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Dinking water supply and
sanitation services on the
threshold of the XXI century

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Santiago, Chile, December 2004

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Abstract

The objective of this paper is to analyse the status of drinking water supply and sanitation services in the countries of Latin America and the Caribbean at the beginning of the twenty-first century. For this purpose, and for methodological reasons, the study is divided into two parts. The first section consists of an analysis of access to services and their quality. The coverage levels achieved in the region may be considered reasonable, with the possible exception of wastewater treatment, but there are still serious deficiencies in access to services, which disproportionately affect low-income groups and rural areas. The insufficient coverage and poor quality of the services not only have negative impacts on the health of the population but also affect the environment, the economy, foreign trade and the availability of water for various uses. The second section of the study contains an analysis of the reforms carried out in recent years by the countries of the region. Despite the inevitable differences in a region that includes very different countries, the reforms have shown many common features: institutional separation of the functions of sectoral policy-making, economic regulation and systems administration; extension and consolidation of the decentralization process in the provision of services; a general interest in promoting private participation; formulation of new regulatory frameworks; and the requirement, since the crisis of the 1980s, that services should move towards being self-financing, and when that occurs, that subsidy arrangements should be set up for low-income groups. Lastly, some conclusions are drawn.

Introduction

“There is very little that a government can do that will result in greater benefits than providing clean and healthy water to the population. With this action ... the incidence of diseases ... is reduced, bringing down global health costs ... increasing overall productivity and contributing to political stabilization” (Oxman and Oxer, 2000). The governments of Latin American and Caribbean countries have recognized this fact, and have made great efforts to increase the coverage of drinking water supply and sanitation services. At the same time, despite the undeniable and significant progress made, the situation of these services continues to be a cause of serious concern in many countries. These issues may be analysed in relation to five basic parameters:

- **Water extraction.** In the region, drinking water supply accounts for 20% (from 1% in Guyana to 68% in Trinidad and Tobago) of total water extractions (WRI, 2003). As this is a relatively low rate of use (crop irrigation accounts for 70% of all water extractions) and also considering the great abundance of water resources in the region, it is clear that the deficit in coverage of services is, with some isolated exceptions, mainly the result of lack of investment in infrastructure rather than a lack of water availability.
- **Demographic growth and urbanization.** Since the mid-twentieth century, the region has experienced demographic growth at a rate unprecedented in its history: from 167 million inhabitants in 1950 to 519 million in 2000 (United Nations, 2002). According to United Nations projections, the

region's population will reach 723 million inhabitants in 2030. This demographic growth has been accompanied by a significant urban concentration of the population (42% in 1950, 75% in 2000 and a projected 84% for 2030), and some urban areas in the region are already amongst the largest population concentrations in the world.

- **Levels of coverage.** Compared to other regions of the world, the coverage levels achieved in the Latin American and Caribbean countries may generally be considered as reasonable, with the possible exception of wastewater treatment (see Table 1).
- **Coverage deficit.** According to the most recent Evaluation of Drinking Water and Sanitation Services ("*Evaluation 2000*"), carried out under the coordination of the Pan American Health Organization (PAHO), some 77 million persons in the region lack access to drinking water services supply and approximately 103 million to sanitation services (PAHO, 2001a). The majority of those without access to services are poor and live in rural areas. Wastewaters from about 208 million persons are discharged into recipient water bodies without any treatment and cause severe pollution problems.
- **Quality of services.** In general, the quality and reliability of the services are mediocre and the infrastructure is in poor condition.

Table 1
DRINKING WATER SUPPLY AND SANITATION COVERAGE BY REGION, AROUND 2000
(Percentage)

| | Drinking water supply | | | Sanitation | | | Urban wastewater treatment |
|--|-----------------------|-------|-------|------------|-------|-------|----------------------------|
| | Urban | Rural | Total | Urban | Rural | Total | |
| Africa | 85 | 47 | 62 | 84 | 45 | 60 | 0 |
| Latin America and the Caribbean | 93 | 62 | 85 | 87 | 49 | 78 | 14 |
| North America | 100 | 100 | 100 | 100 | 100 | 100 | 90 |
| Asia | 93 | 75 | 81 | 78 | 31 | 48 | 35 |
| Europe | 100 | 87 | 96 | 99 | 74 | 92 | 66 |
| Oceania | 98 | 63 | 88 | 99 | 81 | 93 | a |

Source: WHO/UNICEF (2000).

^a Not available.

