the provision of potable water (2.19 million additional persons served by 1989) and sanitation facilities (2.72 million persons) far outpaced the population growth in those areas, estimated at 1.33 million. The result of this expansion has been an increase in rural water coverage from 17 percent to 30 percent and in rural sanitation from 6 percent to 23 percent. Table 1 presents the percentages of the population with access to at least basic potable water and sanitation services in 1989.

Table 1

1989 WATER SUPPLY AND SANITATION COVERAGE LEVELS *

	URBAN		RURAL	
	Water	Sanitation	Water	Sanitation
Bolivia	79%	43%	28%	15%
Ecuador	80	79	40	37
Peru	78	59	24	18
Combined	79	61	30	23

* Percentage of population with access to basic services.

1995 Targets

For the purposes of tracking progress in the expansion of water and sanitation facilities and projecting the funding needs of each country, the WASH Project has constructed a model of overall coverage expansion which establishes as a goal full water and sanitation coverage in Bolivia, Ecuador, and Peru within 30 years, by 2020. Targets for 1995 are developed and analyzed in Chapters 2 and 3 of this report. The 1995 targets represent the first stage in achieving full coverage by 2020 and have been set as percentage targets; that is, they indicate gains to be made in the percentage of the population with access to water and sanitation facilities. The targets are specific to each of the four subsectors within each country, and progress toward these targets will be tracked and reported in future studies. It should be noted that these targets were not developed with country participation and do not, therefore, reflect specific country goals. Rather, they are intended as a means of focusing attention on the level of effort and funding needed if increasing levels of water and sanitation coverage are to be provided for urban and rural populations in these countries.

As seen in Table 2, the 1995 targets are set to increase urban water coverage for the three countries by 5 percentage points, to 84 percent; rural water coverage by 15 percentage points, to 45 percent; urban sanitation by 10 points, to 71 percent; and rural sanitation by 17 points, to 40 percent.

Table 2

1995 WATER SUPPLY AND SANITATION COVERAGE TARGETS *

	URBAN		RURAL	
	Water	Sanitation	Water	Sanitation
Bolivia	85%	55%	44%	33%
Ecuador	84	85	52	51
Peru	84	69	40	36
Combined	84	71	45	40

* Percentage of population with access to basic services.

To achieve the 1995 goals, significant levels of funding will be required. This report estimates the total investment levels needed for each country to meet the 1995 targets, the level of funding currently committed to the effort to increase coverage, and existing shortfalls in funding. The concept of funds committed to increasing coverage used for each of the WASH reports includes only those monies that have been firmly committed and that will be used specifically to extend coverage to populations currently not served by water and sanitation facilities. Investments that will be used to rehabilitate existing water or sewerage systems or to provide other needed improvements that do not affect coverage are not included in the analysis.

Currently, international donors and local governments have committed nearly $67 million to coverage-expanding projects that are either ongoing or have been approved for initiation in the next few years. In the case of ongoing projects, only those monies for 1990 and beyond have been considered. In addition, only those funds committed by local governments in conjunction with externally funded projects are included in the analysis. Given that over $1 billion will have to be spent over the next six years to achieve the 1995 targets, huge shortfalls in funding exist. Table 3 shows by country and by subsector the levels of additional funding needed to achieve the 1995 targets.

Table 3

SHORTFALLS IN FUNDING NEEDED TO MEET THE 1995 TARGETS

(Costs in 1989 US$, 000s)

	URBAN		RURAL		
	Water	Sanitation	Water	Sanitation	TOTAL
Bolivia	$83,386	$75,350	$16,309	$10,134	$185,179
Ecuador	85,949	98,440	31,006	41,836	257,231
Peru	239,241	260,023	41,225	50,029	590,518
TOTAL	$408,576	$433,813	$88,540	$101,999	$1,032,928

The expansion of water and sanitation services to the extent called for by the 1995 targets can only occur as a result of a long-term approach to the development of the water and sanitation sector. The provision of these services to a larger portion of the populations of Bolivia, Ecuador, and Peru requires not only large amounts of additional funding, but the improvement of institutional capabilities within each country so that the construction initiated under these projects can be sustained and further expanded.

While the funding shortfall for the urban sector is over four times that of the rural sector, coverage levels in the rural sector are far below urban rates, and therefore, the funding of projects to extend coverage in the rural areas remains a priority. A.I.D. has played a leading role in the construction of water and sanitation facilities in rural areas. Clearly, this involvement should be sustained or expanded, if possible. In addition, A.I.D. has and should continue to focus on providing water and sanitation services to marginal, low-income communities, where coverage rates (like those in the rural areas) are substantially lower than the urban average. In the urban sector, however, the bulk of potential financing to support municipal water and sanitation construction projects comprises loans from the Inter-American Development Bank (IDB) and the World Bank. These institutions are not currently lending to the Government of Peru because it is in arrears in servicing current debt. Thus, the 1995 targets for Peru's urban sector will not be met until this flow of investment is renewed. In Bolivia and Ecuador, however, the two lending institutions are in the process of developing substantial loans, which will, if ratified, have a positive impact on reducing the current funding shortfalls.

Each of the countries in this study deserves consideration by A.I.D. for expanded water and sanitation programs. In particular, Peru is in critical need of additional financing. With the conclusion of A.I.D.'s decade-long rural water and sanitation program in 1989, Peru will be

without a major source of funding to support the expansion of water and sanitation facilities in the rural areas.

WASH's Lessons Learned

The WASH Project has learned over the past 10 years that the construction of water and sanitation systems alone is not enough to ensure the desired results of safe, accessible water and hygienic excreta disposal. Efforts to provide potable water and sanitary waste disposal must be integrated with other development activities. To succeed, water and sanitation projects must also provide hygiene education to communities served, train personnel in the operation and maintenance of the facilities, strengthen the local agencies and institutions which work in the water and sanitation sector, and involve the community to be served in the planning and execution of the project.

In WASH's experience, the realization of the goal of increased access to water and sanitation facilities also requires substantial coordination among all the various agencies and institutions involved in the sector as well as a long-term commitment to build not only the systems themselves but the local institutional capacity to maintain them.

SOUTH AMERICA

1

INTRODUCTION

1.1 Purpose and Goals

Since 1987, the Water and Sanitation for Health (WASH) Project has, at the request of the Latin America and Caribbean (LAC) Bureau of the U.S. Agency for International Development (A.I.D.), conducted an annual analysis of water and sanitation coverage levels and funding needs in Central America.[1] In 1989, the LAC Bureau expanded the scope of its study to include, for the first time, selected Andean and Caribbean nations. This report, the first on the Andean countries of Bolivia, Ecuador, and Peru, will be updated annually through 1994.

The goals of this study are as follows:

- To collect and analyze available data (since 1980) on the number of persons with access to water and sanitation facilities and to make projections on the basis of current coverage levels (through the end of 1989) for each of the four subsectors of urban water, rural water, urban sanitation, and rural sanitation.

- To develop coverage targets for 1995 for use by WASH and the LAC Bureau as tools to measure progress in each of the Andean countries in extending access to basic water and sanitation services to a larger percentage of the population.

- To describe ongoing and future water and sanitation projects and programs, including investment information, in each country.

- To estimate, using available information, the amount of investment currently committed to provide access to water and sanitation services to residents not served at this time and to determine what additional investments will be needed to meet the 1995 targets.

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[1] The initial WASH report was *Planning for Central America Water Supply and Sanitation Programs*, WASH Field Report No. 209, November 1987; the first update, WASH Field Report No. 253, was published in May 1989.

1.2 Approach and Definitions

1.2.1 Sources

This report was prepared in Washington, D.C., from information presented by USAID missions and international donors working in Bolivia, Ecuador, and Peru. Each of the missions and the USAID Regional Housing and Urban Development Office (RHUDO)/Quito were asked to provide current data on water and sanitation coverage and current and planned programs in each country. Per capita unit costs for the construction of additional water and sanitation connections were derived from the information provided by the Pan American Health Organization (PAHO) and USAID Missions. Other institutions contacted for information include the Inter-American Development Bank (IDB), the World Bank, United Nations Children's Fund (UNICEF), CARE, the Japanese International Cooperation Agency (JICA), the Canadian International Development Agency (CIDA), the West German Reconstruction Loan Corporation (KfW), and the West German Agency for Technical Cooperation (GTZ).

1.2.2 Methodology

The methodology used to determine the funding needed to achieve the 1995 planning targets is described below and summarized on the accompanying chart:

(1) Determine historical coverage data for the period between 1980 and 1989.

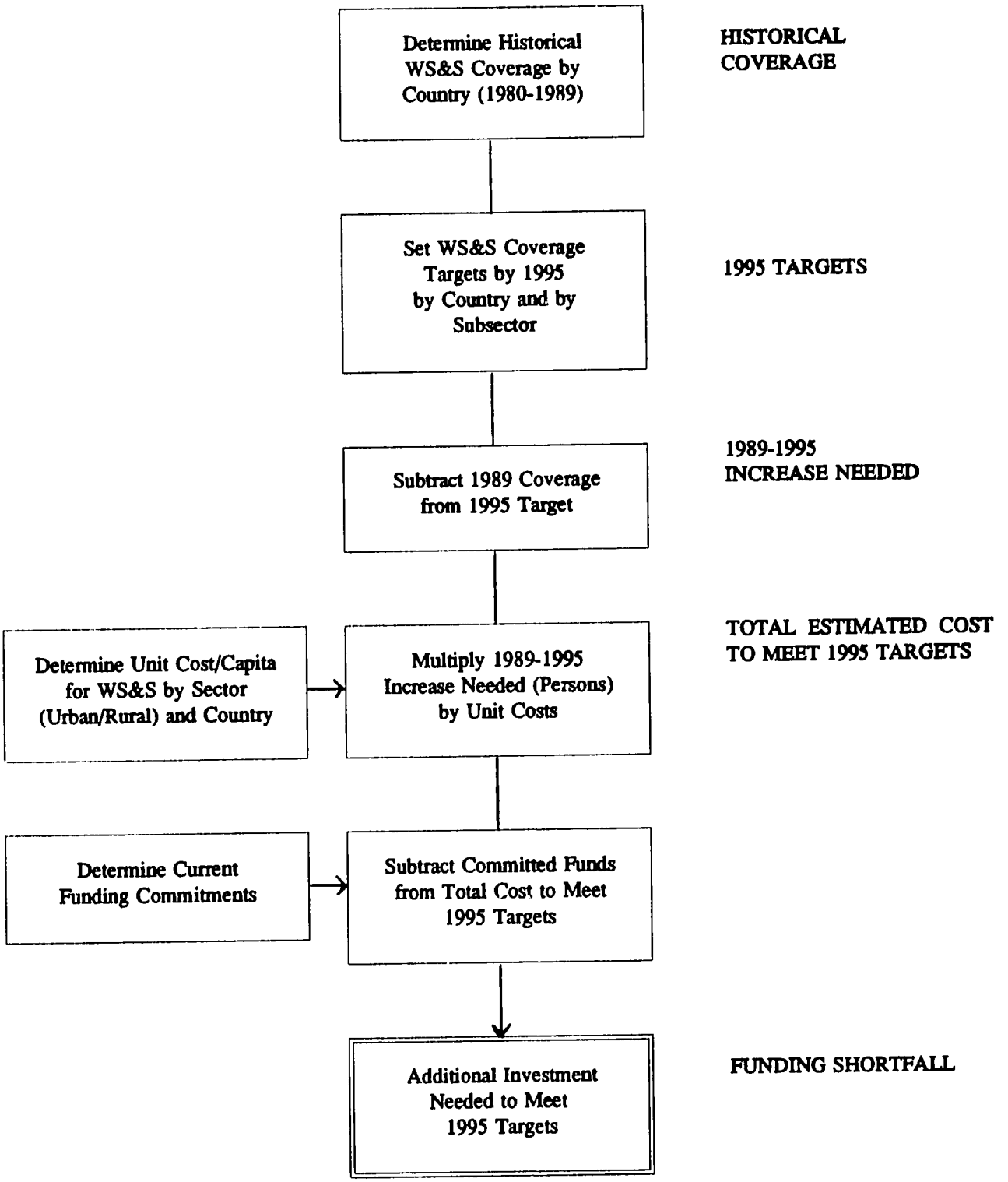
(2) Develop 1995 subsector targets (urban and rural, water and sanitation) for each country;

(3) Determine the total investment needed to meet the 1995 targets by subtracting the number of people with coverage in 1989 from the number with coverage at the 1995 target level and multiplying the resulting amount by the unit cost per capita of providing coverage.

(4) Estimate the amount of funding currently committed to increase coverage using information from international donors working in the sector.

(5) Calculate the funding shortfall to meet the 1995 targets by subtracting the amount that has been firmly committed at this time from the total amount of funding needed.

METHODOLOGY FOR DETERMINING FUNDS NEEDED TO MEET 1995 WASH TARGETS



1.2.3 Definitional Framework

The definitional framework used for this study of Andean nations is identical to that used by WASH and the LAC bureau in the Central America and Caribbean reports. In some cases, WASH has had to use its best judgment to bring data based upon different assumptions into conformity with the definitions given below.

Urban and Rural Populations

Population centers of over 2,000 persons are considered to be urban; all others are rural.

Water Supply Coverage

Water supply is available either through direct connection or from a water system outlet (standpipe or public fountain) within 200 meters of the home.

Sanitation Coverage

Sanitation service is provided by an in-house or in-compound sewerage connection, septic tank, or at a minimum, a latrine.

It should be noted that the quality of coverage may vary greatly between the different types of service (e.g., direct connection versus community standpipe) and between countries. For example, one city may be served with a water distribution system but, due to shortages in the water supply, water is not available for more than a few hours a day. Another city, however, may be served continuously. In this study, however, it is not possible to make such distinctions in the quality of coverage, and all persons reported to have coverage, as defined above, are considered to have at least minimal access to water and/or sanitation services.

Noninfrastructure Projects

Noninfrastructure projects are an essential component of the effort to improve the water and sanitation sector in each country. These projects, which support the institutional development of national and municipal water and sewerage agencies, nongovernmental organizations, and local water companies, also provide much needed training of personnel in the management and operation and maintenance aspects of water and sanitation systems. The need for both increased efficiency and an improved ability to sustain existing water and sanitation services is well recognized. However, these projects do not directly provide for the expansion of services and, therefore, expenditures for such projects are not included in this study as investments which increase coverage.

Excluded Funds

Some of the large loans made by the IDB and the World Bank have not been considered in their entirety in the investment analysis. These loans, which support the rehabilitation of existing water and sewerage systems and/or the construction of off-site facilities (e.g., treatment plants, dams, and reservoirs) are used to improve or sustain the quality of services and are not focused on increasing coverage to unserved populations. Frequently, these investments do support some system expansion, and for the purpose of this report, 10 percent of the total loan has been considered as funding which supports the expansion of water and sanitation services. A detailed analysis of the funding commitments included in the investment analysis is provided in each of the country profile appendixes at the end of the report.

1.3 Report Organization

This study is organized into three chapters and three appendixes. Following this introduction, Chapter 2 discusses the water and sanitation data for the three countries, including current and past coverage levels, the 1995 WASH targets, and currently committed investments. Chapter 3 examines the shortfalls in funding to meet the 1995 targets. The country profile appendixes provide a more detailed discussion of the water and sanitation sectors for each of the three countries. Located at the end of each appendix are the following tables and figures:

Table 1	Actual Water Supply Coverage Versus 1995 Targets
Table 2	Actual Sanitation Coverage Versus 1995 Targets
Table 3	Investment Needed to Meet the 1995 Targets
Figure 1	Urban and Rural Water Supply Coverage
Figure 2	Urban and Rural Sanitation Coverage
Figure 3	1989 Coverage and 1995 Targets (by the number of persons with coverage)
Figure 4	1989 Coverage and 1995 Targets (by the percentage of the population with access)
Figure 5	Total Investment Needed to Meet the 1995 Targets

1.4 Additional Planning Reports

As noted earlier, the LAC Bureau has commissioned similar reports on Central America and the Caribbean. The 1989 Central America report (WASH Field Report No. 301) examines the water and sanitation sectors of Belize, Guatemala, Honduras, El Salvador, and Costa Rica. The Caribbean report (WASH Field Report No. 303) covers the countries of Barbados, the Dominican Republic, Grenada, Haiti, and Jamaica. Each study will be updated annually through 1994.

2

WATER SUPPLY AND SANITATION IN BOLIVIA, ECUADOR, AND PERU

Data on water and sanitation coverage levels (the number of persons with access to basic water and sanitation services) and population projections from 1980 through 1989 were obtained from each of the Andean USAID missions, RHUDO/Quito, and PAHO. Much of the information provided by these agencies was obtained directly from national sources—water and sewerage agencies, coordinating committees, and census bureaus. In some cases, population or coverage figures were adjusted to conform with the definitional framework used in this study. A more detailed discussion of the data sources for each country can be found in the country profile appendixes.

It should be noted that changes in water and sanitation coverage data can occur in lumps; that is, the reported coverage level may rise quickly over a short period of time as a major system is completed. This does not mean, however, that a country can bring all the potential users on line simultaneously or that it can sustain that rate of growth. Rather, the expansion of water and sanitation facilities to significantly greater percentages of a country's population occurs over an extended period of time. Overall, however, the coverage figures included in this report, although approximate in nature, should provide a reasonably accurate picture (for sector planning purposes) of the water and sanitation sectors of the Andean nations of Bolivia, Ecuador, and Peru.

2.1 Population and Coverage Trends, 1980-1989

In 1980, less than 50 percent of the people living in the Andean countries in this study had access to a potable water source. The availability of sanitation facilities was even more limited: only one in three persons had, at a minimum, access to a latrine. In the rural areas of these countries, coverage rates were, and continue to be, far below these averages—17 percent of rural residents had access to a water system in 1980, while just 6 percent had access to an excreta disposal system. The urban residents of these countries had significantly higher rates of water and sanitation coverage in 1980—71 percent and 58 percent, respectively.

In the 1980s, as seen in Tables 1 and 2 and Figures 1 and 2, gains have been recorded in each of the subsectors of this study: urban water, rural water, urban sanitation, and rural sanitation. The rapid population growth which the region has experienced, particularly in the urban areas, however, has limited the effect of these numerical gains in terms of in increasing the percentage of the population with coverage. For example, in the period between 1980 and 1989, the urban population of the three countries increased by approximately 42 percent or 7.03 million persons. During the same time, the number of urban residents with access to potable water increased by 60 percent, an increase of 6.88 million persons. Though the increase in urban water coverage is notable, the number of additional people served was 15,000 less than the population increase. Urban sanitation expansion was significantly slower, 4.9 million people gained access to an excreta disposal system, 2.1 million short of the population increase. In rural communities, population expansion was significantly lower, and gains made in the provision of potable water (2.19 million people) and sanitation facilities (2.72 million people) outpaced the rural population increase (1.33 million) experienced between 1980 and 1989.

Among the three countries included in this study, Ecuador maintains the highest coverage rates in each of the four subsectors. In the urban sector, all three countries have close to 80 percent water coverage, but sanitation coverage varies from a high of 79 percent in Ecuador to 59 percent in Peru and 43 percent in Bolivia.

Among rural communities, access to a water system ranges from a high of only 40 percent in Ecuador to 28 percent in Bolivia and 24 percent in Peru. Rural sanitation coverage ranges from Ecuador's high of 37 percent to 18 and 15 percent in Peru and Bolivia, respectively. It should be noted, however, that both Bolivia and Peru reported practically no rural sanitation coverage in 1980. Since that time, A.I.D. and other international donors have played a major role in assisting local governments with the construction of water systems and latrines in rural communities.

To support the extension of water and sanitation projects to both urban and rural communities, the World Health Organization (WHO) attracted the attention of the international donor community and local governments by its declaration of the 1980s as the International Drinking Water Supply and Sanitation Decade. Although the initial time frame of the Decade expires in 1990, it is expected that countries will continue to recognize the importance of water and sanitation coverage for improved health and will continue their efforts to extend coverage to unserved populations.