These problems, together with the reappearance of cholera in the region at the beginning of the 1990s, have led the governments of Latin American and Caribbean countries to give high priority to the drinking water supply and sanitation sector.¹ As a result, over the past two decades, this sector has been subject to extensive reforms in the majority of the region's countries: "Efforts have been made for more than fifteen years to promote ... the establishment of a new institutional

¹ As a result, it is very common in government work and the public debate, and also in international conferences, that discussions on water issues give almost exclusive emphasis to drinking water supply and sanitation services, thus separating this sectoral concern from the more general need to improve the capacity for managing water as a natural resource (Dourojeanni and Jouravlev, 2002; Jouravlev, 2002). The expansion of coverage of services means that the use of water will increase, a resource for which there is already intense competition in many river basins, especially for irrigated crops. The same will happen with wastewater discharges, which are one of the main sources of water pollution, which has already reached critical proportions, especially in waters downstream of large urban areas. Good water management systems are thus an essential prerequisite for making progress in resolving the problems of drinking water supply and sanitation. This implies, inter alia: (i) modern water legislation, which responds adequately to the nature of the problems facing the use of the resource and that is in harmony with the concepts and practices of society; (ii) a water authority that is independent of sectoral uses, and with powers and resources in accordance with its responsibilities; (iii) an effective conflict resolution system; (iv) a water allocation system that promotes investment in the development and conservation of the resource, and at the same time ensures its efficient and orderly use, avoids monopolies and facilitates its control in the public interest; and (v) a water pollution control system that is capable of mobilizing economic resources to finance the large-scale investments that are needed in wastewater treatment systems (Peña and Solanes, 2002).

arrangement for the provision of public services through networks designed to introduce the market dynamic as an ordering element in the sector, redefining the working areas and practices in both the public and private sectors. This transformation has affected the sectoral agenda in almost all of the countries of Latin America and the Caribbean and has brought a broad process of change in the model of provision of drinking water supply and sanitation services” (Corrales, 2003).

Despite some differences, there are many common trends in the reforms carried out, or underway, in the countries of the region:

- Modification of the institutional structure of the drinking water supply and sanitation sector in many countries, while in others this process is underway. The reforms invariably include institutional separation of the functions of sectoral policy-making, economic regulation and systems administration.
- Modifications to the industrial structure of the sector, with the emphasis on decentralization of services provision, in many cases to the local level.
- In many countries policies have been adopted to ensure non-political management of services by autonomous public agencies or local governments, in accordance with technical and commercial criteria. There is also a general interest in promoting private sector participation.
- A desire to formulate new regulatory frameworks for the sector both to facilitate private participation and to bring about a significant improvement in the efficiency of public provision of services.
- The changes in the institutional and industrial structure of the sector have gone hand in hand with a requirement for services to be self-financing. Interest has also been shown in establishing sophisticated subsidy systems for low-income social groups.

In general terms, it may be said that the reforms relating to modification of the institutional and industrial structure of the sector, the formulation of new legal and regulatory frameworks, the setting up of the designated institutions and, in some cases, the transfer of services to the private sector, have made relatively rapid progress. There are still significant lags, however, in reforms associated with tariff readjustments to levels that guarantee the self-financing of services, the creation of effective subsidy systems, implementation of the regulatory frameworks and modification of the behaviour of public service providers. As a result of these gaps, and also the macroeconomic instability and structural deficit of public finances, the reforms have not achieved the expected degree of success. “Despite the efforts made, the region still shows a high level of exclusion from services, and even more worrying is the fact that the rate of overcoming coverage problems has diminished while the numbers of the socially excluded have been growing in many countries” (Corrales, 2003).

I. Current situation of drinking water and sanitation services

A. Drinking water supply and sanitation services

1. Evolution of service coverage

Since the approval of the Charter of Punta del Este in 1961,² the governments of Latin American and Caribbean countries have made significant efforts to extend the coverage of their drinking water supply and sanitation services. Table 2 shows the continuous growth of the population served and the increase in the percentage with access to services in the countries of the region. An analysis of this information leads to the following general conclusions:

- The most significant progress in the expansion of drinking water supply and sanitation services was made in the 1980s, which were also the “*International Drinking Water Supply and Sanitation Decade*” (1981-1990), as proclaimed by the General Assembly of the United Nations in November 1980.

² In accordance with the provisions of the Charter of Punta del Este, which was signed in the context of the Inter-American Economic and Social Council of the Organization of American States (OAS), in 1961 the governments of the region took on the commitment of achieving a substantial improvement in the expansion of drinking water supply and sanitation services. The specific commitment was to provide adequate drinking water supply and sewerage to not less than 70 percent of the urban and 50 percent of the rural population by the end of the decade (PAHO, 2002).

- There was also a very significant increase in the number of persons with access to drinking water supply services during the 1960s and 1970s.
- In the 1980s and 1990s there was a significant rise in the number of persons connected to sewerage systems.
- In the 1990s, there was a substantial increase in the number of persons served by *in situ* sanitation systems, such as latrines and septic tanks.

Table 2

LATIN AMERICA AND THE CARIBBEAN: COVERAGE OF DRINKING WATER SUPPLY AND SANITATION SERVICES, 1960-2000

| Year | Drinking water supply (household connections and easy access) | | Sewerage | | Latrines and septic tanks | |
|------|---|-----|------------------------------|-----|------------------------------|-----|
| | (millions of inhabitants) | (%) | (millions of inhabitants) | (%) | (millions of inhabitants) | (%) |
| 1960 | 69 | 33 | 29 | 14 | a | A |
| 1971 | 152 | 53 | 59 | 21 | a | A |
| 1980 | 236 | 70 | 95 | 28 | 105 | 31 |
| 1990 | 341 | 80 | 168 | 39 | 116 | 27 |
| 2000 | 420 | 85 | 241 | 49 | 152 | 31 |

Source: PAHO (2001a).

^a Not available.

2. Current level of service coverage

2.1 Drinking water supply

According to the estimates of the PAHO, approximately 85% of the region's population has access to drinking water supply services, either through household connections or through easy access to a public source (PAHO, 2001a). Some countries have coverage levels higher than 95% (Bahamas, Barbados, Costa Rica, Puerto Rico, Saint Kitts and Nevis, Santa Lucia and Uruguay), while levels of less than 70% are recorded in El Salvador, Haiti, Nicaragua and Paraguay (see Table 3).

The current levels of coverage mean that almost 77 million people (15%) do not have access to drinking water supply services, of which 26 million (7%) are in urban areas and 51 million (39%) in rural areas (PAHO, 2001a). Moreover, almost 54 million persons (11%) are supplied by systems defined as "easy access" which are in most cases a significant health risk.

The part of the population which does not have access to drinking water supply services is obliged to adopt alternative solutions (such as public sources, individual wells, illegal connections to the drinking water network, rainwater collection or taking water from rivers, lakes, water springs and other bodies of water without prior treatment). Many of these options offer no guarantee of the quality of water obtained, as increasing levels of water pollution are affecting many bodies of water in the countries of the region.

2.2 Sanitation

With regard to sanitation services, only 49% of the regional population is connected to conventional sewerage systems, and the another 31% use "*in situ*" sanitation systems (PAHO, 2001a). The levels of coverage for sewerage are considerably less than for those for drinking water supply through household connections. Only in Chile, Colombia, Guatemala and Mexico, does the urban population connected to sewerage systems exceed 70%, while in Paraguay, Suriname and

Table 3
LATIN AMERICA AND THE CARIBBEAN: ACCESS TO DRINKING WATER SERVICES, AROUND 2000
 (Percentage)

| | Total population | Urban population | | | Rural population |
|-----------------------------------|------------------|----------------------|-------------|-----------|------------------|
| | | Household connection | Easy access | Total | |
| Caribbean | | | | | |
| - Bahamas | 96 | 69 | 30 | 98 | 86 |
| - Barbados | 100 | 100 | 0 | 100 | a |
| - Cuba | 93 | 84 | 15 | 98 | 76 |
| - Dominica | 93 | 98 | 2 | 100 | 90 |
| - Grenada | 93 | 93 | 4 | 97 | 93 |
| - Haiti | 46 | 15 | 34 | 49 | 45 |
| - Jamaica | 81 | 59 | 39 | 98 | 59 |
| - Puerto Rico | 100 | 100 | 0 | 100 | 100 |
| - Dominican Republic | 88 | 62 | 35 | 96 | 73 |
| - Saint Kitts and Nevis | 99 | 72 | 27 | 99 | a |
| - St. Vincent and the Grenadines | 93 | 73 | 20 | 93 | 93 |
| - Saint Lucia | 98 | 75 | 23 | 98 | a |
| - Trinidad and Tobago | 86 | 66 | 20 | 86 | a |
| <i>Sub-total</i> | <i>81</i> | <i>71</i> | <i>21</i> | <i>92</i> | <i>61</i> |
| Central America and Mexico | | | | | |
| - Belize | 91 | 100 | 0 | 100 | 82 |
| - Costa Rica | 95 | 99 | 0 | 100 | 92 |
| - El Salvador | 59 | 86 | 6 | 92 | 25 |
| - Guatemala | 80 | 87 | 11 | 99 | 70 |
| - Honduras | 81 | 89 | 5 | 94 | 70 |
| - Mexico | 87 | 93 | 1 | 94 | 65 |
| - Nicaragua | 67 | 88 | 7 | 95 | 34 |
| - Panama | 87 | 87 | 1 | 88 | 86 |
| <i>Sub-total</i> | <i>84</i> | <i>92</i> | <i>2</i> | <i>95</i> | <i>63</i> |
| South America | | | | | |
| - Argentina | 79 | 72 | 13 | 85 | 30 |
| - Bolivia | 73 | 87 | 6 | 93 | 44 |
| - Brazil | 89 | 91 | 5 | 96 | 65 |
| - Chile | 94 | 95 | 4 | 99 | 66 |
| - Colombia | 91 | 89 | 9 | 98 | 73 |
| - Ecuador | 70 | 77 | 5 | 81 | 51 |
| - Guyana | 93 | 92 | 7 | 98 | 91 |
| - Paraguay | 44 | 69 | 1 | 70 | 13 |
| - Peru | 75 | 76 | 11 | 87 | 51 |
| - Suriname | 86 | 91 | 8 | 98 | 58 |
| - Uruguay | 98 | 94 | 5 | 98 | 93 |
| - Venezuela | 83 | 84 | 1 | 85 | 70 |
| <i>Sub-total</i> | <i>85</i> | <i>86</i> | <i>6</i> | <i>93</i> | <i>60</i> |
| Total | 85 | 87 | 6 | 93 | 61 |