TABLE - 1

WATER SUPPLY COVERAGE:
1980 AND 1989 COVERAGE LEVELS

			WATER SUPPLY								
			ALL AREAS		URBAN AREAS			RURAL AREAS			
	YEAR	TOTAL POPULATION	POP. SERVED	% SERVED	URBAN POP.	TOTAL SERVED	% SERVED	RURAL POP.	TOTAL SERVED	% SERVED
BOLIVIA	1980:	5,600	2,044	37 %	2,489	1,728	69 %	3,111	316	10 %
	1989:	6,582	3,598	55 %	3,445	2,720	79 %	3,137	878	28 %
ECUADOR	1980:	8,123	3,881	48 %	3,825	3,021	%	4,298	860	20 %
	1989:	10,485	6,500	62 %	5,724	4,600	80 %	4,761	1,900	40 %
PERU	1980:	16,815	8,129	48 %	10,205	6,919	68 %	6,610	1,210	18 %
	1989:	21,823	13,050	60 %	14,376	11,250	78 %	7,447	1,800	24 %
TOTAL:	1980:	30,538	14,054	46 %	16,519	11,668	71 %	14,019	2,386	17 %
	1989:	38,890	23,148	60 %	23,545	18,570	79 %	15,345	4,578	30 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure 1

1980 AND 1989 WATER SUPPLY COVERAGE
BY URBAN AND RURAL SECTORS

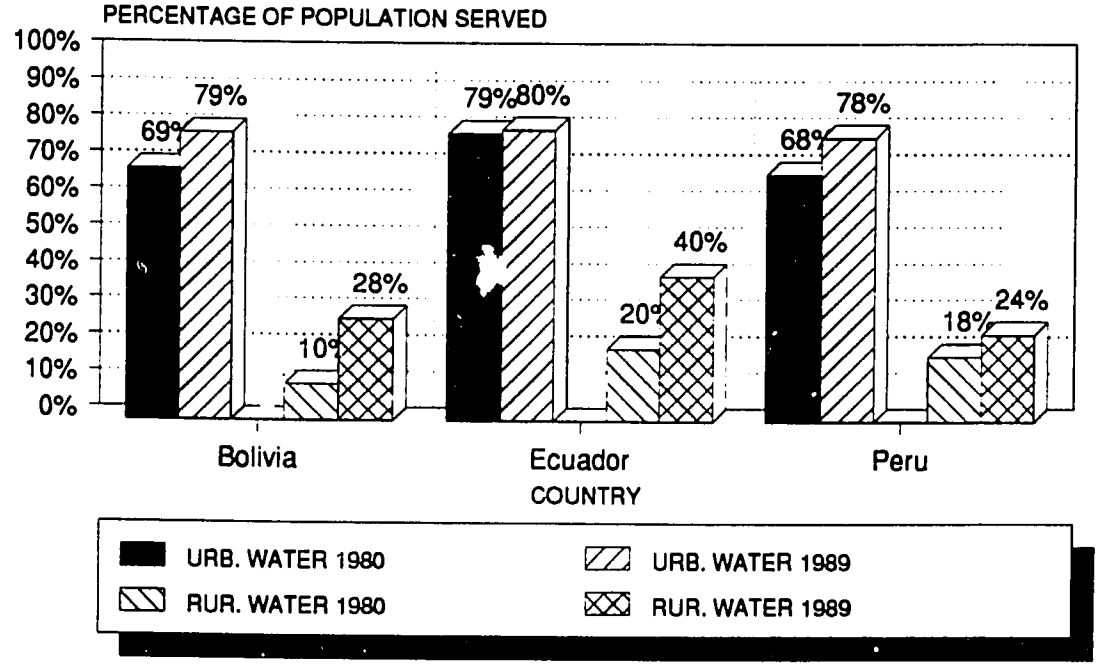


TABLE - 2

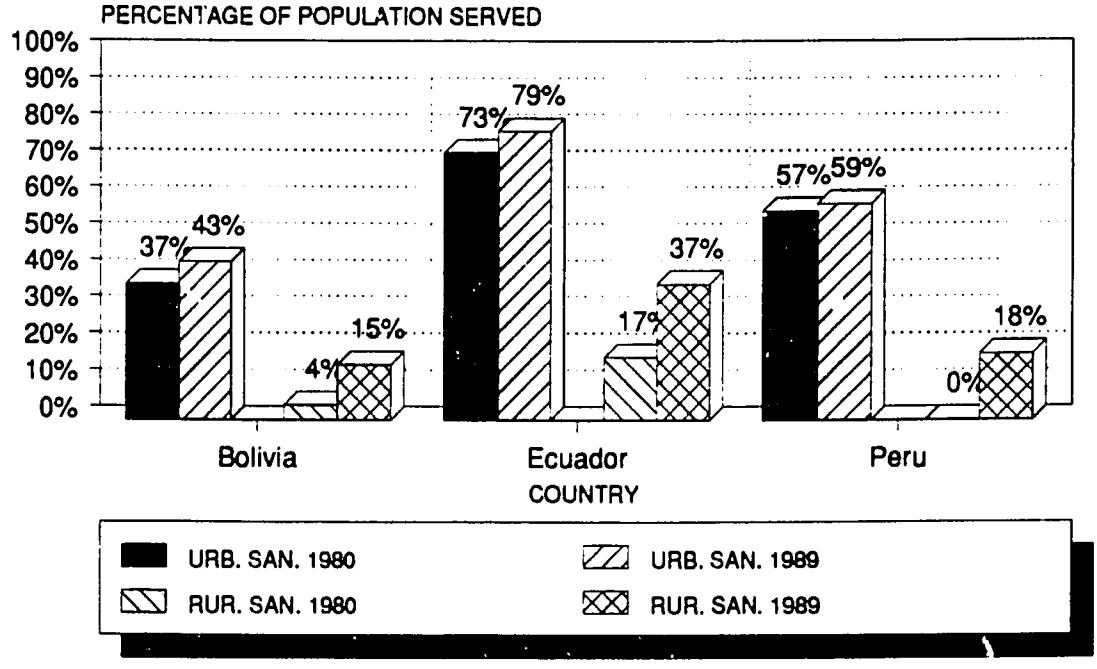
SANITATION COVERAGE:
1980 AND 1989 COVERAGE LEVELS

		SANITATION								
		TOTAL	ALL AREAS		URBAN AREAS			RURAL AREAS		
	YEAR	POPULATION	POP. SERVED	% SERVED	URBAN POP.	TOTAL SERVED	% SERVED	RURAL POP.	TOTAL SERVED	% SERVED
BOLIVIA	1980:	5,600	1,032	18 %	2,489	916	37 %	3,111	116	4 %
	1989:	6,582	1,961	30 %	3,445	1,481	43 %	3,137	480	15 %
ECUADOR	1980:	8,123	3,531	43 %	3,825	2,800	73 %	4,298	731	17 %
	1989:	10,485	6,260	60 %	5,724	4,500	79 %	4,761	1,760	37 %
PERU	1980:	16,815	5,868	35 %	10,205	5,844	57 %	6,610	24	0 %
	1989:	21,823	9,800	45 %	14,376	8,450	59 %	7,447	1,350	18 %
TOTAL:	1980:	30,538	10,431	34 %	16,519	9,560	58 %	14,019	871	6 %
	1989:	38,890	18,021	46 %	23,545	14,431	61 %	15,345	3,590	23 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure 2

1980 AND 1989 SANITATION COVERAGE
BY URBAN AND RURAL SECTORS



2.2 The 1995 Targets

For the purposes of tracking progress in the expansion of water and sanitation facilities and projecting the funding needs of each country, the WASH Project has constructed a model of overall coverage expansion which establishes as a goal full water and sanitation coverage in Bolivia, Ecuador, and Peru within 30 years, by 2020. The 1995 targets developed and discussed in this report represent the first stage in achieving full coverage in each of the subsectors of this study by 2020: urban water, urban sanitation, rural water, and rural sanitation. The 1995 targets, however, were not developed with country participation and are not, therefore, reflective of specific country goals. Rather, they are intended as a means of focusing attention on the level of effort and funding needed if increasing levels of water and sanitation coverage are to be provided for both urban and rural populations in these countries.

To set the 1995 targets, the 1989 coverage levels for each subsector were divided into percentile ranges: 90-99 percent coverage, 80-89 percent coverage, etc. Percentage-point increases were then calculated to establish the rate of coverage expansion necessary for the countries to attain full coverage in 30 years. Because coverage levels in each country vary widely, the rate of expansion needed to attain full coverage varies accordingly; subsectors with lower coverage rates in 1989 (i.e., rural water and sanitation) require larger percentage-point increases than those subsectors with high coverage rates (i.e., urban water and sanitation). As seen in Table 3, this rate of expansion is incrementally greater by 2 percentage points for each 10-point drop in current coverage rates. To calculate the 1995 targets, actual coverage rates for each of the four subsectors in each country were inflated by the corresponding percentage increase shown in Table 3. For example, Bolivia currently has a rural water supply coverage rate of 28 percent. The 20-29 percentile range calls for an increase of 16 percentage points in six years, which makes the 1995 target for Bolivia's rural water supply subsector 44 percent (28 + 16). It should be noted, however, that since urban areas are facing more rapid population growth than rural areas, the attainment of smaller percentage-point gains in the urban sectors requires the addition of more new connections than in the rural sector.

Table 3

1995 TARGET CALCULATION

Current Coverage *	Required Six-Year Increase **	Coverage 1995 Target ***	2020 Target
100%	-----	100%	100%
90-99%	+ 2 pts.	92%	100%
80-89%	+ 4 pts.	84%	100%
70-79%	+ 6 pts.	76%	100%
60-69%	+ 8 pts.	68%	100%
50-59%	+ 10 pts.	60%	100%
40-49%	+ 12 pts.	52%	100%
30-39%	+ 14 pts.	44%	100%
20-29%	+ 16 pts.	36%	100%
10-19%	+ 18 pts.	28%	100%
0-9%	+ 20 pts.	20%	100%

* Ten-point percentile range.
** Increase in percentage points (e.g., 80 percent to 84 percent coverage is a 4-point gain).
***Target percentages shown represent the increase of the base percentage shown in the first column.

The actual 1995 targets for each of the countries, along with the 1989 coverage levels, are shown in Tables 4 and 5 and Figures 3 and 4. For the region as a whole, the targets are set to increase access to water in the combined urban and rural populations from 60 percent in 1989 to 70 percent in 1995. The combined regional sanitation target is set to increase coverage from the current 46 percent to 60 percent by 1995. In terms of the number of additional persons with service, approximately 9 million more people with easy access must be added in both the water and sanitation sectors to meet the 1995 targets (Table 6).

TABLE - 4

WATER SUPPLY COVERAGE:
1989 COVERAGE LEVELS VS. 1995 TARGETS

			WATER SUPPLY								
			ALL AREAS		URBAN AREAS			RURAL AREAS			
	YEAR	TOTAL POPULATION	POP. SERVED	% SERVED	URBAN POP.	TOTAL SERVED	% SERVED	RURAL POP.	TOTAL SERVED	% SERVED
BOLIVIA	1989:	6,582	3,598	55 %	3,445	2,720	79 %	3,137	878	28 %
	1995:	7,831	5,275	67 %	4,461	3,792	85 %	3,370	1,483	44 %
ECUADOR	1989:	10,485	6,500	62 %	5,724	4,600	80 %	4,761	1,900	40 %
	1995:	12,314	8,719	71 %	7,237	6,079	84 %	5,077	2,640	52 %
PERU	1989:	21,823	13,050	60 %	14,376	11,250	78 %	7,447	1,800	24 %
	1995:	25,123	17,702	70 %	17,393	14,610	84 %	7,730	3,092	40 %
TOTAL:	1989:	38,890	23,148	60 %	23,545	18,570	79 %	15,345	4,578	30 %
	1995:	45,268	31,696	70 %	29,091	24,481	84 %	16,177	7,215	45 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure 3

1989 WATER SUPPLY COV. VS. 1995 TARGETS
BY URBAN AND RURAL SECTORS

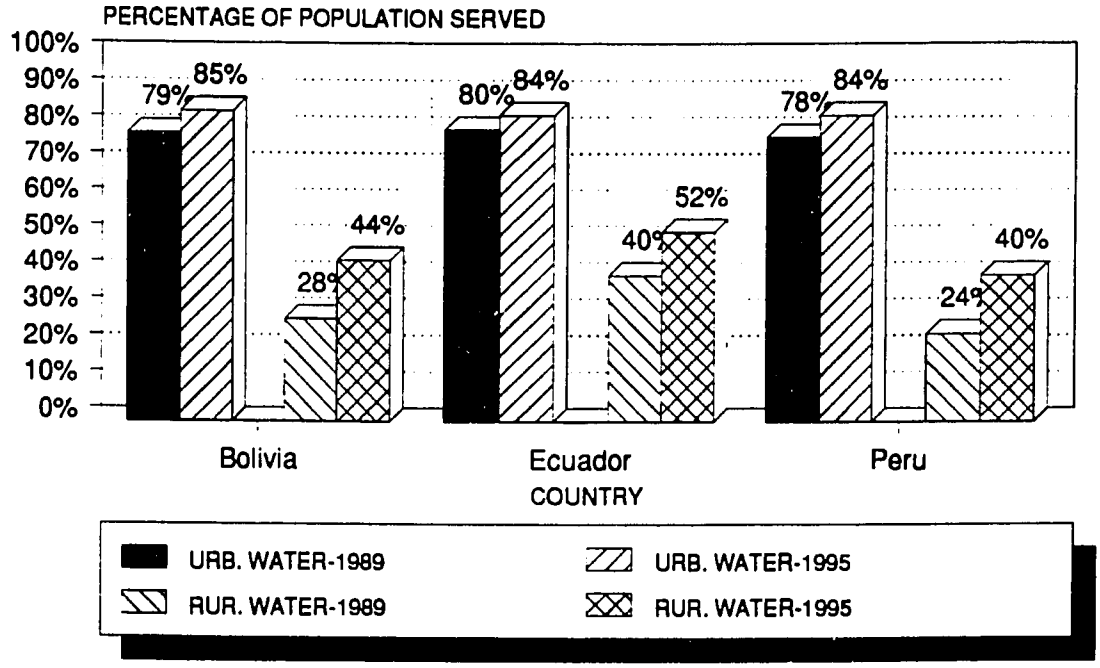


TABLE - 5

SANITATION COVERAGE:
1989 COVERAGE LEVELS VS. 1995 TARGETS

	YEAR	TOTAL POPULATION	SANITATION: ALL AREAS POP. SERVED	ALL AREAS % SERVED	URBAN AREAS URBAN POP.	URBAN AREAS TOTAL SERVED	URBAN AREAS % SERVED	RURAL AREAS RURAL POP.	RURAL AREAS TOTAL SERVED	RURAL AREAS % SERVED
BOLIVIA	1989:	6,582	1,961	30 %	3,445	1,481	43 %	3,137	480	15 %
	1995:	7,831	3,565	46 %	4,461	2,453	55 %	3,370	1,112	33 %
ECUADOR	1989:	10,485	6,260	60 %	5,724	4,500	79 %	4,761	1,760	37 %
	1995:	12,314	8,740	71 %	7,237	6,151	85 %	5,077	2,589	51 %
PERU	1989:	21,823	9,800	45 %	14,376	8,450	59 %	7,447	1,350	18 %
	1995:	25,123	14,784	59 %	17,393	12,001	69 %	7,730	2,783	36 %
TOTAL:	1989:	38,890	18,021	46 %	23,545	14,431	61 %	15,345	3,590	23 %
	1995:	45,268	27,089	60 %	29,091	20,605	71 %	16,177	6,484	40 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure 4

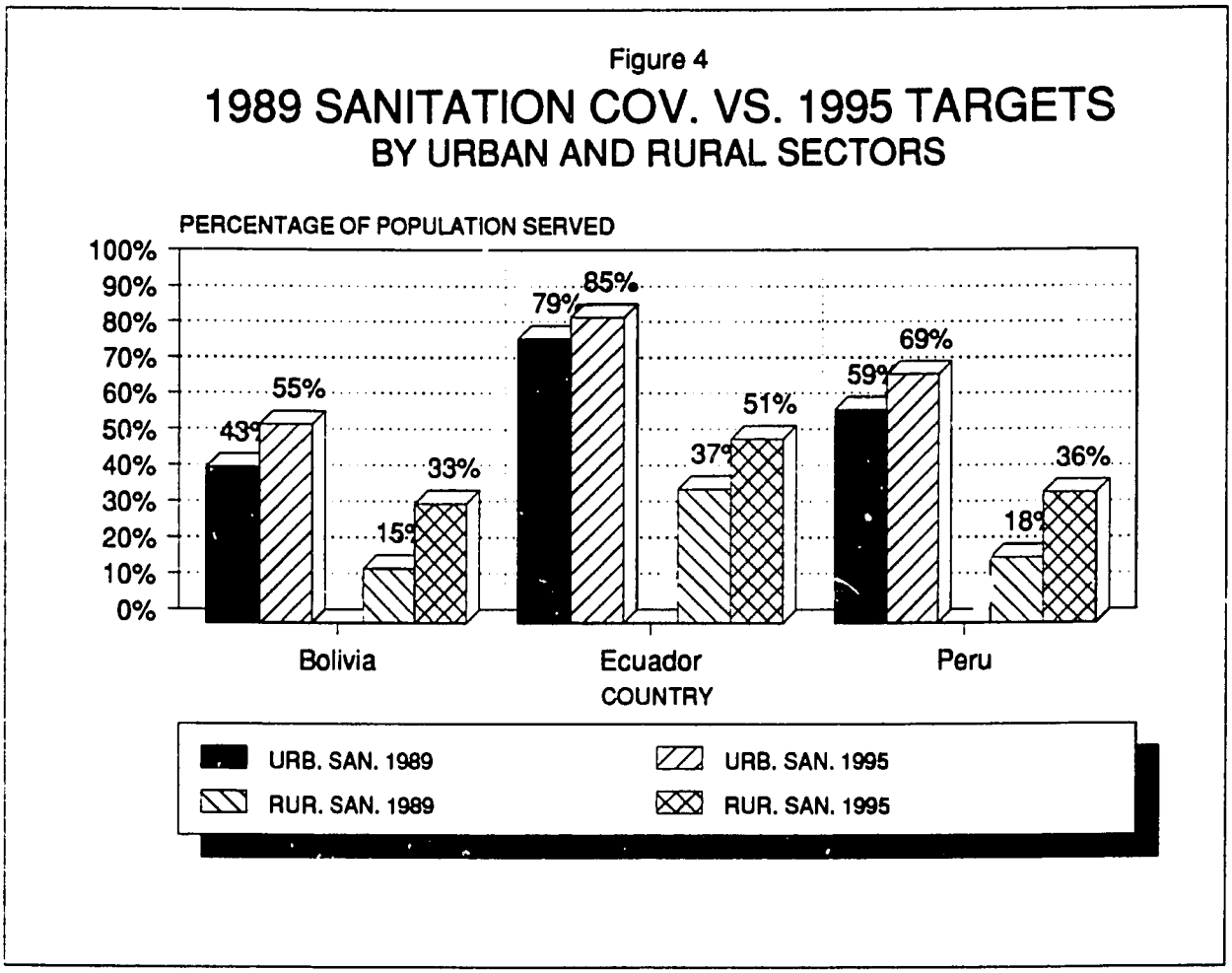


TABLE - 6

INCREASE OVER 1989 COVERAGE LEVELS
NEEDED TO MEET 1995 TARGETS

	WATER SUPPLY			SANITATION		
	TOTAL	URBAN	RURAL	TOTAL	URBAN	RURAL
BOLIVIA	1,676	1,072	604	1,604	972	632
ECUADOR	2,219	1,479	740	2,480	1,651	829
PERU	4,652	3,360	1,292	4,984	3,551	1,433
TOTAL	8,547	5,911	2,636	9,068	6,174	2,894

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

2.3 Funding Commitments and Shortfalls

In Table 7, the current funding commitments for each of the three countries are shown. The amounts in this table reflect investments that have been firmly committed and will be used to extend coverage to persons currently not served by basic water or sanitation services. As noted in Chapter 1, some of the current water and sanitation programs in these countries contribute only partially to increasing coverage. The rehabilitation of existing systems, the construction of off-site facilities such as dams, reservoirs and treatment plants, and the provision of technical assistance to strengthen the institutional capacities of national agencies working in the water and sanitation sector are important to the development of the sector, but such activities do not directly increase coverage. For such projects, only 10 percent of the total project funds was considered to be allocated to increasing coverage (Table 7).

TABLE - 7

COMMITTED FUNDING TO INCREASE COVERAGE

(Costs in 1989 US$, 000s)

		WATER SUPPLY		SANITATION	
COUNTRY	TOTAL	URBAN	RURAL	URBAN	RURAL
BOLIVIA	$18,300	$2,375	$7,882	$2,375	$5,668
ECUADOR	$46,550	$7,228	$13,372	$10,572	$15,378
PERU	$5,750	$2,712	$119	$2,788	$131
TOTAL	$70,600	$12,315	$21,373	$15,735	$21,177

As of the end of 1989, approximately $71 million has been committed to water and sanitation projects to expand coverage. Of the three countries, Ecuador currently has the greatest amount of committed investments, nearly $47 million. Bolivia and Peru have garnered substantially less, $18 million and $3 million, respectively. Following is a breakdown by donor of firmly committed investments to increase water and sanitation coverage levels in the three countries. Only government funds committed in conjunction with programs of external support agencies are included in this analysis.

Source	Committed Investments To Increase Coverage (1990-1995)
A.I.D.	$20,450,000
National Counterpart Funds	18,750,000
Germany (KfW and GTZ)	10,750,000
IDB	5,750,000
Netherlands	5,050,000
CIDA	4,200,000
France	2,800,000
UNICEF	1,600,000
Overseas Development Agency (ODA; U.K.)	1,000,000
CARE	250,000
TOTAL	70,600,000

Clearly, A.I.D. plays an important funding role in supporting water and sanitation projects in these Andean countries. In particular, A.I.D. has been a major supporter of projects which expand services to populations currently without access to basic water and sanitation facilities, especially in rural and peri-urban areas. The figures above do not show, however, the relative importance of the IDB and the World Bank in financing the rehabilitation and upgrading of large municipal systems. These large projects, although not directly focused on extending coverage, play a critical role in maintaining existing water and sewerage systems serving major population centers and enable the future expansion of these systems. Due to Peru's debt problems, which has led to the suspension and cancellation of IDB and World Bank loans there, financing is currently scarce. In Ecuador and Bolivia, however, both banks are developing loan programs which will contain sizable water and sanitation components.

To determine the funding needed to meet the 1995 targets, the estimated number of additional persons with coverage needed for each of the four subsectors in each country (Table 6) was multiplied by the unit cost per capita of coverage expansion for each subsector in each country (see country profiles in the appendixes). To obtain the amount of additional investment needed, the amount currently committed for expanding coverage was subtracted from the total cost of meeting the targets.

As seen in Table 8, the funding needed to increase access to water supplies is approximately $531 million for the three countries. With nearly $34 million of that amount currently committed to this effort, a shortfall of $497 million remains. The funding shortfall for sanitation facility construction and expansion is slightly higher, $536 million. Overall, the total shortfall in funding needed to meet the 1995 water and sanitation targets in each of the countries is estimated at $1,033 million. Figure 5 provides a graphic display of the total investment required to meet the 1995 targets for the three countries in each subsector, broken down between currently committed investments (shaded areas) and investment shortfalls (striped areas).

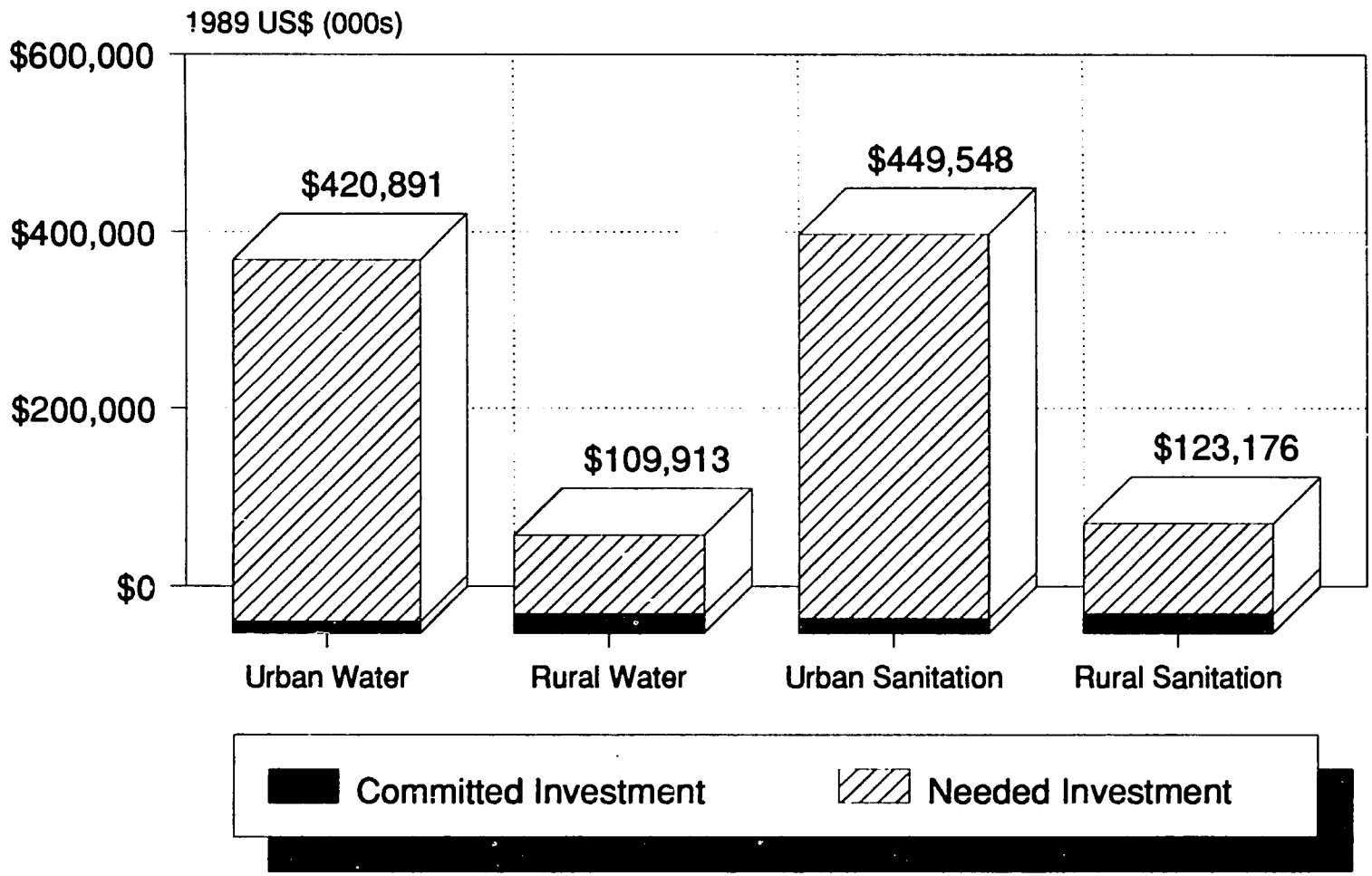
TABLE - 8
ESTIMATED FUNDING NEEDED
TO MEET 1995 TARGETS
(COSTS IN 1989 US$, 000s)

	WATER SUPPLY			SANITATION			TOTAL
	TOTAL	URBAN	RURAL	TOTAL	URBAN	RURAL	
BOLIVIA-- MEET 1995 GOALS *	109,952	85,761	24,191	93,527	77,725	15,802	203,479
COMMITTED FUNDING	10,257	2,375	7,882	8,043	2,375	5,668	18,300
FUNDS NEEDED	99,695	83,386	16,309	85,484	75,350	10,134	185,179
ECUADOR-- MEET 1995 GOALS *	137,555	93,177	44,378	166,226	109,012	57,214	303,781
COMMITTED FUNDING	20,600	7,228	13,372	25,950	10,572	15,378	46,550
FUNDS NEEDED	116,955	85,949	31,006	140,276	98,440	41,836	257,231
PERU-- MEET 1995 GOALS *	283,297	241,953	41,344	312,971	262,811	50,160	596,268
COMMITTED FUNDING	2,831	2,712	119	2,919	2,788	131	5,750
FUNDS NEEDED	280,466	239,241	41,225	310,052	260,023	50,029	590,518
TOTAL MEET 1995 GOALS *	530,804	420,891	109,913	572,724	449,548	123,176	1,103,528
COMMITTED FUNDING	33,688	12,315	21,373	36,912	15,735	21,177	70,600
FUNDS NEEDED	497,116	408,576	88,540	535,812	433,813	101,999	1,032,928

* FROM THE 1989 BASE LEVEL OF COVERAGE

Figure 5

ANDEAN COUNTRIES: TOTAL FUNDING
NEEDED TO MEET 1995 TARGETS



3

CONCLUSIONS

In Chapter 2, the population and coverage trends in the Andean countries were discussed. The 1995 targets, which aim to track progress toward the provision of potable, easily accessible water and acceptable sanitary excreta disposal facilities to all residents of Bolivia, Ecuador, and Peru by 2020, were also presented. Finally, the funding currently committed by external donors and the local governments to finance the expansion of services was calculated. This chapter examines the prospects for achieving the 1995 targets in each of the three countries. The conclusions are based on the more detailed analysis of each country in the country profile appendixes.

3.1 Prospects for Meeting the 1995 Targets

3.1.1 Bolivia

In the urban sector, Bolivia's 1995 water target is set at 85 percent, an increase of nearly 1.1 million persons. The urban sanitation target for 1995 is 55 percent, which requires the expansion of services to almost 1 million additional urban residents. The cost of expanding water and sanitation coverage to these levels will require an estimated $163 million, of which only $5 million in financing has been committed as of the end of 1995. The IDB and World Bank, however, are currently developing large loans to finance water and sanitation system expansion and rehabilitation in many Bolivian cities. If these proposed loans are signed, the current investment shortfall in the urban sector could be dramatically reduced.

The targets for the rural sector seek to accomplish sizable gains in the percentage of the rural population with access to water and sanitation facilities, though the numbers of additional persons with coverage needed to meet the targets are nearly half the urban targets. In the rural water supply subsector, the 1995 target is set to increase coverage from the 1989 level of 28 percent to 44 percent (an additional 604,000 persons). Rural sanitation is set to increase from the current 15 percent, the lowest among the three countries, to 33 percent (an increase of 632,000 persons). Overall, the cost of meeting the rural targets is nearly $40 million, $24 million to finance the construction and expansion of water supply systems and $16 million to build sanitary excreta disposal systems. Over one quarter of the financing needed has been committed at this time, though proposed projects by the Canadian government and A.I.D. should provide increased financing for these activities.

3.1.2 Ecuador

In the urban water subsector, the 1995 target has been set to raise coverage from the 1989 level of 80 percent to 84 percent of the urban population in 1995. To attain this level of expansion in the face of rapid urbanization, an additional 1.5 million persons will have to gain access to a water supply. In the urban sanitation subsector, the 1995 target of 85 percent is set to raise coverage from the current level (79 percent) by providing adequate sanitation facilities to an additional 1.65 million people. In the rural areas, where coverage rates are currently 40 percent and 37 percent for water and sanitation access, respectively, the targets are set to increase coverage to 52 percent for water and 51 percent for sanitation. These targets reflect increases of 740,000 and 829,000 in the number of people in rural areas with access to water systems and latrines, respectively.

The financing required to meet the 1995 targets totals $257 million, nearly $47 million of which has been committed as of the end of 1989 to expand water and sanitation coverage throughout the country. By subsector, the funding shortfalls are as follows: $86 million for urban water, $98 million for urban sanitation, $31 million for rural water, and $42 million for rural sanitation. With the World Bank and IDB currently preparing and appraising loans which would contain water and sanitation components, the large funding shortfalls that currently exist may be soon be reduced significantly.

3.1.3 Peru

The population of Peru is nearly equal to the combined populations of Bolivia and Ecuador. As a consequence, the number of additional persons with water and sanitation coverage needed to meet the 1995 targets and the financing required to attain them are much higher than for either of the other countries in this study. In the urban water subsector, the 1995 target is set at 84 percent, up from 78 percent in 1989. The urban sanitation target is set at 69 percent, a 10 percentage point increase over the 1989 coverage level. Overall, the 1995 targets call for an additional 3.4 million urban residents with access to a water system and 3.6 million with some form of sanitary excreta disposal facility. The funding required to attain these levels of coverage is huge: $242 million for urban water system construction and $263 million for urban sanitation facilities. With all of the current loans from the World Bank and IDB either canceled or suspended because of Peru's debt problems, external financing for these activities is minimal. Without substantial amounts of financing from these donors in the future, the Government of Peru (GOP) will be hard pressed to maintain existing levels of coverage in the face of the country's rapid urbanization. The expansion of coverage to the urban population set by the 1995 targets may well be impossible to attain.

In the rural sector, the 1995 targets are set to increase access to water systems by 16 percentage points, to 40 percent, and access to sanitation facilities by 18 percentage points, to 36 percent. The financing required to obtain these goals is much lower than that for the

urban sector, due to the lower unit costs of building rural systems and the fewer number of additional connections needed to attain these targets. Overall, the current funding shortfall for rural water and sanitation expansion totals $91 million. Though A.I.D. and the Dutch government may begin new rural water and sanitation projects in the near future, additional externally funded projects will be necessary if the 1995 targets for Peru's rural areas are to be achieved.

3.2 Regional Summary

Clearly, the 1995 targets are ambitious. Yet, if these Andean countries are to be able to provide basic water and sanitation services to a larger percentage of their population at the same time that they are experiencing rapid population growth, a great deal of additional funding will be required. Of the over $1 billion necessary to meet the 1995 goals, just $71 million is currently committed to projects that will extend coverage. The funding shortfalls are, by subsector: $409 million for urban water, $89 million for rural water, $434 million for urban sanitation, and $102 million for rural sanitation.

Although each of the three countries faces substantial shortfalls in funding necessary to meet the 1995 targets, Peru, because of its large population and suspended and canceled loans, accounts for the bulk of the overall funding shortfall—approximately $591 million. The funding shortfall between the urban and rural sectors is similarly disproportionate. As seen in Table 9, the estimated shortfall in funds to meet the urban water and sanitation targets accounts for most (81 percent) of the overall shortfall. The reasons for this stem from the fact that the unit costs of urban water and sanitation construction, on average, are substantially higher than the rural unit costs and that the urban targets require more additional persons served. On an annual basis, as shown in Table 10, the current funding shortfall totals $172 million: $68 million for urban water, $72 million for urban sanitation, $15 million for rural water, and $17 million for rural sanitation.

TABLE - 9

ESTIMATED FUNDING SHORTFALLS
TO MEET 1995 TARGETS
- BY URBAN AND RURAL AREAS*
(COSTS IN 1989 US$, 000s)

COUNTRY	URBAN WATER SUPPLY AND SANITATION	RURAL WATER SUPPLY AND SANITATION	TOTAL
BOLIVIA	$158,736	$26,443	$185,179
ECUADOR	$184,389	$72,842	$257,231
PERU	$499,264	$91,254	$590,518
TOTAL	$842,389	$190,539	$1,032,928

* SEE TABLE 8 FOR BREAKDOWN OF COSTS TO MEET 1995 TARGETS.

TABLE - 10

ANNUAL COSTS
TO FUND SHORTFALLS AND MEET 1995 TARGETS
(IN 1989 US$, 000s)

	URBAN AREAS		RURAL AREAS		TOTAL
	WATER SUPPLY	SANI-TATION	WATER SUPPLY	SANI-TATION	
BOLIVIA	$13,898	$12,558	$2,718	$1,689	$30,863
ECUADOR	$14,325	$16,407	$5,168	$6,973	$42,872
PERU	$39,874	$43,337	$6,871	$8,338	$98,420
TOTAL:	$68,096	$72,302	$14,757	$17,000	$172,155

NOTE: Annual costs are determined by dividing total funding needed by six (for FY1990-1995).

Shortfalls in funding, however, are just one obstacle (albeit a significant one) preventing these countries from further extending water and sanitation coverage. Country-specific political factors, large external debts, the inability of local institutions to absorb funds that have been committed, and delays in implementation also threaten the ability of the countries to continue progress toward the goal of providing adequate water and sanitation coverage for urban and rural populations.

While the funding shortfalls for the urban sector are notably larger than those in the rural sector, coverage levels in the rural sector are far below urban rates, and therefore, the funding of projects to extend coverage in the rural areas remains a priority. A.I.D. has played a leading role in the construction of water and sanitation facilities in rural areas. This involvement should be sustained or expanded. In the urban sector, the bulk of the financing to support municipal water and sanitation construction projects traditionally comprises loans from the IDB and World Bank, though Peru currently is without financing from these sources. Within the urban sector, A.I.D. has and should continue to focus on providing water and sanitation services to marginal, low-income communities, where coverage rates (like those in the rural areas) are substantially lower than the urban average.

Each of the countries in this study deserves consideration by A.I.D. for expanded water and sanitation programs. In particular, Peru is in critical need of additional financing. With the conclusion of A.I.D.'s decade-long rural water and sanitation program in 1989, Peru will be without a major source of funding to support the expansion of water systems and latrine construction in the rural areas. Hopefully, A.I.D. will find a way to continue its involvement in basic water and sanitation facility construction through its ongoing child survival program or through a new project.

The financing of water and sanitation projects, in most cases, involves both local and external financing. While A.I.D. water supply and sanitation projects are normally funded with Development Assistance (DA) funds, in some cases the local funding component is also financed by A.I.D. through the Economic Support Fund (ESF) for countries lacking the necessary counterpart funding. Because of the dearth of available local funds, A.I.D. may need to use a combination of DA and ESF monies to fund both the external and local share of some water and sanitation projects. A.I.D. may also be able to assist countries with local capital formation to facilitate the increased availability of local counterpart funds for water and sanitation projects.

3.3 WASH's Lessons Learned

Over the past 10 years, the WASH Project has learned that the construction of water and sanitation systems alone is not enough to ensure the desired results of safe, accessible water and hygienic excreta disposal. Efforts to provide potable water and sanitary waste disposal must be integrated with other development activities. To succeed, water and sanitation projects must also provide hygiene education to communities served, train personnel in the operation and maintenance of the facilities, strengthen the local agencies and institutions which work in the water and sanitation sector, and involve the community to be served in the planning and execution of the project.

While the focus of this report has been on those investments which directly expand coverage to previously unserved populations, investment in the development of the nonphysical infrastructure of the water and sanitation sector is also necessary and can contribute to expanded coverage as well. The enhancement of a country's absorptive capacity, through the provision of technical assistance and training for national institutions working in the sector, is critical to improving the efficient implementation and sustainability of water and sanitation projects. Through such efforts, costly delays caused by weak organizational structures, poor use of human resources, and inadequate project preparation can be averted. In addition to emphasizing the more efficient use of funds, other areas for improvement include the establishment of sound cost-recovery schemes, the reduction of unaccounted for water in urban systems, and the use of alternative technologies to lower construction costs, particularly for urban sanitation systems. The benefits of providing technical assistance to support these improvements will likely be seen in the future expansion of water and sanitation coverage, the improvement of existing systems, and the increased sustainability of these systems.

While donors play a crucial role in providing capital and technical assistance to support these efforts, local governments must establish and control development priorities for the sector. In addition, the communities themselves should be responsible for the facilities. The private sector can also play an important role in supporting the expansion and maintenance of water and sanitation facilities. Potential areas for local private sector involvement include the

design of projects, the provision of materials (pipes, handpumps, cement, etc.), the construction of facilities, and the operation and maintenance of water and sanitation systems. In WASH's experience, the realization of the goal of increased access to water and sanitation facilities requires substantial coordination among all the various agencies and institutions involved in the sector, as well as a long-term commitment to build not only the systems themselves but the local institutional capacity to maintain them.

APPENDIXES

INTRODUCTION TO THE APPENDIXES

Profiles of each of the three Andean countries covered by this report are included as appendixes. At the start of each appendix, current health, economic, and social indicators are provided, along with a brief introduction. Following this background information is a detailed discussion of the water and sanitation sector: externally funded current and proposed projects in the country, current coverage levels, the 1995 targets, and investment needed to meet the 1995 goals. After the discussion of each donor's program in a country, the total amount of committed funding included in the investment analysis is indicated.

DATA SOURCES

The sources of the statistics cited at the beginning of each appendix are as follows.

1989 Population (Urban, Rural)

> Population figures were provided by each of the USAID missions, using figures from the government censuses. In cases in which the information was inconsistent with previously reported figures or other data, the USAID mission or WASH staff used their best judgment to determine accurate population figures.

Population Growth Rates (Urban, Rural)

> These figures were also provided by USAID missions and reflect 1989 growth rates.

1995 Population (Urban, Rural)

> Population figures for 1995 were extrapolated using 1989 population and growth rates reported by the USAID Missions.

Infant Mortality Rate

The Center for International Health Information (CIHI), an A.I.D.-funded activity, provided these figures, which represent estimates for 1989 of the number of infant deaths (under one year old) per 1,000 live births.

Child Mortality Rate

Also obtained from CIHI, these numbers reflect the number of deaths among 1,000 children who, having reached the age of one, died before they were five years old.

Mortality Rate due to Diarrheal/Intestinal Diseases

These rates were obtained from USAID missions and the Ministry of Public Health in each of the countries. They represent the number of deaths from diarrheal/intestinal diseases per 1,000 deaths.

Life Expectancy (Total, Male, Female), Adult Literacy, GNP per Capita ($1987), GNP per Capita Annual Growth from 1965-87, and Average Annual Inflation from 1980-87

The World Bank's *1989 World Development Report* was the source of these figures.

Currency

The foreign currency exchange rates in this report were obtained from the Bank of America Global Trading and reflect official currency rates as of November 17, 1989.

COVERAGE AND INVESTMENT TABLES AND FIGURES

At the conclusion of each appendix, a number of tables and accompanying graphs provide a numerical and visual summary of coverage and investment trends. The tables and graphs appear in the same order in each of the appendixes, though they may be referenced at different points in the text.

Actual Water Supply Coverage Versus 1995 Targets

Table 1 shows population and urban and rural coverage figures for the water sector for selected years from 1980 through 1989. The 1995 targets are also included in this table.

Urban and Rural Water Supply Coverage

Figure 1 provides a visual reference for following the trends in both urban and rural water supply coverage from 1980 through 1989. Coverage levels for those years which fall between the data points shown in Table 1 were projected as midpoints between the years for which data were available. It should be noted that data on 1980 and 1989 are presented for each country, though the middle years vary between countries.

Actual Sanitation Coverage Versus 1995 Targets, Urban and Rural Sanitation Coverage

Table 2 and Figure 2 are identical in format to Table 1 and Figure 1. In this case, each refers to urban and rural sanitation coverage.

1989 Coverage and 1995 Targets (# of Persons with Coverage, % of Population with Coverage)

Figures 3 and 4 show existing 1989 coverage levels and the 1995 targets for each of the four subsectors of this study: urban water, rural water, urban sanitation, and rural sanitation. The unit of analysis in Figure 3 is numbers of people, and in Figure 4, it is the percentage of the population with coverage.

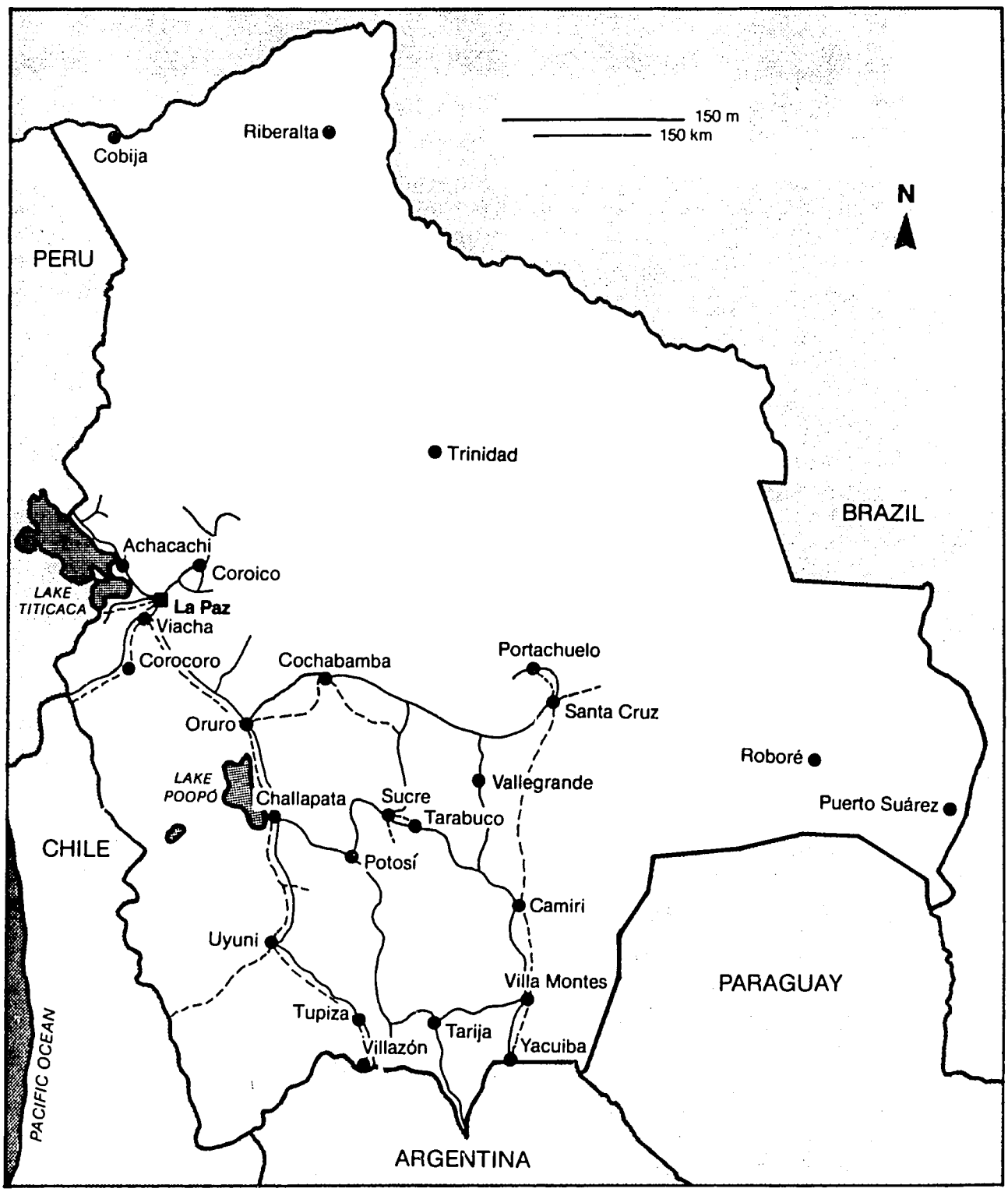
Investment Needed to Meet 1995 Targets

Table 3 presents the number of additional persons with coverage needed to meet the 1995 targets and the projected shortfall in funds needed to meet the 1995 targets. To calculate the latter, the number of additional persons with coverage needed to meet the 1995 targets was multiplied by the unit costs per capita of constructing water supply systems and sanitation facilities. The resulting product is the total investment needed to meet the targets. Subtracting currently committed investments that will increase coverage from the total investment needed provides the funding shortfall for meeting the 1995 targets. The unit costs per capita were obtained from PAHO and the USAID missions.

Total Investment to Meet 1995 Targets

Figure 5 shows committed and needed investments to meet the 1995 targets. The number at the top of each box represents the total amount of funding needed; currently committed investments are shown as partly filling in each box. The remaining space in the box represents the amount of needed investment yet to be committed.

BOLIVIA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Portachuelo
Santa Cruz
Oruro
Roboré
LAKE POOPÓ
Challapata
Sucre
Vallegrande
Tarabuco
Puerto Suárez
CHILE
Potosí
Camiri
Uyuni
Villa Montes
PARAGUAY
Tupiza
Tarija
Villazón
Yacuiba
PACIFIC OCEAN
ARGENTINA

Appendix A

COUNTRY PROFILE: BOLIVIA

COUNTRY BACKGROUND

1989 Population:	6.58 million (Urban—3.44, Rural—3.14)
Annual Population Growth:	2.2% (Urban—4.4%, Rural—1.2%)
Infant Mortality Rate:	102
Child Mortality Rate:	63
Mortality Rate due to Diarrheal/Intestinal Diseases:	110
Life Expectancy:	54 (Male—52, Female—56)
Adult Literacy Rate:	Male—84%, Female—65%
GNP per Capita:	$580
GNP per Capita Annual Growth (1965-87):	-.5%
Currency:	Bolivianos 2.93 = US$1
Average Annual Inflation (1980-87):	601.8%

Situated in the central region of South America, Bolivia is bordered by Brazil to the north and the east, Argentina to the south, Chile to the southwest, Peru to the west, and Paraguay to the southeast. The landlocked country covers 1.1 million square kilometers, has a population of 6.6 million, and is both geographically and culturally diverse. The country can be separated into three disparate physical regions—the altiplano, the valleys, and the lowlands consisting of large grasslands, forest, and the Chaco Desert. The population comprises three ethnic groups: Indians, Europeans, and mestizos; Indians account for nearly 70 percent of the total. Approximately one-quarter of the population, in particular those persons residing outside the main cities, do not speak Spanish; instead, they speak either of the native Indian languages. Aymara or Quechua.

Politically and economically, Bolivia underwent many changes in the 1980s. At the time of President Victor Paz Estenssoro's election in mid-1985, the country's annual inflation rate was 20,000 percent. Through tough economic reform measures instituted by the Paz Estenssoro government, the country's inflation rate was brought down to 16 percent in 1988. The country still had, however, a balance of payments deficit of approximately $100 million in 1989.

After a period of slow population growth in the 1950s, Bolivia has experienced more rapid population growth since that time, particularly in urban areas. With nearly 52 percent of the population currently living in urban areas, Bolivia has one of the highest annual rates of urban growth (4.4 percent) and growth, which is placing an ever greater strain on already inadequate municipal infrastructures. Although the country must confront the increased urban needs resulting from internal migration, it is among the dispersed, rural communities that access to health care and water and sanitation facilities is most severely lacking. PAHO reports that less than 50 percent of Bolivians have access to effective primary health care services; in rural areas 70 percent of the inhabitants lack these services. The country's life

expectancy rate of 54 years is one of the region's lowest. Bolivia's infant mortality rate declined from 151 deaths per 1,000 live births in the period 1970-75 to 102 deaths in 1989, but this rate is still significantly higher than the Latin America regional average. Diarrheal diseases continue to be the leading cause of illness, accounting for over 32 percent of all illnesses reported in 1987.

Overall, the Ministry of Planning and Coordination is responsible for coordinating all external and government financing for the water and sanitation sector. The *Comité Técnico de Asesoramiento de Agua Potable y Saneamiento* (COTEAS) also coordinates some of the current activities in this sector, but its ability to do so is limited by the fact that COTEAS is not an implementing agency and does not have sufficient financial and personnel resources to manage this effort.

In the urban areas, water and sanitation activities are managed by semiautonomous water companies or cooperatives in the major cities of each of the nine geographic departments. In turn, these institutions are coordinated and overseen by the Ministry of Urban Affairs and its CORPAGUAS group. In the rural parts of the country, the Ministry of Social Welfare and Planning coordinates all water and sanitation activities. Regional Development Corporations also operate in each of Bolivia's nine departments, using funds generated from petroleum exports and other fiscal revenues to support regional development in each department, including water and sanitation sector development.

INVESTMENT AND COVERAGE LEVELS

Current Projects

Bolivia benefits from ongoing water and sanitation programs sponsored by a number of bilateral and multilateral donors. In addition, three loans to provide financing for water and sanitation activities in the country, two with the IDB and one with the World Bank, are currently being prepared and appraised. Once completed and approved, these loans should have a sizable impact on the availability and quality of water and sanitation services in urban areas throughout the country.

CIDA

In May 1989, CIDA conducted a study of the water and sanitation sector of Bolivia to determine guidelines and criteria for the appraisal of future project proposals in this sector. The resulting report recommended that CIDA support an expanded water and sanitation program in the rural areas of Bolivia, particularly in the altiplano.[1] Though plans for future investment are still tentative, it is likely that CIDA will soon begin developing a substantial rural project to be implemented by CARE, UNICEF, or a Canadian nongovernmental organization (NGO).

Total Committed Funding to Increase Coverage (1990-1995): $0

IDB

The Inter-American Development Bank continues to be an important source of financial support for Bolivian water and sanitation projects conducted in the urban areas of the country. Currently, the IDB is making disbursements on two ongoing loans, beginning one small loan project in 1990, and planning two large loans: one to begin in late 1990 and the other following in 1991.

The IDB's current involvements include a project begun in 1984 to support water system and sewerage rehabilitation and extension in the southern city of Tarija. The loan for this project, which also contains a small component to support the institutional strengthening of Tarija's water and sewerage agency, is nearly two-thirds disbursed. The second loan, which has been ongoing for the past 10 years and is scheduled to be fully disbursed by the end of 1990, has supported the rehabilitation and extension of potable water and sewerage systems in the cities of Cochabamba and La Paz. Total funding for this loan, which benefitted 38,000 households in La Paz and 10,800 households in Cochabamba, is just over $40 million.

In its efforts to assist in the upgrading and extending of water and sewerage systems in the urban areas of the country, the IDB funded a one-year study by PAHO to evaluate the water and sanitation needs of 10 major Bolivian cities. In a follow-up to the PAHO study, the IDB will, in 1990, finance another study to prepare designs for water and sewerage system improvements in the cities included in the scope of the original study. Based upon the findings of the PAHO study, which was completed in February 1989, the IDB is beginning to prepare two loans to implement the recommended water and sewerage expansions and improvements. It is expected that the first loan will support work in three to five of the cities in the study and begin in late 1990; the second loan is expected to finance projects in the remaining cities and commence in 1991. Investment levels for these unsigned loans have not yet been finalized but should involve a total IDB contribution of approximately $70 million.

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[1] The report by CIDA, entitled *An Analysis of the Water and Sanitation Sector of Bolivia* and written by C.G. Delbridge and H.J. McPherson, was useful in the preparation of this report.

Below is a list of the loans through which the IDB is currently making disbursements. The sector study and the unsigned loans, however, were not considered as committed investments to increase coverage.

SOURCE	TARIJA (1984-1991)	COCHABAMBA/LA PAZ (1979-1990)	WATER STUDY (1989-1990)
IDB	$10,100,000	$32,600,000	$6,300,000
NATIONAL FUNDS	3,400,000	7,600,000	0
TOTAL	13,500,000	40,200,000	6,300,000

Total Committed Funding to Increase Coverage (1990-1995): $3,500,000

World Bank

In 1987, the World Bank completed two water and sanitation projects, one for the city of Santa Cruz and the other to support the construction of water and sewerage systems for small cities with populations of between 2,000 and 50,000. Currently, the Bank is appraising a loan to support water and sanitation development in the cities of Santa Cruz, Cochabamba, and La Paz. This loan, with co-financing from KfW and the municipal water agencies of the cities where work will be performed, will be used to strengthen, institutionally and financially, the water companies in each of the three cities. Along with the provision of technical assistance and training, operational improvements to the system facilities will be made, and the systems will be expanded to serve additional residents. Total funding for this proposed but unsigned loan is broken down by donor as follows:

Source	Amount
World Bank	$30,000,000
KfW	$10,000,000
Water Companies	$10,000,000
Total	$50,000,000

In conjunction with the United Nations Development Programme (UNDP), the World Bank has also supported, since 1987, a small pilot project in the altiplano to collect hydrogeologic data and test handpumps. In addition, the World Bank and the UNDP have prepared three proposals for funding. These projects involve a major, country-wide water and sanitation sector review, a pilot water and sanitation project for the altiplano using locally made handpumps, and a public health and urban sanitation project for Bolivian cities. The sector study will likely be financed by the UNDP, and the pilot antiplano project will be financed by the Government of the Netherlands.

Total Committed Funding to Increase Coverage (1990-1995): $0

Federal Republic of Germany

The West German government, through the KfW, is providing financing to support a number of projects in water and sanitation including water channel rehabilitation in the areas of Ravelo and the department of Chuquisaca ($7.25 million); the rehabilitation and extension of water and sanitation services in Oruro ($3.5 million); the construction of latrines in the rural areas of the altiplano ($2.25 million); and the rehabilitation of the water system for the city of Sucre ($10 million).

The German government also supports, through GTZ, two water and sanitation projects in Bolivia: one to conduct a water study of the Incachaca water reservoir and improve the water capacity of the water system, and another to assist in strengthening the institutional capacities of *Asociacion Nacional de Empresas de Servicios de Agua Potable y Alcantarillado* (ANESAPA). Financing for the Incachaca water reservoir totals $3.1 million; $250,000 has been provided for the institutional development of ANESAPA.

Total Committed Funding to Increase Coverage (1990-1995): $3,750,000

UNICEF

UNICEF has been active throughout the past decade in Bolivia's water and sanitation sector, particularly in the construction of small, gravity-fed water systems in rural districts of the altiplano. In 1989, UNICEF constructed 33 rural water systems, 5 in northern Potosi and 28 in southern Cochabamba. Though UNICEF has spent approximately $1 million per year in this sector, it will phase out its water and sanitation activities in 1990. Instead, UNICEF will redirect its efforts to providing health education components for water and sanitation projects financed by other external support agencies. UNICEF will, however, continue to implement an Italian-funded anti-poverty program for northern Potosi and southern Cochabamba. This project will be ongoing for five years and contains a water component of $1.6 million.

Total Committed Funding to Increase Coverage (1990-1995): $1,600,000

Netherlands

The Dutch government has focused its support of water and sanitation development in the rural areas of the country, especially the altiplano. As mentioned earlier, the Dutch will fund a project with the World Bank and the UNDP. An integrated water, sanitation, and health education program for rural communities in northern Potosi, this five-year project will cost approximately $4 million and will involve the construction of 1,250 handpumps and latrines. The project will be implemented with community participation and will begin in September 1990.

Total Committed Funding to Increase Coverage (1990-1995): $4,000,000

A.I.D.

A.I.D. plays an important role in the funding of rural water and sanitation programs in Bolivia. Until recently, the agency supported four water and sanitation projects in the rural areas of the country, but one project, the Savings and Loan Water and Sanitation Project ended in 1989. At the time of its completion, all of the subprojects for the Savings and Loan program were in operation, and approximately 16,500 families in five departments of the country were benefitting from the water and sanitation services.

Among the ongoing projects is A.I.D.'s Child Survival and Rural Sanitation Project. Implemented by CARE, this project began in 1986 and will end in August 1990. Funding, which was originally set at $4.5 million, ran out before the project was completed, and A.I.D. has provided an additional $500,000 for the next year. The purpose of this project has been to reduce infant and child mortality through the expansion of water and sanitation coverage and the strengthening of the Regional Development Corporations working in rural communities in the departments of La Paz, Oruro, Potosi, and Chuquisca.

Another ongoing A.I.D. effort is the Community and Child Health Project. This project began in 1989 and contains a water and sanitation component of $3.5 million to finance the construction of 200 rural water systems in three departments of the country: La Paz, Cochabamba, and Santa Cruz. The project also contains a component to strengthen the provision of child survival services.

The third of A.I.D.'s current water and sanitation programs is being executed by CARITAS, a nongovernmental organization. CARITAS will use approximately $800,000 of ESF money to construct 15 water and sewerage systems in rural and urban communities. Approximately one-half of these funds had been dispersed by the end of 1989.

Total Committed Funding to Increase Coverage (1990-1995): $4,450,000

Japanese International Cooperation Agency (JICA)

JICA currently supports a program to drill underground wells and lay a pipe network in El Alto. This project was started in June 1989 and is intended to double the amount of available water for El Alto (population 300,000) by tapping into additional groundwater reserves and pumping water to storage tanks and reservoirs. The Japanese are providing $17.8 million to support this project, which should be completed in April 1990. The project will increase the amount of water available to users of the system, but will not increase coverage. JICA also is developing two urban water projects to benefit peri-urban residents of Cochabamba and Oruro. These projects, however, have not been approved and further details were not available at the writing of this report.

Total Committed Funding to Increase Coverage (1990-1995): $0

United Kingdom

The United Kingdom's Overseas Development Agency is currently financing a two-year, $2 million water and sanitation program in the Yungas. The project involves well construction, sanitation, irrigation, and health education components and should be completed by early 1991.

Total Committed Funding to Increase Coverage (1990-1995): $1,000,000

PAHO

PAHO is currently working to strengthen institutions working in the areas of drinking water, excreta disposal, pollution control, and housing improvement. In particular, PAHO is emphasizing training of personnel and the development of the institutional capacity of various organizations.

Total Committed Funding to Increase Coverage (1990-1995): $0

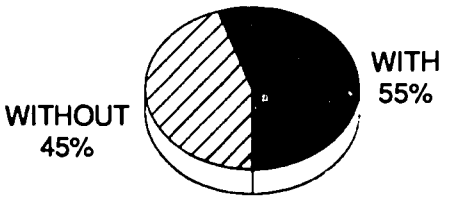
Water and Sanitation Coverage (1980-1989)

The population and coverage figures reported in Tables A-1 and A-2 were obtained from a variety of sources, as identified below.

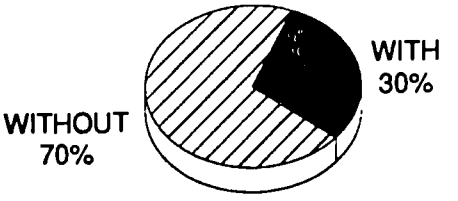
Figure	Source
1980 Population and Coverage	PAHO
1986 Population and Coverage	División de Saneamiento Ambiental
1988, 1989, 1995 Population	Instituto Nacional de Estadística (INE) [2]
1988 Coverage	ANESAPA
1989 Coverage and 1995 Targets	WASH

As seen in Tables A-1 and A-2 and Figures A-1 and A-2, Bolivia has experienced relatively constant expansion of water and sanitation services to its urban and rural populations. Though these tables show a decline in the percentage of the urban population with sanitation services from 1980 to 1986, the number of persons with sanitation services actually increased during that time, but at a slower rate than the urban population did. Despite the increases achieved in the 1980s, as seen from the charts below only one in two Bolivians had access to a water supply system and fewer than two out of three Bolivians still do not have access to even basic sanitation facilities.

1989 ACCESS TO WATER



1989 ACCESS TO SANITATION



MEETING THE TARGETS

1995 Targets

The 1995 targets are set to increase substantially coverage percentages in all subsectors. As discussed earlier in Chapter 2, these targets were not developed with country participation and are simply intended for use as planning tools to gauge the progress that individual countries have made in expanding water and sanitation services among their populations. The rate of coverage expansion called for by each 1995 target is relative to the level of current coverage. For example, the lower the current level of coverage the higher the

[2] A national survey conducted in 1988 showed that previous population projections had overestimated the country's population growth. The revised population figures have been used for all years following 1988.

percentage-point gain called for by the 1995 target. The reverse holds in the case of high coverage rates—the 1995 target would require a smaller percentage-point increase.

As seen in Figures A-3 and A-4 and Table A-3, the targets call for an increase in urban water coverage from the current rate of 79 percent to 85 percent in 1995, an increase of nearly 1.1 million persons with coverage. The urban sanitation target for 1995 is 55 percent, up from 43 percent in 1989 (972,000 additional persons served). In the rural subsectors, the percentage-point gains are larger, though the number of additional persons served is below that needed in the more rapidly expanding urban areas. For the rural water subsector, the 1995 target is set to increase coverage from 28 percent to 44 percent (an additional 604,000 persons), and the rural sanitation target is set to increase coverage from the current 15 percent to 33 percent (632,000 additional persons served by latrines or some kind of sanitary excreta disposal system).

Meeting the 1995 Urban Water and Sanitation Targets

The total cost to meet the urban water and sanitation targets in 1995 is substantial—nearly $163 million. Thus far, external support for the construction of new urban connections constitutes a small fraction of the total costs, as seen in Figure A-5. The current shortfall in funding needed to meet the urban targets is nearly $159 million. Two of the major donors, the IDB and the World Bank, are, however, currently in the process of developing large loans to finance water and sewerage rehabilitation and extension in many of the larger cities of the country. If the loans are signed and disbursements are made, these monies could cover the current shortfall.

Meeting the 1995 Rural Water and Sanitation Targets

The total cost of increasing existing coverage levels to meet the 1995 rural water and sanitation targets is $40 million, $24 million for water system construction and $16 million for the building of sanitary excreta disposal systems. Of this amount, over 25 percent of the necessary investment is committed at this time, leaving a shortfall of $16 million in the rural water subsector and of $10 million in the rural sanitation subsector. CIDA's and A.I.D.'s proposed involvements should partially reduce this deficit, but additional investment from other sources will be necessary.

TABLE A - 1
BOLIVIA

ACTUAL WATER SUPPLY
COVERAGE VERSUS 1995 TARGETS

YEAR	TOTAL POP-ULATION	WATER SUPPLY								
		ALL AREAS		URBAN AREAS			RURAL AREAS		
		POP. SERVED	% SERVED	URBAN POP.	TOTAL SERVED	% SERVED	RURAL POP.	TOTAL SERVED	% SERVED
1980	5,600	2,044	37 %	2,489	1,728	69 %	3,111	316	10 %
1986	6,569	2,870	44 %	3,132	2,286	73 %	3,437	584	17 %
1988	6,400	3,378	53 %	3,300	2,541	77 %	3,100	837	27 %
1989	6,582	3,598	55 %	3,445	2,720	79 %	3,137	878	28 %
TARGETS FOR 1995	7,831	5,275	67 %	4,461	3,792	85 %	3,370	1,483	44 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure A-1

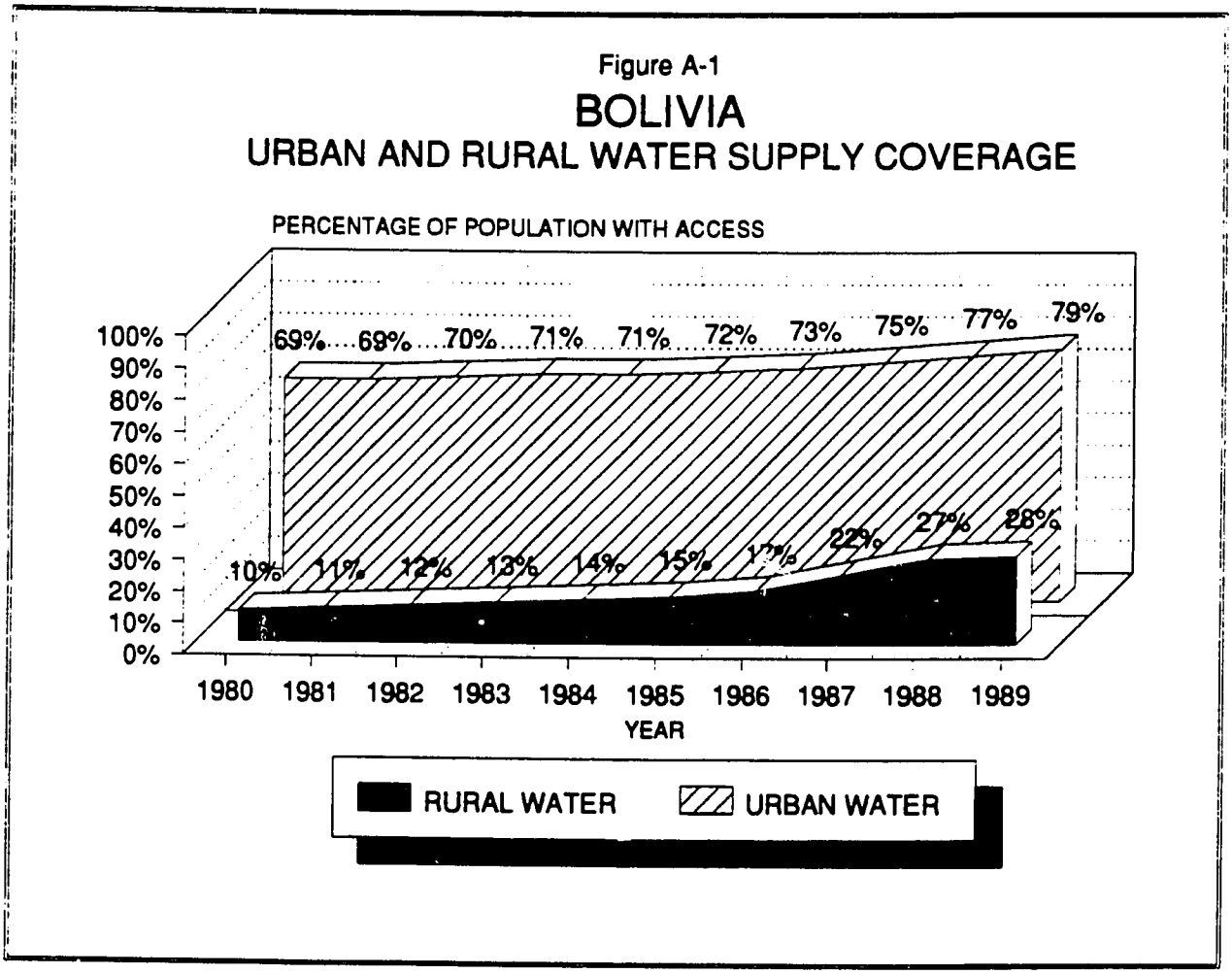


TABLE A - 2
BOLIVIA

ACTUAL SANITATION
COVERAGE VERSUS 1995 TARGETS

		SANITATION							
	TOTAL	ALL AREAS		URBAN AREAS			RURAL AREAS		
YEAR	POP-ULATION	POP. SERVED	% SERVED	URBAN POP.	TOTAL SERVED	% SERVED	RURAL POP.	TOTAL SERVED	% SERVED
1980	5,600	1,032	18 %	2,489	916	37 %	3,111	116	4 %
1986	6,569	1,378	21 %	3,132	1,034	33 %	3,437	344	10 %
1988	6,400	1,820	28 %	3,300	1,386	42 %	3,100	434	14 %
1989	6,582	1,961	30 %	3,445	1,481	43 %	3,137	480	15 %
1995 TARGET	7,831	3,565	46 %	4,461	2,453	55 %	3,370	1,112	33 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure A-2

BOLIVIA

URBAN AND RURAL SANITATION COVERAGE

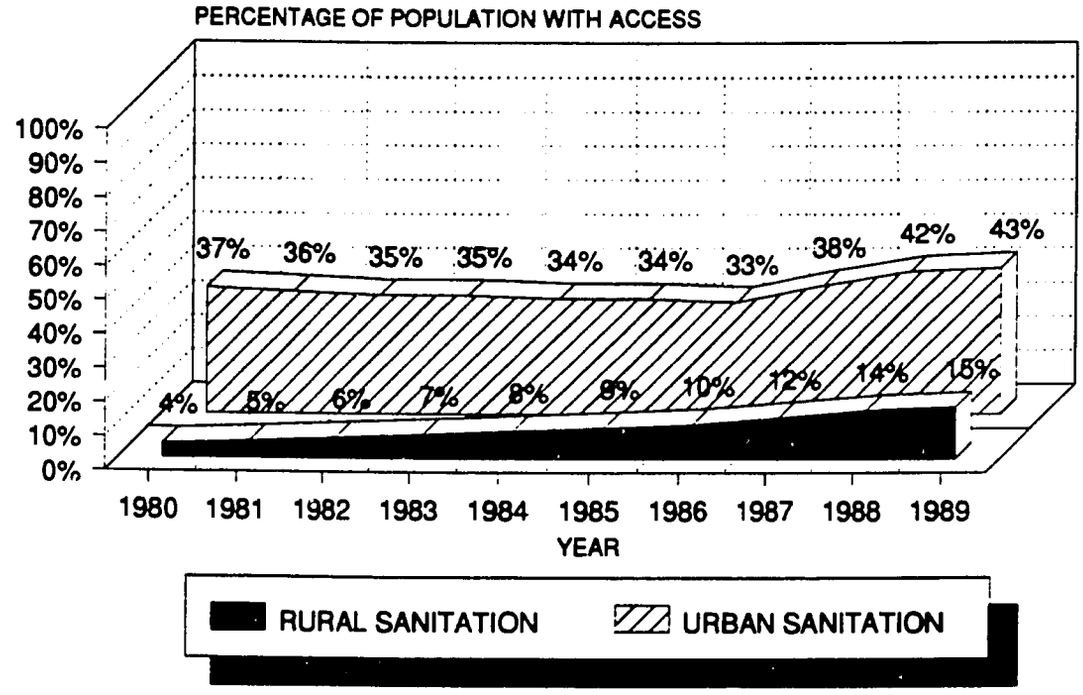


Figure A-3

BOLIVIA

1989 COV. & 1995 TARGETS (# OF PEOPLE)

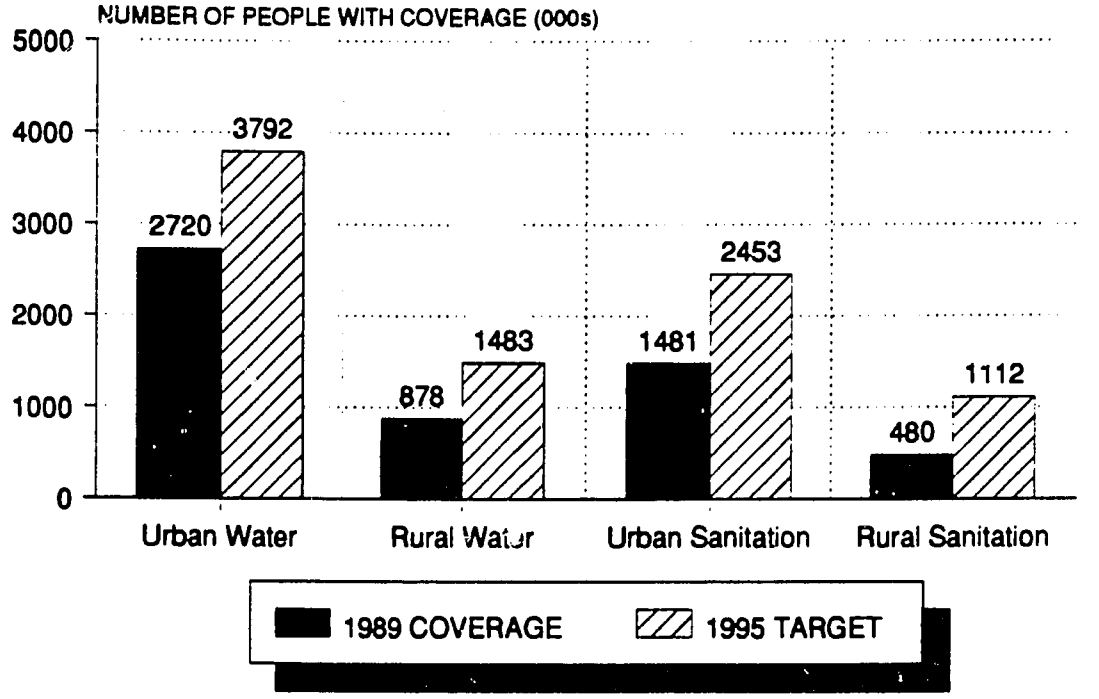


Figure A-4

BOLIVIA

1989 COVERAGE & 1995 TARGETS (% OF POP.)

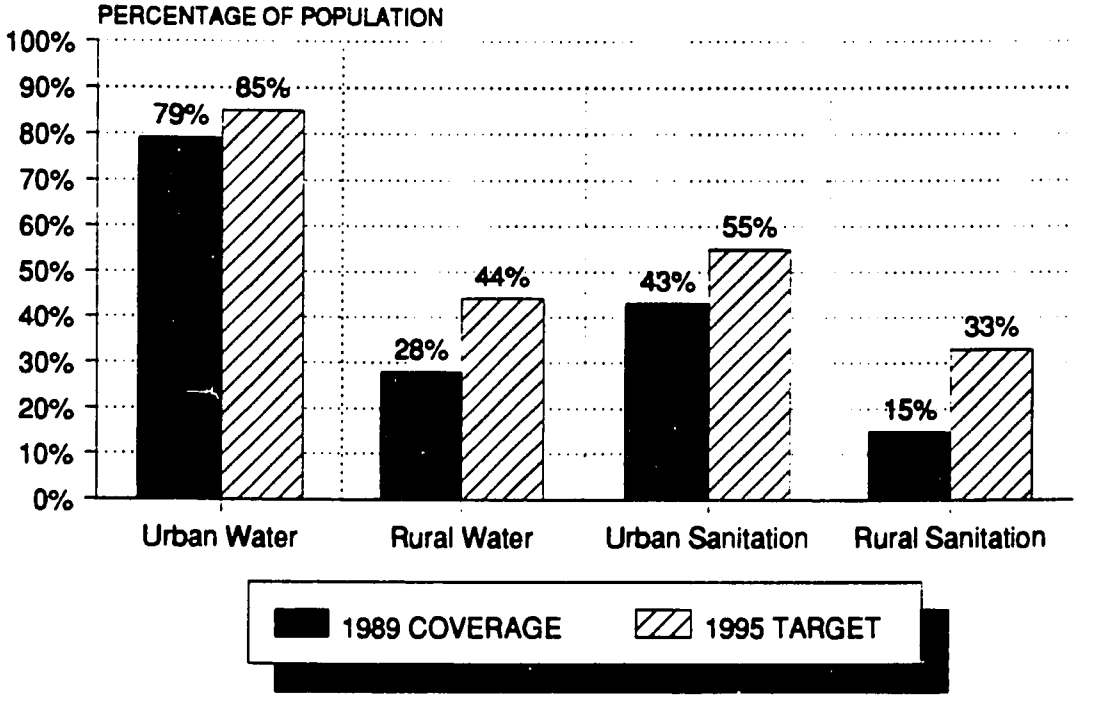


TABLE A - 3
BOLIVIA

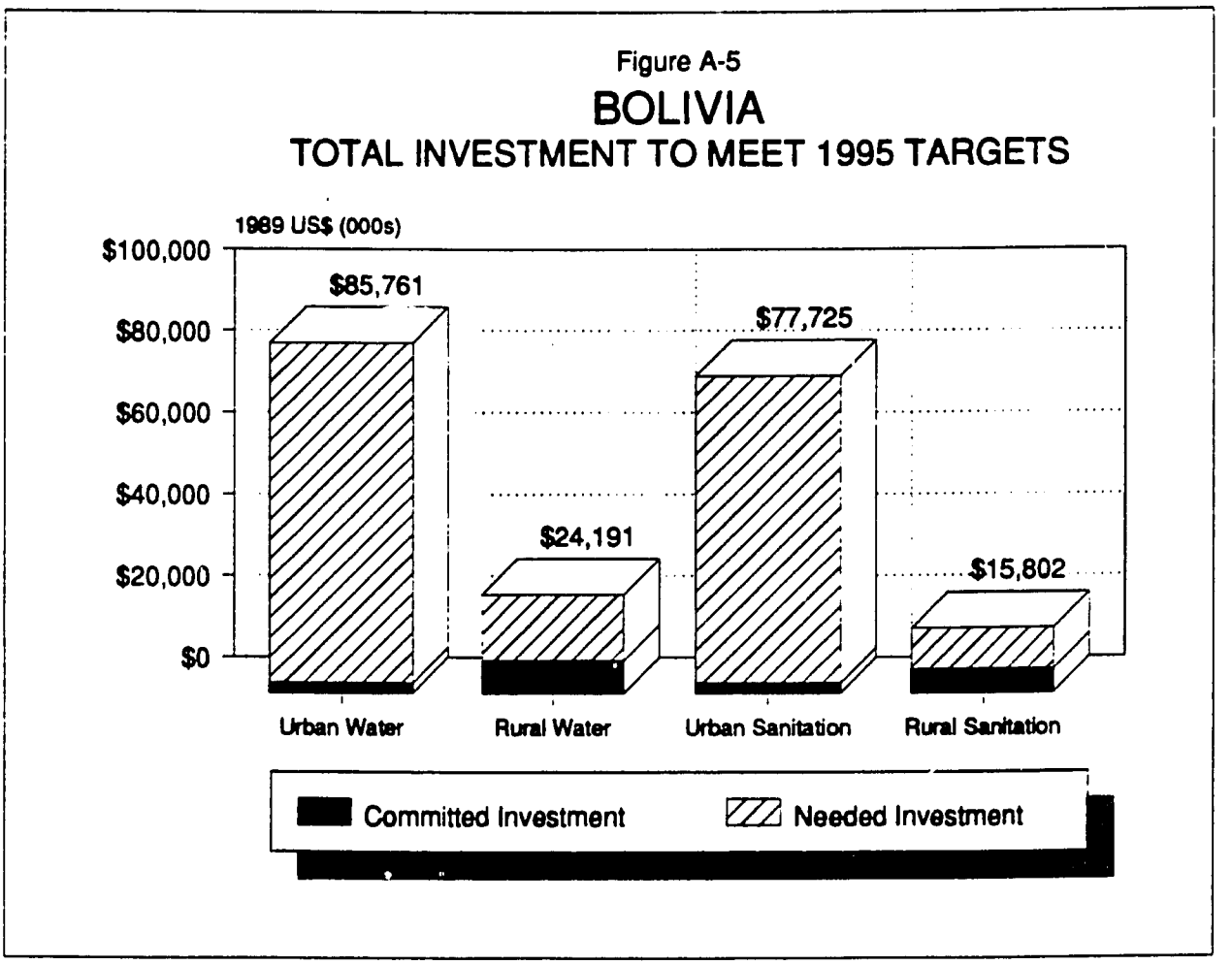
INVESTMENT NEEDED TO MEET
THE 1995 TARGETS

	WATER SUPPLY COVERAGE (PERSONS - 000s)			SANITATION COVERAGE (PERSONS - 000s)		
	TOTAL	URBAN	RURAL	TOTAL	URBAN	RURAL
TARGET FOR 1995 (000s)	5,275	3,792	1,483	3,565	2,453	1,112
COVERAGE IN 1989	3,598	2,720	878	1,961	1,481	480
REQUIRED INCREASE	1,676	1,072	604	1,603	972	632
UNIT COST PER CAPITA ($)	N/A	$80	$40	N/A	$80	$25
ESTIMATED TOTAL COST TO MEET 1995 TARGET ($000s)	$109,952	$85,761	$24,191	$93,527	$77,725	$15,802
COMMITTED FUNDS * ($000s)	$10,257	$2,375	$7,882	$8,043	$2,375	$5,668
PROJECTED FUNDING SHORTFALL ($000s)	$99,695	$83,386	$16,309	$85,484	$75,350	$10,134

TOTAL FUNDING SHORTFALL: $185,179

* ONLY THOSE FIRMLY COMMITTED INVESTMENTS WHICH INCREASE COVERAGE

Figure A-5



ECUADOR


PACIFIC OCEAN
COLOMBIA
N
Esmeraldas
Tulcán
Ibarra
Putumayo
Quito
Bahía de Caráquez
Manta
Latacunga
Portoviejo
Tena
Ambato
Guaranda
Puyo
Cononaco
Babahoyo
Riobamba
Guayaquil
Alausí
Macas
Azoguez
Cuenca
Machala
PERU
Loja
Zamora
Macará
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Appendix B

Country Profile: ECUADOR

COUNTRY BACKGROUND

1989 Population:	10.5 million (Urban—5.7, Rural—4.8)
Population Growth:	2.7% (Urban—3.9%, Rural—1.1%)
Infant Mortality Rate:	61
Child Mortality Rate:	25
Mortality Rate due to Diarrheal/Intestinal Diseases:	38
Life Expectancy:	66 (Male—64, Female—68)
Adult Literacy Rate:	Male—85%, Female—80%
GNP per Capita:	$1,040
GNP per Capita Annual Growth (1965-87):	3.2%
Currency:	666.5 sucre = US$1
Average Annual Inflation (1980-87):	29.5%

Ecuador is located on the west coast of South America, with Peru to the south and west and Colombia to the north. With a population of 10.5 million persons, the country covers 454,752 square kilometers, including the Galapagos Islands. Like many of its Latin American neighbors, the country has undergone rapid urbanization, particularly in the main cities of Guayaquil, Quito, and Cuenca.

The current government took office in mid-1988, at which time Ecuador's economy was in a critical state; the inflation rate was 63 percent and the value of the sucre had fallen 114 percent in the first six months of 1988. The economy of the country had suffered from low world oil prices and a major earthquake in March 1987, which shut down for six months the trans-Andean pipeline, which resulted in a decline in Ecuador's oil exports in 1987. In response to the economic problems faced by the country, the Borja administration adopted emergency economic measures to halt the growing fiscal deficit.

PAHO reports that the country's rapid population growth has hindered the ability of the Government of Ecuador (GOE) to provide primary health care services. Currently, approximately 20 to 30 percent of the population, persons living primarily in dispersed rural communities, receive no health care. Nonetheless, Ecuador's infant mortality rate is reported to be 61 deaths per 1,000 live births, lower than its Andean neighbors Peru and Bolivia. Diarrhea, however, continues to be one of the leading causes of death among Ecuadorian children, accounting for approximately 20 percent of all deaths of children under the age of five.

There are a number of Ecuadorian agencies working in the water and sanitation sector. The *Instituto Ecuatoriano de Obras Sanitarias* (IEOS), an entity of the Ministry of Health, is charged with national planning for water and sanitation activities. IEOS develops standards and also furnishes technical assistance to other agencies working in the sector, including municipal governments and their respective water and sewerage companies. The *Instituto Ecuatoriano de Recursos Hidráulicos* is another national-level agency and is linked indirectly

to water and sanitation activities by virtue of it serving as the national manager of water resources, including irrigation, watersheds, rivers, and ocean shores.

The primary financial channel for local and national infrastructure activities has been the Ecuadorian Development Bank (BEDE). Since its creation in 1976, BEDE has been evaluating and financing numerous infrastructure projects, including some in the water and sanitation sector. At this time, however, BEDE has limited capacity to provide technical and financial assistance to other entities in the water and sanitation sector.

At the local level, municipal governments are actively involved in providing water and sanitation services to their residents. The larger cities have their own water and sewerage companies, and in some cases, these companies also manage utility services in the surrounding rural areas. As the central government planning entity, the National Development Council serves as an institutional bridge between the government's planning functions and the various organizations working in the water and sanitation sector.

INVESTMENT AND COVERAGE LEVELS

Current Projects

World Bank

The World Bank currently has one loan to finance development of the water and sanitation sectors of Ecuador. However, disbursements of the loan, which began in 1986, were suspended late in 1989 because the executing agency for the loan, *Empresas Municipales de Agua Potable de Guayaquil* (EMAP-G), the municipal water company serving Guayaquil, was changed during the course of the loan. The loan must now be renegotiated with the new water and sewerage agency. Except for an analysis of the present state of EMAP-G (formerly EPAP-G) conducted by the Miami Dade Water and Sewerage Supply Association, no work under this loan was completed before the suspension. The work that was intended to be carried out under this loan included the rehabilitation of the existing water system, the strengthening of the institutional capabilities of EMAP-G, and the construction and metering of new connections for approximately 30,000 people. The Bank loan, co-financed with the United Kingdom, totaled $20 million. At this time, however, it is not clear when the loan will be renegotiated to finance the activities of the new Guayaquil municipal water agency.

Total Committed Funding to Increase Coverage (1990-1995): $0

IDB

The Inter-American Development Bank currently supports two urban infrastructure development loan projects—the Quito Water Supply and the Guayaquil Sewerage loans—and is in the process of appraising two more loans—one of which is a joint urban development project to be done in conjunction with the World Bank.

The ongoing Quito loan, which is not expected to be fully disbursed until 1992, is directed toward improving the water supply to serve the rapidly expanding Quito population. The loan supports the construction of water storage tanks and transmission lines and the installation of 100,000 new metering systems. While the IDB has financed the designs for the tanks and transmission lines, the Bank has not constructed any of the tanks. Rather, a private Argentinean construction firm has financed and constructed water storage tanks, a pumping station, and transmission main to serve the Quito area. The IDB is currently rethinking its strategy and may build upon the work carried out by the Argentineans to further bolster the amount of water available to the Quito area. This project, however, does not contain a component to expand coverage to unserved residents of Quito, and thus, it has not been considered in the investment analysis.

The second active IDB loan supports the development of sanitation services for slum areas in Guayaquil, the most populous city in the country. While the IDB is financing the sewerage connections, the World Bank has been financing the water component for these areas. As mentioned earlier, the World Bank's loan has been suspended. The IDB, which is financing $24 million of the sewerage project, estimates that the work, which also contains a component for storm drainage, will benefit 150,000 people when completed in 1990. Funding for the two IDB loans is shown below.

Source	Quito	Guayaquil
IDB	28,000,000	24,000,000
GOE	15,400,000	2,800,000
Total	43,400,000	26,800,000

The IDB is also currently appraising two loans to Ecuador which contain sizable water and sanitation components. The first is a direct loan to the city of Cuenca to finance the development of the city's potable water and sewerage systems. Funds may also be used to construct a treatment plant, though the primary emphasis of the project will be to increase the amount of water available to the current users of the system. This loan, which will be appraised by the IDB Board in February 1990, could begin later in the year.

Another loan option currently being studied by the IDB would support a large urban development project for the entire country. With joint financing from the World Bank, investments would be channeled through BEDE, which would then lend the money to municipalities in response to specific project proposals prepared by the municipal governments. The project will provide funds for basic infrastructure improvements, and it is expected that water and sanitation projects would be a substantial portion of the overall program. As the plans for this program are still tentative, the investment details are not available at this time.

Total Committed Funding to Increase Coverage (1990-1995): $3,000,000

A.I.D.

A.I.D. has just begun two projects supporting water and sanitation development in Ecuador, one serving rural communities and the other low-income families in urban areas of the country.

A.I.D. has just started a $22 million Water and Sanitation for Health and Ecuador Development Project aimed at improving the health of infants and children living in rural Ecuador. The project will focus on providing access to potable water and environmental sanitation and strengthening the institutional capability of IEOS to assist rural communities in eight provinces. The goals will be to install cost-effective water and sanitation systems and to educate communities to use these systems to improve family health and to maintain and improve them in the future. The GOE and local communities will invest approximately $18 million, and A.I.D. will provide $4 million. Overall, this project is intended to support water and sanitation projects in 640 communities and to benefit approximately 320,000 persons. This project, which began in 1989, is expected to be completed in December 1993.

A.I.D. also actively supports the construction of urban water and sanitation facilities in Ecuador through its National Shelter Delivery System Program. The program, which supports a broad range of public and private initiatives intended to improve living conditions of low-income urban families, provides $35 million in Housing Guaranty loan authority. Of these funds, an estimated $12 million will support water and sanitation provision to low-income, urban families. The primary implementing organization for this program is BEDE, working through municipal infrastructure agencies in the larger cities and through IEOS in the smaller urban areas. The program began in September 1989 and is expected to serve over 42,000 urban families when completed at the end of 1991.

Total Committed Funding to Increase Coverage (1990-1995): $34,000,000

CARE

CARE is currently responsible for implementing three projects in rural Ecuador with water and sanitation components. Two of the projects, one serving the southern regions of Loja and Acuay and the other in the provinces of Bolivar, Los Rios, and Pastaza, are funded with money from the Government of the Netherlands. The third project serves the central Ecuadorian provinces and is funded with Canadian money. For the past 15 years, CARE has constructed approximately 15 water systems per year. Each of these community-based projects supports latrine construction and hygiene education and seeks significant involvement of the communities in which the project is in operation. CARE has received funding of $1.58 million from the Dutch government and $200,000 from the Canadians. The Loja and Acuay project is scheduled for completion in 1990, and the others will be active through 1992.

Total Committed Funding to Increase Coverage (1990-1995): $1,250,000

PAHO

PAHO's work in the water and sanitation sector has focused upon the establishment of a program of institutional development and personnel training with IEOS and assistance in the reformulation of the water and sanitation sections of Ecuador's National Plan.

Total Committed Funding to Increase Coverage (1990-1995): $0

National Sanitation (FONASA) Fund

The GOE has established the FONASA Fund to finance priority programs with revenues generated from petroleum sales. The FONASA Fund has as part of its purpose the provision of potable water and sanitation facilities to rural communities in the country. The exact levels of FONASA funding for 1990 and beyond were not available for this report, though they constitute IEOS's counterpart fund for the international donor projects.

Total Committed Funding to Increase Coverage (1990-1995): $0

France

The Government of France has recently signed a loan with the GOE to finance infrastructure development in eight medium-sized cities. This $28.3 million loan will providing financing for water and sanitation service improvement and expansion and will be implemented by IEOS. For the purposes of this report, it has been assumed that approximately 10 percent of these funds will be used to increase coverage.

Total Committed Funding to Increase Coverage (1990-1995): $2,800,000

Federal Republic of Germany

Based upon a recently completed water and sanitation study, West Germany's KfW is preparing a loan for Santo Domingo. Further details, however, are not available at this time. Another loan, however, has been recently approved and is scheduled to begin in early 1990. This loan will support a basic health program with a component to construct potable water systems (27 projects) and latrines (17 projects) in the southern departments of Loja and Zamora. KfW funding for this loan totals approximately $5 million, and an additional $500,000 will be provided by the GOE.

Total Committed Funding to Increase Coverage (1990-1995): $5,500,000

Spain

Although its work does not directly contribute to the expansion of coverage, the Government of Spain is seeking to address another need in Ecuador's water and sanitation sector—improved water quality. Spain is financing and providing technical assistance in the construction of a plant to produce chlorine locally for use in Ecuadorian water treatment plants. Spain is providing $15 million for this project.

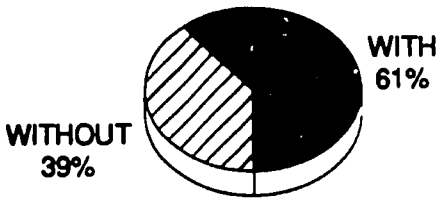
Total Committed Funding to Increase Coverage (1990-1995): $0

Water and Sanitation Coverage (1980-1989)

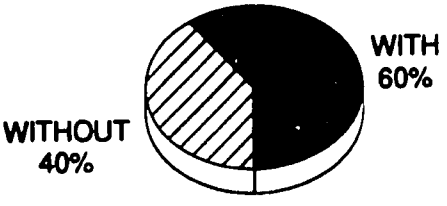
The population and coverage data shown in Tables B-1 and B-2 were obtained from a variety of sources. The population figures for 1980 were obtained from PAHO and the figures for the remaining years were taken from M. Whitaker and J. Alzamora's A.I.D.-sponsored study, *Characteristics and Indicators of Ecuador's Population*, conducted in August 1988. For coverage data, two sources were used: PAHO (for urban figures) and IEOS (for rural figures).

For the population as a whole, access to water and sanitation facilities has increased since 1980, when less than one-half of all Ecuadorians had access to potable water (48 percent) or an excreta disposal system (43 percent). As shown in the chart below, an increase of 14 percentage points had been recorded in the water sector by 1989, while sanitation levels rose even more significantly, by 17 percentage points.

1989 ACCESS TO WATER



1989 ACCESS TO SANITATION



The gains in coverage, however, differ between the urban and rural populations (Tables B-1 and B-2 and Figures B-1 and B-2). In the 1980s, the percentage of the rural population with access to water and sanitation services doubled, with approximately 1 million additional rural inhabitants served by water and sanitation facilities. In the urban areas, nearly 1.6 million more residents had access to potable water, while there were 1.7 million more residents with access to some form of sanitary excreta disposal system. During that same time period, however, the urban population increased by nearly 2 million persons, an increase greater than the total expansion of either water or sanitation services. In the rural areas, the population increased by only 500,000, enabling Ecuador to make substantial gains in providing basic services to a larger portion of the population.

MEETING THE TARGETS

1995 Targets

As a total for measuring the continuing expansion of water and sanitation services, the 1995 targets have been set at 84 percent coverage in urban water and 85 percent coverage in urban sanitation, 52 percent coverage in rural water, and 51 percent in rural sanitation (Tables B-1 and B-2 and Figures B-3 and B-4). The need for increased services is particularly acute in the rural areas of the country, where coverage levels are approximately half those in the urban areas. Specifically, the targets are set to raise Ecuador's rural water coverage by 740,000 persons and its rural sanitation coverage by 829,000 (Table B-3). In the urban areas, the estimated number of additional persons with coverage needed to meet the water supply target is nearly 1.48 million, and for sanitation, the figure is 1.65 million.

Meeting the 1995 Urban Water and Sanitation Targets

In order to meet the objective of expanding urban water and sanitation service to a wider percentage of a population that is itself expanding at a rate of 4.4 percent annually, a great deal of investment is required. To meet the 1995 urban water and sanitation coverage goals, an estimated $202 million will be needed for the construction of urban water and excreta disposal systems (Table B-3 and Figure B-5). Of this amount, $17.8 million has been committed at this time, $7.2 million for water expansion and $10.6 million for sanitation services. Though the current investment shortfall stands at $184 million for the urban areas of Ecuador, there are a number of loans currently being discussed by the IDB and the World Bank, one of which would be a joint loan to finance urban development throughout the country. Other large potential loans are one from the IDB to finance potable water and sewerage development in the city of Cuenca and the suspended World Bank loan for Guayaquil.

Meeting the 1995 Rural Water and Sanitation Targets

In the rural areas of the country, a total of nearly $101 million is needed to meet the targets, $29 million of which has been committed at this time. The funding shortfall of $72 million, while substantial, may be also be reduced by the proposed IDB/World Bank loan, which would provide large amounts of money to be disbursed for water and sanitation projects in both urban and rural areas. Nonetheless, it is clear that Ecuador will need additional funding in this area to supplement the financing already committed in A.I.D.'s current rural water and sanitation project.

TABLE B - 1
ECUADOR

ACTUAL WATER SUPPLY
COVERAGE VERSUS 1995 TARGETS

		WATER SUPPLY							
	TOTAL	ALL AREAS		URBAN AREAS			RURAL AREAS		
YEAR	POP-ULATION	POP. SERVED	% SERVED	URBAN POP.	TOTAL SERVED	% SERVED	RURAL POP.	TOTAL SERVED	% SERVED
1980	8,123	3,881	48 %	3,825	3,021	79 %	4,298	860	20 %
1985	9,365	5,264	56 %	4,812	3,898	81 %	4,553	1,366	30 %
1987	9,908	5,829	59 %	5,248	4,198	80 %	4,660	1,631	35 %
1989	10,485	6,500	62 %	5,724	4,600	80 %	4,761	1,900	40 %
TARGETS FOR 1995	12,314	8,719	71 %	7,237	6,079	84 %	5,077	2,640	52 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure B-1

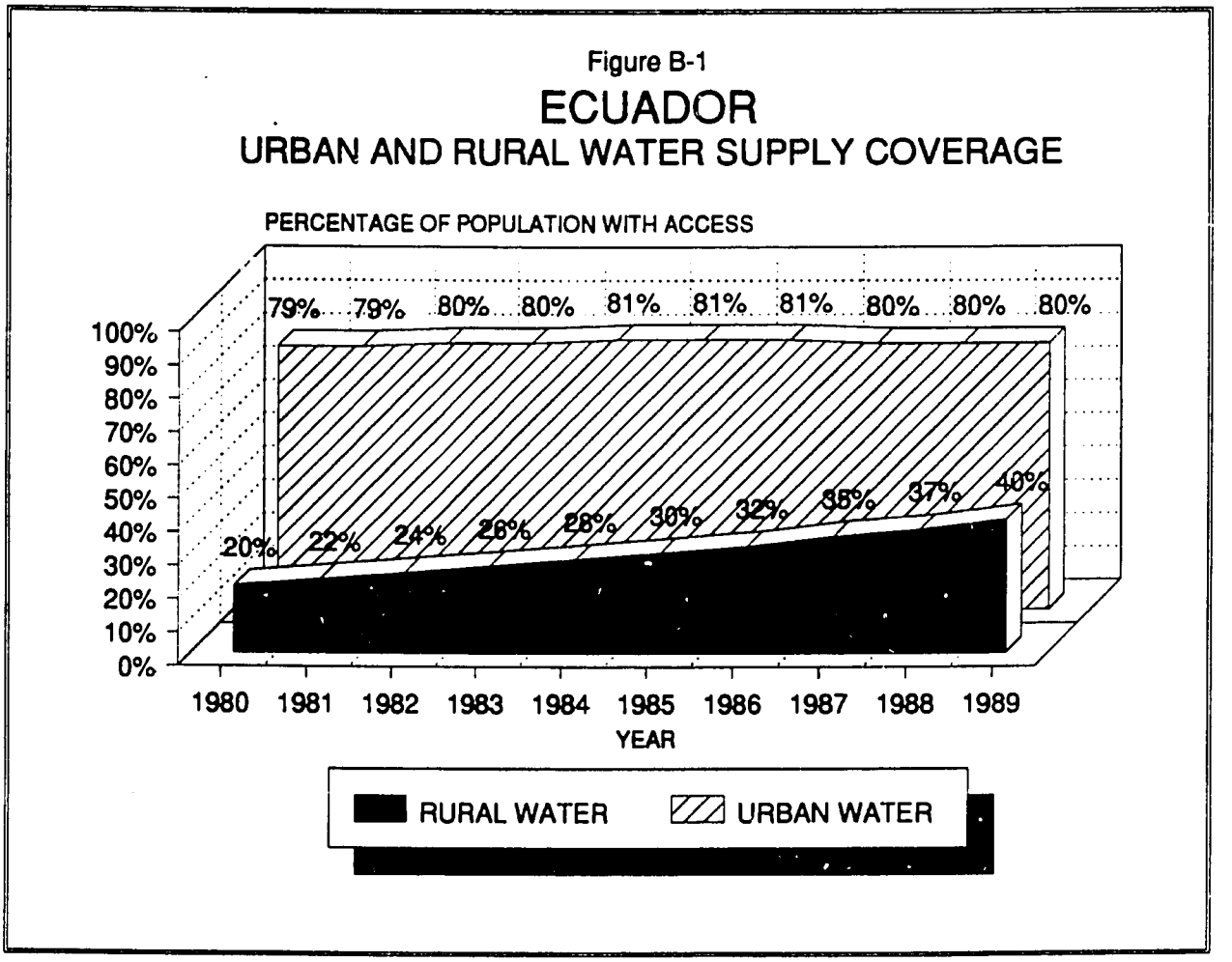


TABLE B - 2
ECUADOR

ACTUAL SANITATION
COVERAGE VERSUS 1995 TARGETS

		SANITATION							
	TOTAL	ALL AREAS		URBAN AREAS			RURAL AREAS		
YEAR	POP-ULATION	POP. SERVED	% SERVED	URBAN POP.	TOTAL SERVED	% SERVED	RURAL POP.	TOTAL SERVED	% SERVED
1980	8,123	3,531	43 %	3,825	2,800	73 %	4,298	731	17 %
1985	9,365	4,980	53 %	4,812	3,705	77 %	4,553	1,275	28 %
1987	9,908	5,603	57 %	5,248	4,112	78 %	4,660	1,491	32 %
1989	10,485	6,260	60 %	5,724	4,500	79 %	4,761	1,760	37 %
1995 TARGET	12,314	8,740	71 %	7,237	6,151	85 %	5,077	2,589	51 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure B-2

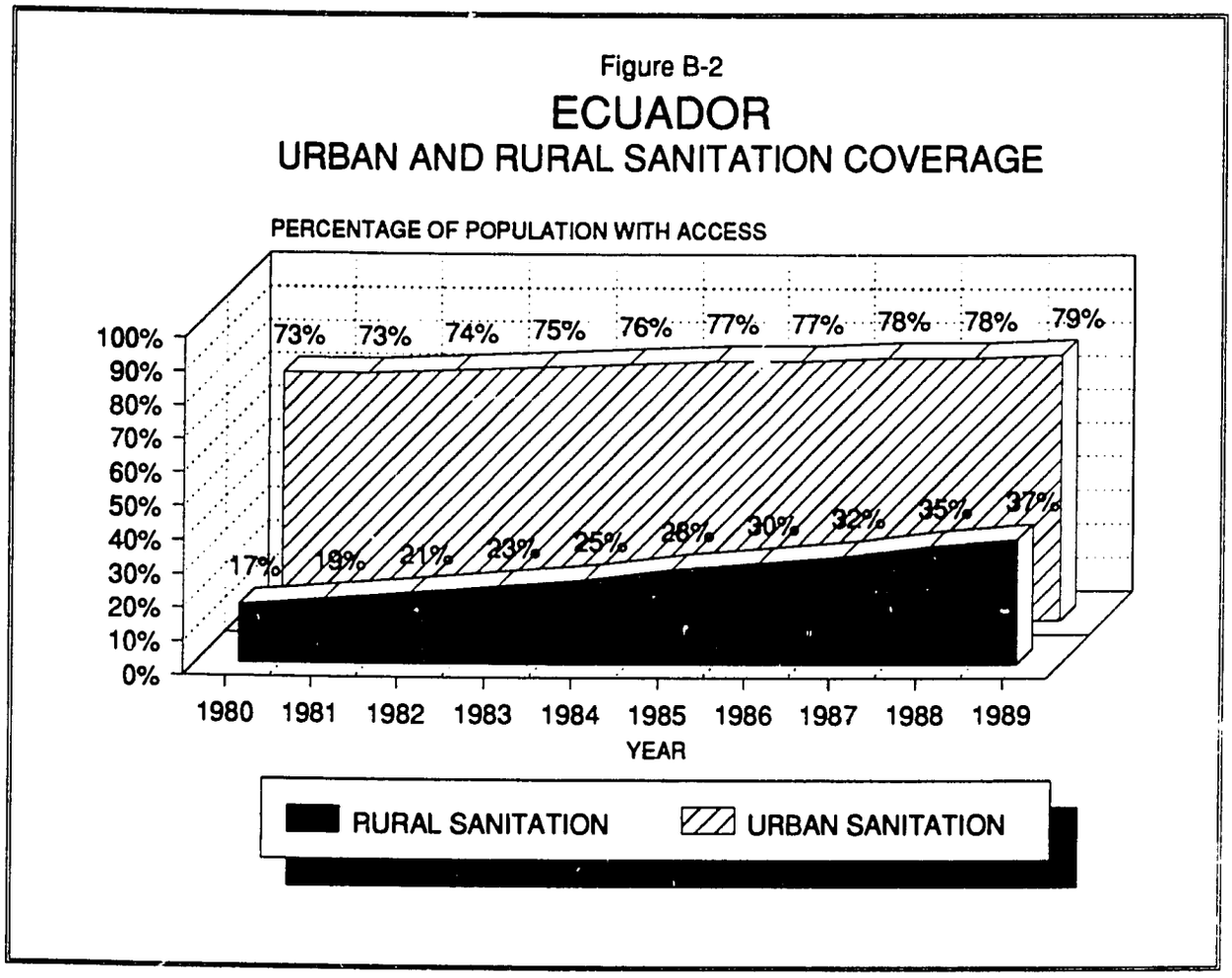


Figure B-3

ECUADOR

1989 COV. & 1995 TARGETS (# OF PEOPLE)

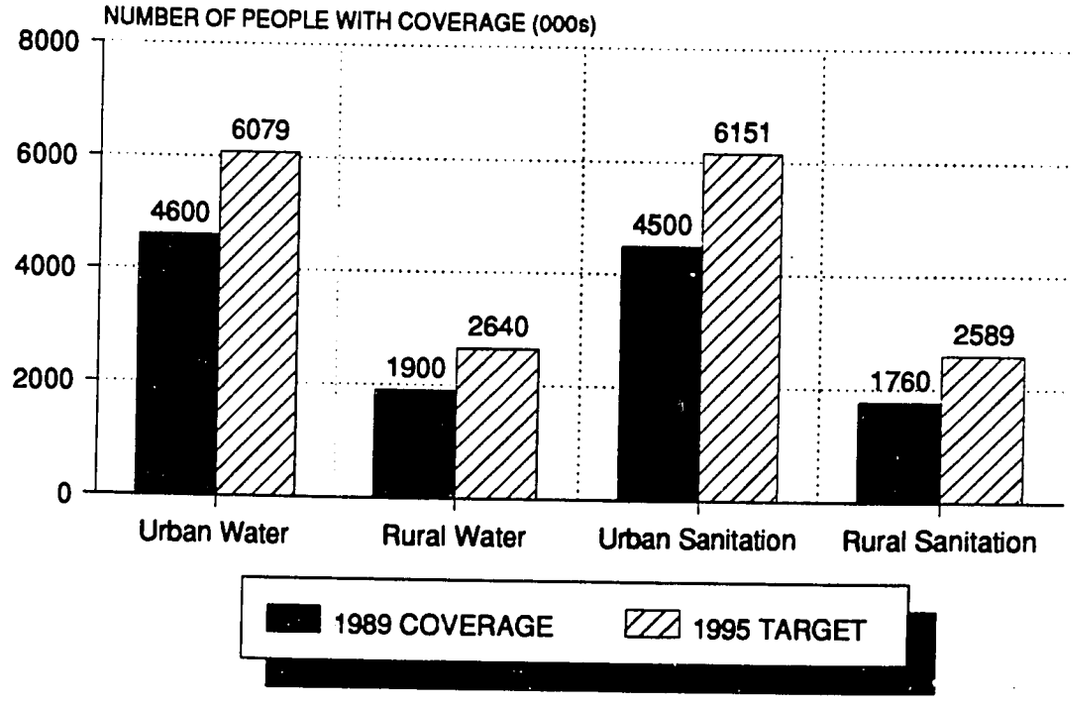


Figure B-4

ECUADOR

1989 COVERAGE & 1995 TARGETS (% OF POP.)

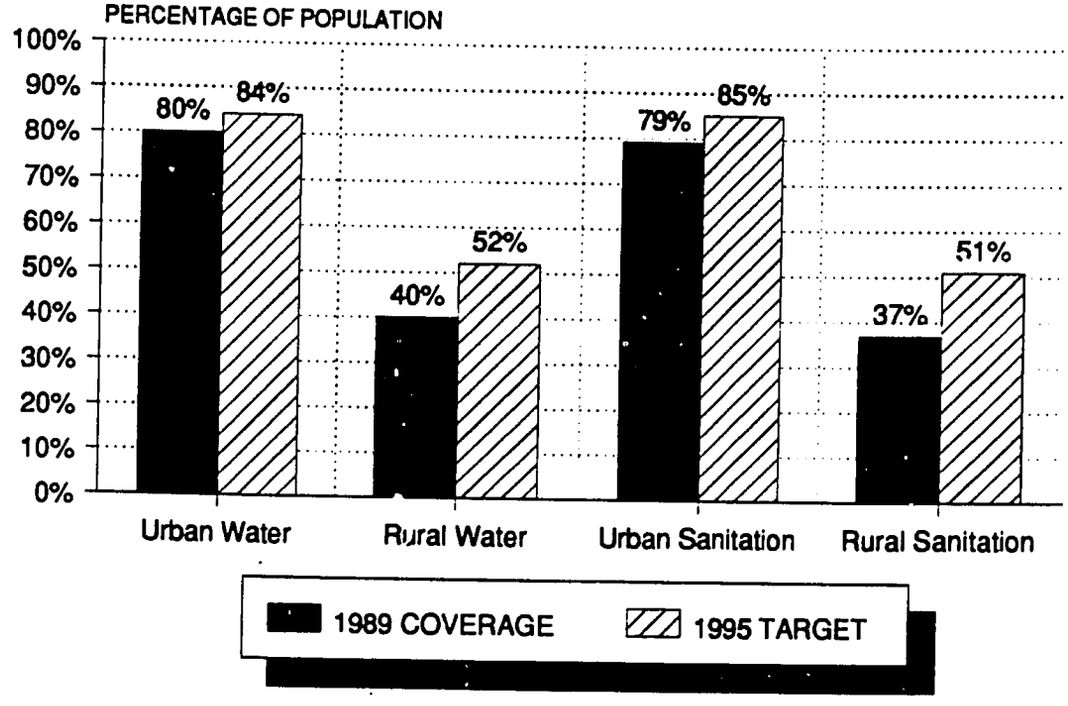


TABLE B - 3
ECUADOR

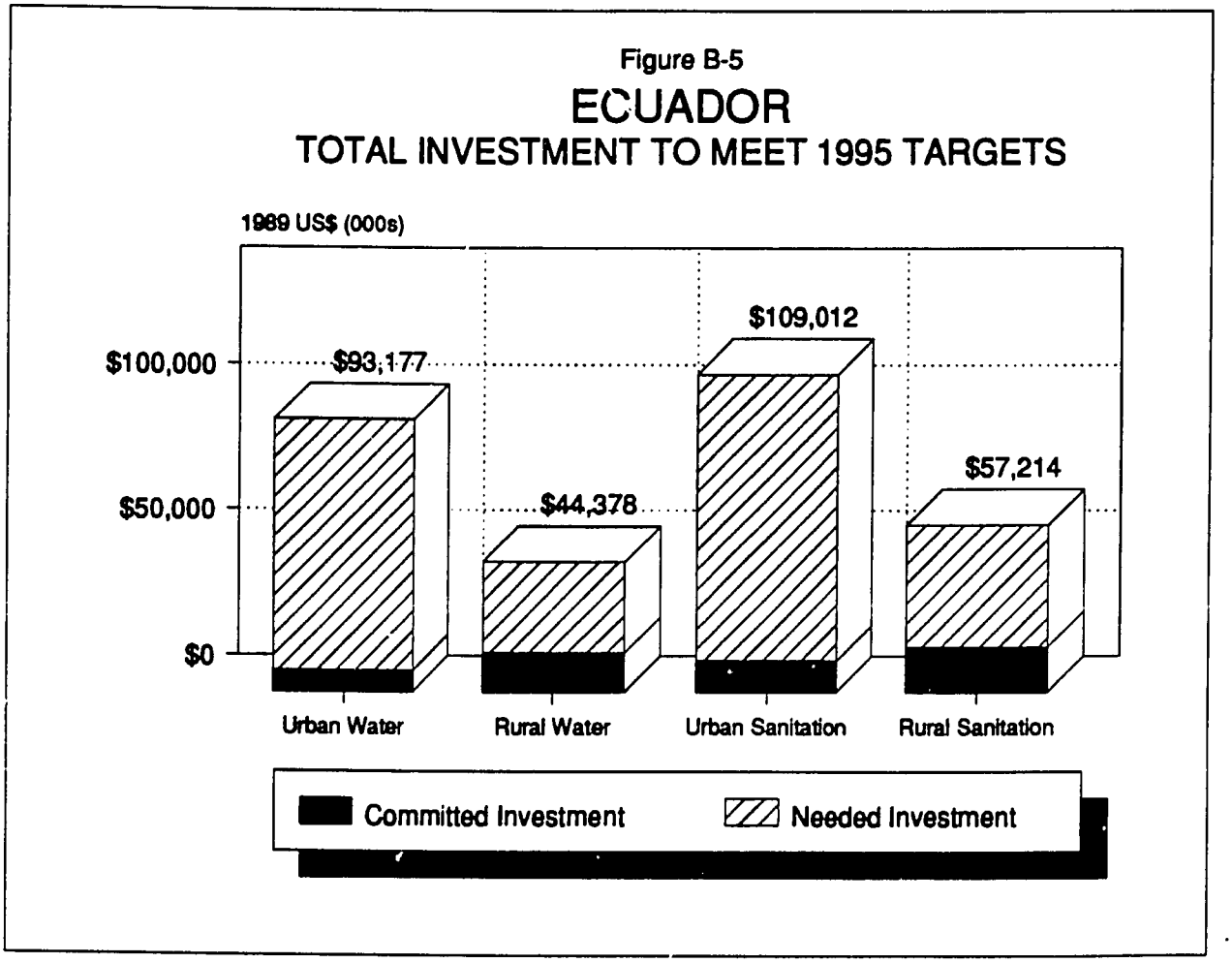
INVESTMENT NEEDED TO MEET
THE 1995 TARGETS

	WATER SUPPLY COVERAGE (PERSONS - 000s)			SANITATION COVERAGE (PERSONS - 000s)		
	TOTAL	URBAN	RURAL	TOTAL	URBAN	RURAL
TARGET FOR 1995	8,719	6,079	2,640	8,741	6,151	2,589
COVERAGE IN 1989	6,500	4,600	1,900	6,260	4,500	1,760
REQUIRED INCREASE	2,219	1,479	740	2,480	1,651	829
UNIT COST PER CAPITA ($)	N/A	$63	$60	N/A	$66	$69
ESTIMATED TOTAL COST TO MEET 1995 TARGET ($000s)	$137,555	$93,177	$44,378	$166,226	$109,012	$57,214
COMMITTED FUNDS * ($000s)	$20,600	$7,228	$13,372	$25,950	$10,572	$15,378
PROJECTED FUNDING SHORTFALL ($000s)	$116,955	$85,949	$31,006	$140,276	$98,440	$41,836

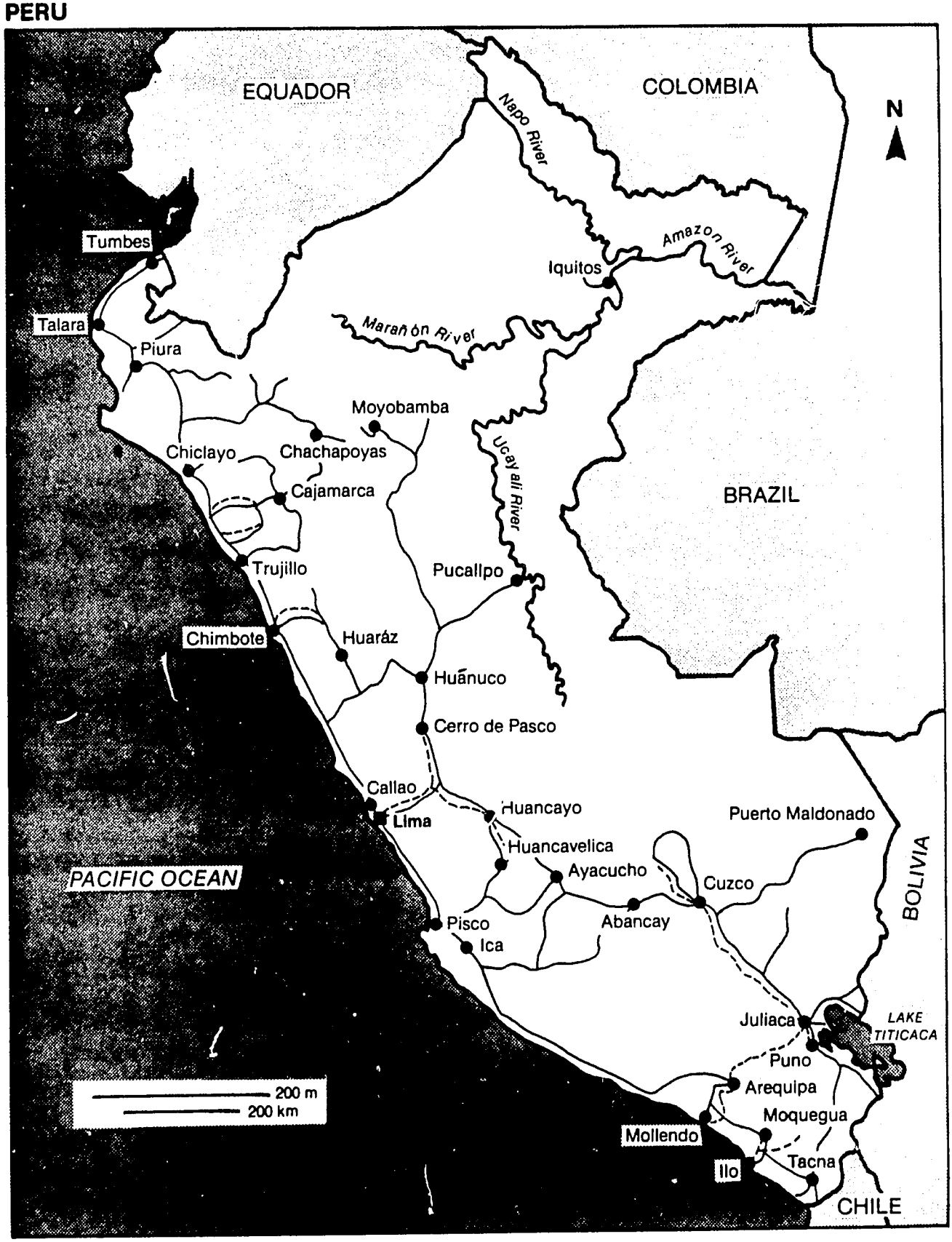
TOTAL FUNDING SHORTFALL: $257,231

* ONLY THOSE FIRMLY COMMITTED INVESTMENTS WHICH INCREASE COVERAGE

Figure B-5



PERU


EQUADOR
COLOMBIA
N
Napo River
Amazon River
Tumbes
Iquitos
Talara
Piura
Marañón River
Moyobamba
Chiclayo
Chachapoyas
Cajamarca
Ucayali River
BRAZIL
Trujillo
Pucallpo
Chimbote
Huaráz
Huánuco
Cerro de Pasco
Callao
Lima
Huancayo
Puerto Maldonado
Huancavelica
Ayacucho
Cuzco
PACIFIC OCEAN
Pisco
Abancay
Ica
BOLIVIA
Juliaca
LAKE TITICACA
Puno
Arequipa
Moquegua
Mollendo
Tacna
Ilo
CHILE
200 m
200 km

Appendix C

Country Profile: PERU

COUNTRY BACKGROUND

1989 Population:	21.7 million (Urban—15.0, Rural—6.7)
Population Growth:	2.5 percent
Infant Mortality Rate:	84
Child Mortality Rate:	33
Mortality Rate due to Diarrheal/Intestinal Diseases:	N/A
Life Expectancy:	62 (Male—60, Female—64)
Adult Literacy Rate:	Male—91 percent, Female—78 percent
GNP per Capita:	$1,470
GNP per Capita Annual Growth (1965-87):	.2 percent
Currency:	4701.18 Inti = US$1
Average Annual Inflation (1980-87):	101.5 percent

Peru is located on the west coast of South America, bordered by Ecuador and Colombia to the north, Brazil and Bolivia to the east, and Chile to the south. The country comprises three geographic regions—the coastal plain, the Andes Mountains, and rain forests east of the Andes. Overall, the country has a landmass of approximately 1.3 million square kilometers and a population of 21.7 million. The population is substantially urban, with nearly 70 percent of Peruvians living in communities of over 2,000 persons.

Though the national average for infant mortality is 84 per 1,000 live births, about average for Latin America, this statistic does not show the disparity that exists between various groups of Peruvians. PAHO reports that while the infant mortality rate for Lima was 57, the rate for rural Huancavelica was 275. Indeed, one out of every two reported deaths was a child under the age of five, with half of those deaths resulting from diseases preventable by sanitation and immunization programs.

Politically and economically, the country has faced a mounting crisis in recent years. With the election of President Garcia in 1985, the Government of Peru (GOP) initiated a program of economic expansion which has not been sustainable. By the end of 1988, the rate of inflation was at 1,000 percent and the country's economy was suffering from a severe recession. Troubled by rising debts, the GOP decided to cut itself off from the International Monetary Fund and to cease loan payments to the World Bank, the IDB, and other banks. Because of the large arrearages which have accrued, it will be difficult for Peru to reschedule its debt and to receive additional loans, should the government to be elected in April 1990 seek to renew its loans.

Responsibilities for the water and sanitation sector are split among various government agencies. *Servicio Nacional de Abastecimiento de Agua Potable y Alcantarillado* (SENAPA), the National Drinking Water and Sewerage Service, was created in 1981. Under the direction of the Ministry of Works, Housing and Construction, SENAPA is Peru's main

implementing agency in the urban water and sanitation sector. The Ministry of Health handles the country's rural water and sanitation programs, and overall coordination of water and sanitation activities is the responsibility of the *Comité Nacional de Saneamiento Basico*.

INVESTMENT AND COVERAGE LEVELS

Current Projects

A.I.D.

A.I.D. began its involvement in the water and sanitation sector of Peru in 1980 with the Rural Water Systems and Environmental Sanitation Project. Originally a $5.5 million project, this rural project was expanded to provide a $10 million loan and a $1 million grant, to which the GOP contributed $5.2 million. Under this project, populations neglected by other water and sanitation programs, namely communities of fewer than 500 persons, were targeted as the main beneficiaries. Over the life of the project, which ended in 1989, an estimated 367,000 persons in 13 highland and valley regions gained access to a water supply system and 35,000 latrines were installed. Other components of the project included the training of water and sanitation system maintenance personnel, the procurement of equipment for field offices, institutional strengthening for local water and sanitation agencies, and the execution of water and sanitation studies.

With the conclusion of this project in 1989, A.I.D. is currently without a water and sanitation project in Peru. Because this project was largely responsible for the gains in rural coverage seen in the 1980s, it is important that A.I.D. continue its involvement in this sector. In recognition of the potential for further development, A.I.D. is currently examining the possibility of adding a water and sanitation component to an ongoing child survival project funded by the agency, in addition to another water and sanitation project to continue the work carried out by A.I.D. in the past decade.

Total Committed Funding to Increase Coverage (1990-1995): $ 0

IDB

The Inter-American Development Bank has suspended two loans for Peru's water and sanitation sector. Since the GOP has failed to make its loan payments, further disbursements of these loans cannot be made until the arrearages are cleared. With presidential elections scheduled for April 1990, a new government may institute the economic reforms necessary for the renewed disbursements of the IDB loans.

The two suspended IDB projects total $50.6 million, $23.5 million of that is in the form of an IDB loan. The balance is local counterpart funds. Under these programs, 21 urban water systems were scheduled to be built, 14 of which were completed prior to the loan suspensions. It is estimated that an additional 12 months will be needed to complete work

under these loans, though the IDB is considering canceling the loans due to Peru's arrearages and the fact that the loans have been delayed beyond even an extended time frame.

In addition to the suspended loans, the IDB is currently developing another water and sanitation loan of $93 million, to which the GOP would contribute $114 million. It is possible that the IDB's share of the $207 million total program may increase to $145 million, with the GOP providing the balance. This loan program, if approved, will be executed by SENAPA and will provide funds to rehabilitate and construct water and sewerage systems in 22 medium-sized cities. The water component is expected to benefit up to 1.6 million persons, and 34,000 would benefit from latrine construction. Another component will support operations and maintenance and technical assistance for strengthening the institutional capacity of local water and sewerage agencies. This four-year loan, however, cannot be approved by the IDB Board until the arrearages accumulated under the current loans are cleared.

Total Committed Funding to Increase Coverage (1990-1995): $ 0

CIDA

CIDA supports a program to construct 500 water systems in the shanty towns of Terrio Ica and Lima. Implemented by a Canadian nongovernmental organization, World University Service of Canada, the program began in the early 1980s and is scheduled to run through 1993. Funding for the remainder of the project is $4 million. CIDA is also supporting the formation of an information system to collect and disseminate water and sanitation information. Both of these Canadian efforts are being executed by SENAPA.

Total Committed Funding to Increase Coverage (1990-1995): $ 4,000,000

World Bank

Due to Peru's debt problem and its inability to meet payments on its loans, the World Bank has not approved any new loans in several years. The most recent water and sanitation project provided financing for the *Servicio de Agua Potable y Alcantarillado de Lima* to construct secondary systems to serve low-income areas in Lima. This loan was active from 1982 to 1987, at which time it was suspended. In June 1989, the loan was finally canceled, with less than half of the $40 million loan having been disbursed.

Total Committed Funding to Increase Coverage (1990-1995): $ 0

CARE

Since 1974, CARE Canada has supported potable water system construction in the rural areas of the country. CARE's current project in this sector is the Integrated Rural Development Project, which contains two components: one for the construction of potable water systems in the rural highlands and another to construct small irrigation systems and support agricultural development activities.

Total Committed Funding to Increase Coverage (1990-1995): $ 250,000

Federal Republic of Germany

In July 1989, the West German government (through GTZ) began the second phase of a water and sanitation pilot project to rehabilitate and expand water supply and sanitation facilities in the districts of Trujillo, Ica, and Placo. Executed by SENAPA, the project is scheduled to run for three years, terminating in mid-1992. The project will focus most heavily on rehabilitation and conduct studies and strengthen SENAPA's institutional capacity. GTZ and the GOP are looking to this pilot project to provide a model for water and sanitation expansion in medium-sized cities that will be transferable to other districts in the future. Funding for this effort totals $5.3 million, $3.2 million of which is provided by GTZ and $2.1 million by the GOP. Because this project is directed primarily toward the rehabilitation of existing systems, only $1.5 million has been considered as investment to increase coverage.

Total Committed Funding to Increase Coverage (1990-1995): $ 1,500,000

Netherlands

The Dutch government, which has long been involved in constructing water and sanitation systems in rural and small urban communities in Peru, is developing a new project to build water and sanitation systems in 27 localities with populations of under 10,000 persons. This project, which has not yet been fully agreed upon, will benefit approximately 60,000 persons and will be financed by $2.5 million from the Dutch government and $600,000 from the GOP. The project will be executed by SENAPA.

Total Committed Funding to Increase Coverage (1990-1995): $ 0

PAHO

PAHO currently supports a program in Peru to conduct studies on basic sanitation for the government's national development plan.

Total Committed Funding to Increase Coverage (1990-1995): $ 0

Water and Sanitation Coverage (1980-1989)

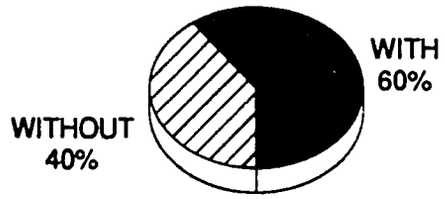
The sources of population and coverage data used for this appendix are as follows:

1980 and 1985, PAHO; 1988, SENAPA; 1989, extrapolated from figures for earlier years.

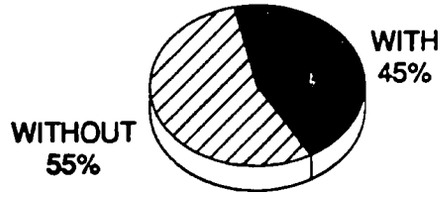
Since 1980, Peru has recorded gains in the percentage of the population with coverage in each of the four subsectors (Tables C-1 and C-2 and Figures C-1 and C-2). The urban population with water coverage rose from 68 percent in 1980 to 78 percent by the end of 1989. In the urban sanitation subsector, a substantial increase was reported during the period 1980 to 1985, when coverage jumped from 57 percent to 67 percent. Since 1985, however, the number of urban residents with sanitation coverage has remained approximately the same. Since the size of the urban population has grown rapidly since 1985, the percentage of urban residents with access to sanitation facilities has dropped 8 percentage points from 1985 to the current level of 59 percent. In the rural water subsector, coverage levels remained static at 17 to 18 percent from 1980 to 1985 and then jumped to 24 percent by the end of 1989. Rural sanitation gains were even more notable; coverage has increased from virtually zero percent in 1980 to 18 percent by 1989, a gain of over 1.3 million persons with access to an excreta disposal system.

As the charts below show for the combined urban and rural populations, less than two-thirds of Peruvians have access to potable water, while less than one-half have access to adequate sanitation facilities.

1989 ACCESS TO WATER



1989 ACCESS TO SANITATION



MEETING THE TARGETS

1995 Targets

Because Peru is the most populous country in this study, the numbers of additional persons with service needed to meet the 1995 targets are significantly higher than those for Bolivia or Ecuador. In the urban water subsector, where the 1995 target is set at 84 percent of the urban population, a six percentage point increase, nearly 3.4 million additional residents with service will be needed in the next six years (Table C-3 and Figures C-3 and C-4). The urban sanitation target, set at 69 percent, requires an increase of an estimated 3.6 million persons served. In the rural sector, the percentage point increases are somewhat higher, though the numbers of additional persons with service are lower, due to the smaller size of Peru's rural population. In the rural water subsector, the target is set to increase coverage from the 1989 rate of 24 percent to 40 percent by 1995, an increase of 1.3 million persons with

potable water. The rural sanitation target is slightly greater, raising coverage levels from 18 percent to 36 percent by 1995 (1.4 million additional persons served).

Meeting the 1995 Urban Water and Sanitation Targets

Overall, the total investment needed to meet the 1995 urban water and sanitation targets is estimated at $505 million, $242 million for water system construction and expansion and $263 million for the construction of sanitation facilities (Table C-3 and Figure C-5). Clearly, this is an extraordinary amount of money for a country currently facing the debts that Peru has accrued. With loans from the IDB and World Bank, the two main donors for large-scale urban water and sanitation programs, suspended due to arrearages on current loans, the generation of significant levels of financing to continue the work to expand these basic infrastructural services to Peruvians will require political and economic solutions to allow for the reactivation of ongoing loans and the development of new ones. With national elections scheduled to take place in April 1990, there is some hope that the new government will be able to resolve the debt problem with the IDB and World Bank and will be able to continue the process of developing Peru's water and sanitation infrastructure. Given the current levels of investment in the urban sector, $3 million to support water system construction and $3 million to finance the construction of sanitation facilities, the current funding shortfalls to meet the 1995 targets are $239 million for urban water and $260 million for urban sanitation.

Meeting the 1995 Rural Water and Sanitation Targets

With the conclusion of A.I.D.'s rural water and sanitation program in 1989, Peru is without a major, externally funded rural program. Currently, the shortfalls in investment needed to meet the 1995 rural targets are $41 million for water system construction and $50 million for latrinization programs. While the Dutch government is preparing a major rural water and sanitation program, there is a definite place for continued A.I.D. investment in this sector.

TABLE C - 1
PERU

ACTUAL WATER SUPPLY
COVERAGE VERSUS 1995 TARGETS

YEAR	TOTAL POP-ULATION	WATER SUPPLY							
		ALL AREAS		URBAN AREAS			RURAL AREAS		
		POP. SERVED	% SERVED	URBAN POP.	TOTAL SERVED	% SERVED	RURAL POP.	TOTAL SERVED	% SERVED
1980	16,815	8,129	48 %	10,205	6,919	68 %	6,610	1,210	18 %
1985	19,698	10,344	53 %	12,546	9,148	73 %	7,152	1,196	17 %
1988	21,256	12,422	58 %	13,890	10,779	78 %	7,366	1,643	22 %
1989	21,823	13,050	60 %	14,376	11,250	78 %	7,447	1,800	24 %
TARGETS FOR 1995	25,123	17,702	70 %	17,393	14,610	84 %	7,730	3,092	40 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure C-1

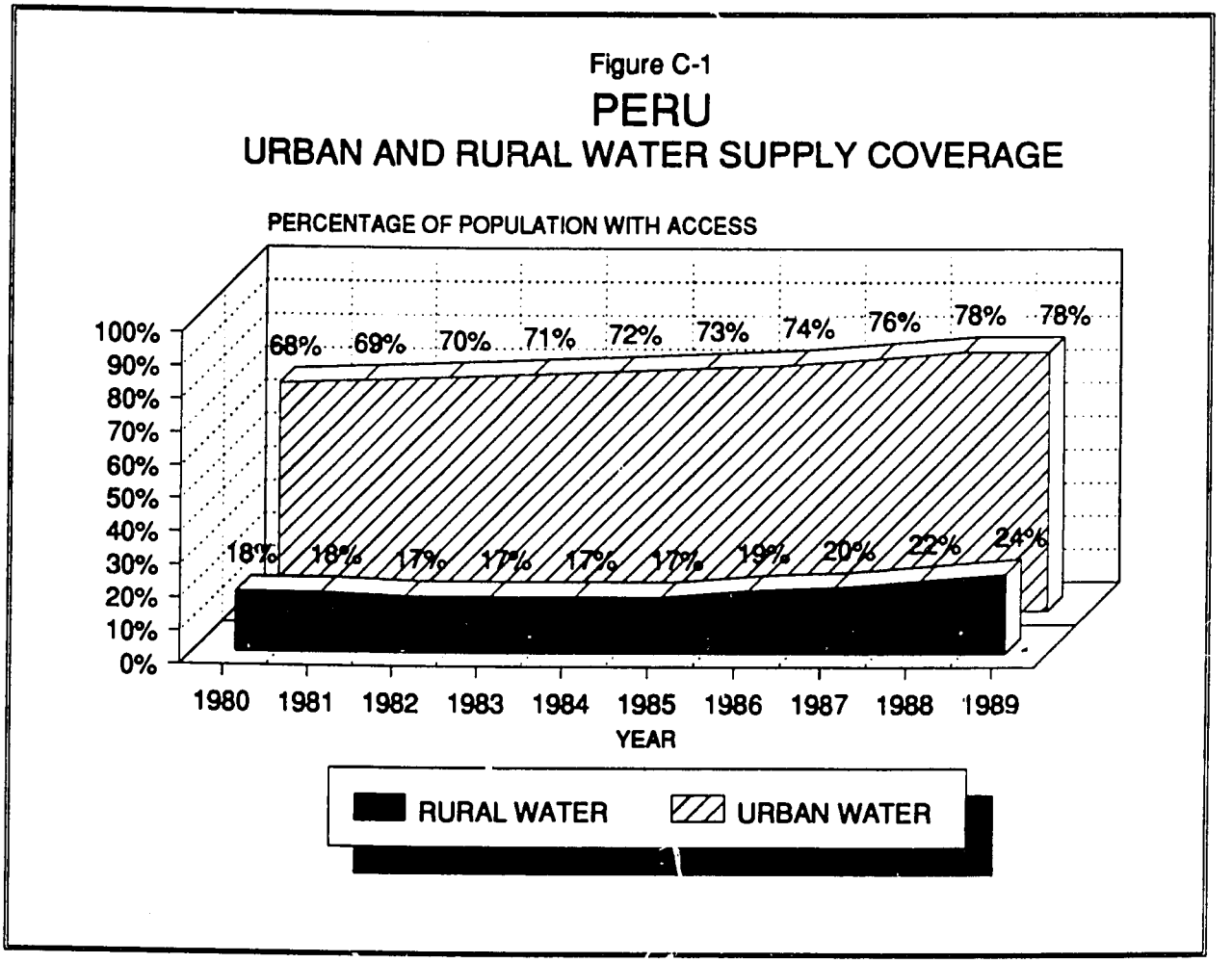


TABLE C - 2
PERU

ACTUAL SANITATION
COVERAGE VERSUS 1995 TARGETS

		SANITATION							
	TOTAL	ALL AREAS		URBAN AREAS			RURAL AREAS		
YEAR	POP-ULATION	POP. SERVED	% SERVED	URBAN POP.	TOTAL SERVED	% SERVED	RURAL POP.	TOTAL SERVED	% SERVED
1980	16,815	5,868	35 %	10,205	5,844	57 %	6,610	24	0 %
1985	19,698	9,299	47 %	12,546	8,408	67 %	7,152	891	12 %
1988	21,256	9,663	45 %	13,890	8,440	61 %	7,366	1,223	17 %
1989	21,823	9,800	45 %	14,376	8,450	59 %	7,447	1,350	18 %
1995 TARGET	25,123	14,784	59 %	17,393	12,001	69 %	7,730	2,783	36 %

POPULATION FIGURES ARE ROUNDED TO NEAREST THOUSAND

Figure C-2

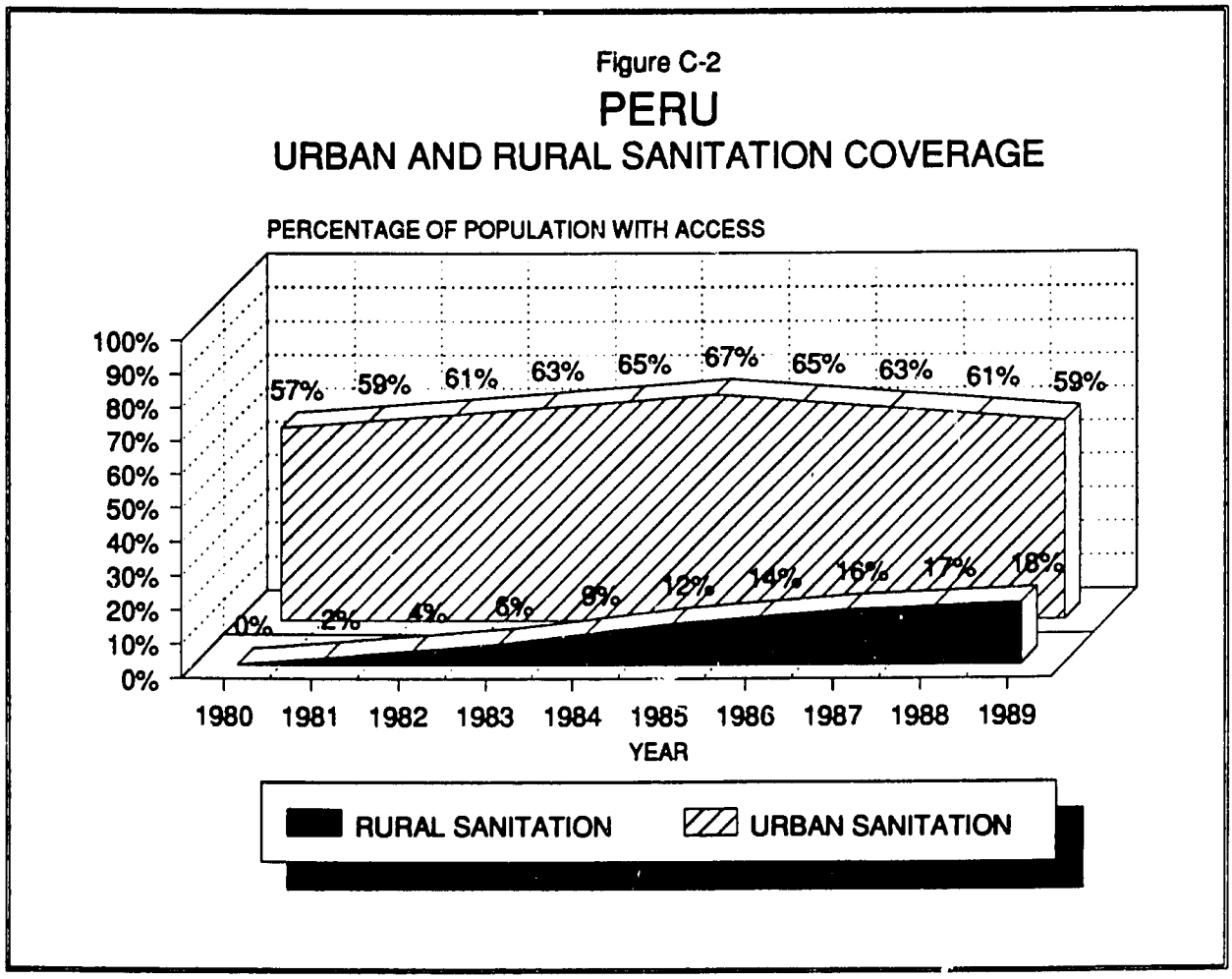


Figure C-3

PERU

1989 COV. & 1995 TARGETS (# OF PEOPLE)

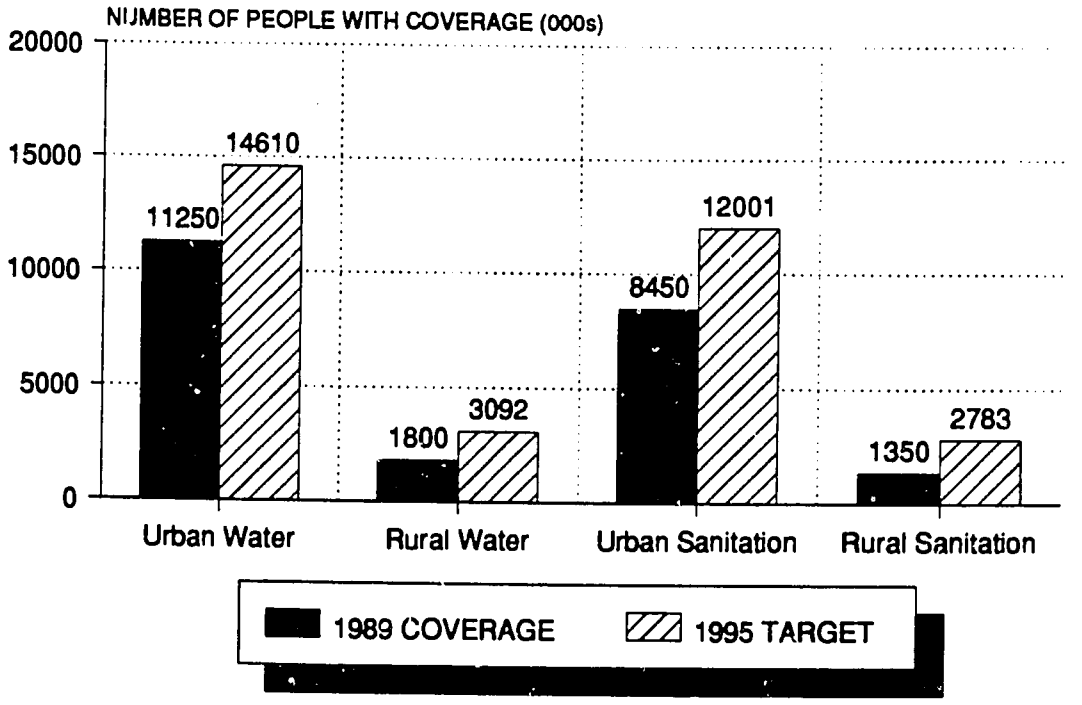


Figure C-4

PERU

1989 COVERAGE & 1995 TARGETS (% OF POP.)

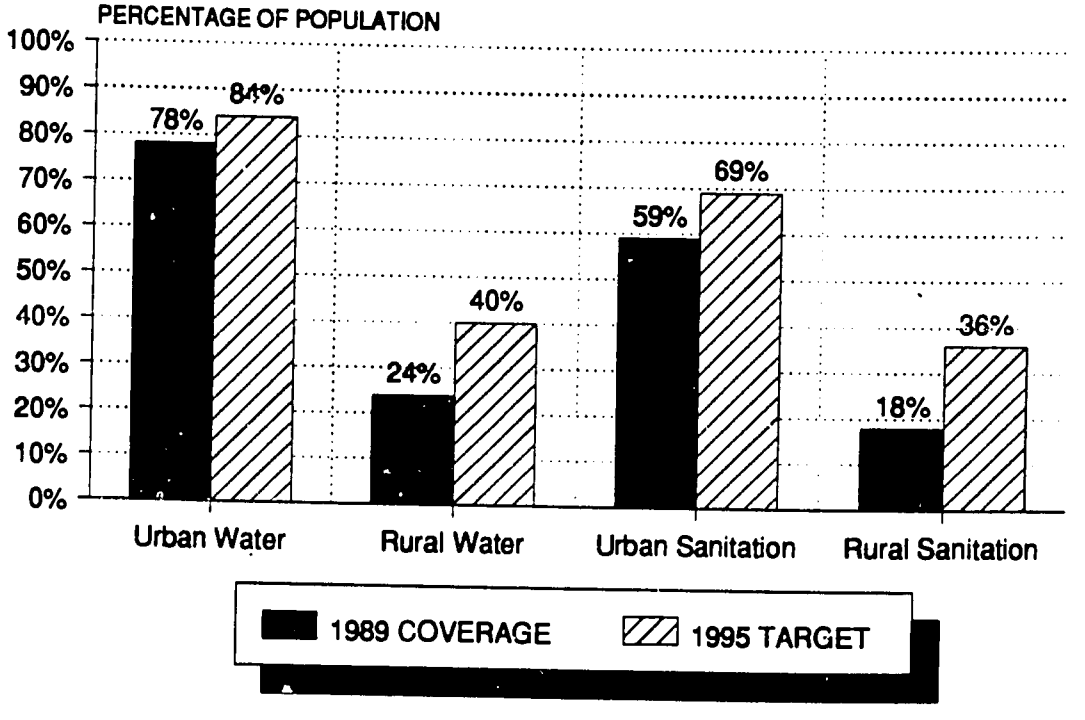


TABLE C - 3
PERU

INVESTMENT NEEDED TO MEET
THE 1995 TARGETS

	WATER SUPPLY COVERAGE (PERSONS - 000s)			SANITATION COVERAGE (PERSONS - 000s)		
	TOTAL	URBAN	RURAL	TOTAL	URBAN	RURAL
TARGET FOR 1995	17,702	14,610	3,092	14,784	12,001	2,783
COVERAGE IN 1989	13,050	11,250	1,800	9,800	8,450	1,350
REQUIRED INCREASE	4,652	3,360	1,292	4,984	3,551	1,433
UNIT COST PER CAPITA ($)	N/A	$72	$32	N/A	$74	$35
ESTIMATED TOTAL COST TO MEET 1995 TARGET ($000s)	$283,297	$241,953	$41,344	$312,971	$262,811	$50,160
COMMITTED FUNDS * ($000s)	$2,831	$2,712	$119	$2,919	$2,788	$131
PROJECTED FUNDING SHORTFALL ($000s)	$280,466	$239,241	$41,225	$310,052	$260,023	$50,029

TOTAL FUNDING SHORTFALL: $590,518

* ONLY THOSE FIRMLY COMMITTED INVESTMENTS WHICH INCREASE COVERAGE

Figure C-5