Source: PAHO (2001a).

^a Not available.

various Caribbean islands, the coverage is less than 20% (see Table 4). In rural areas, in most of the countries (with the exception of Colombia, Ecuador, Guatemala, Jamaica, Mexico, Peru and Venezuela), sewerage is virtually unknown.

These levels of coverage mean that about 103 million persons (21%) do not have access to wastewater and excreta disposal services, including 37 million (10%) in urban areas and 66 million (50%) in rural areas (PAHO, 2001a). This is even more serious in view of the mass use of “*in situ*” systems, which may be considered appropriate in rural areas, where 41% of the population depend on them, but are not technologically appropriate in urban areas, where 27% of the population use them. In some cities they cause problems of ground water pollution (for example, in Buenos Aires, Argentina).³

2.3 Low-income groups

The majority of persons without access to drinking water supply and sanitation services belong to low-income groups. Many of them are concentrated in peri-urban areas, mainly in the poverty belts that exist on the periphery of many of the cities in the region. It has proved very difficult to provide these marginal areas with services of acceptable quality. The main problems encountered in efforts to expand services to marginal populations have been due, on the one hand, to the high poverty levels and the low level of payment capacity and culture, and on the other hand, to high construction and operation costs. These populations have very often experienced explosive growth and have developed in a disorganized manner, settling in areas far from existing networks and with more difficult topographical conditions.

This situation has meant that low-income groups, in many cases, must purchase water from private vendors at prices that far exceed (up to 100 times in some cases; Bosch and others, 1999) those of official companies. Those companies—owing in part to insufficient income—cannot extend their services to the areas where poor people live. Many of the options (such as water trucks) which the poor are obliged to use have a very high cost, and they end up spending a higher proportion of their income on water than persons in a better economic situation. They also incur a high health risk, as there is no guarantee of the quality of the water provided.

2.4 Rural areas

In the countries of the region, the levels of coverage of drinking water supply and sanitation services are significantly higher in urban areas than in rural areas. Moreover, the technical solutions which are used in rural areas (such as wells, septic tanks and latrines) frequently do not ensure a level of service quality or functionality that is comparable with those available in cities (mainly household connections).

3. Quality of services

In many countries of the region, drinking water supply services are intermittent, even in extensive areas of the main cities. It is estimated that over 219 million persons, constituting 60% of the population served through household drinking water supply connections, are served by systems that operate on an intermittent basis (PAHO, 2001a). In some countries, over 95% of the supply systems have problems of intermittency (PAHO, 2001b).

Owing to inadequate maintenance and poor commercial management, there are high levels of water losses in the drinking water supply systems of almost all the countries in the region, which endanger the integrity of the distribution networks, the quality of the drinking water and the

³ In the last three decades, over 500 wells providing drinking water to the population in the Federal Capital and the urban area of Buenos Aires had to be taken out of service because of quality problems caused by irrational use of the aquifer (high nitrate content, salinisation and industrial pollution) (Calcagno, Gaviño and Mendiburo, 2000).

Table 4
LATIN AMERICA AND THE CARIBBEAN: ACCESS TO SANITATION SERVICES, AROUND 2000
(Percentage)

| | Total population | Urban population | | | Rural population |
|-----------------------------------|------------------|----------------------|----------------|-----------|------------------|
| | | Household connection | <i>In situ</i> | Total | |
| Caribbean | | | | | |
| - Bahamas | 100 | 16 | 84 | 100 | 100 |
| - Barbados | 99 | 2 | 97 | 99 | a |
| - Cuba | 94 | 48 | 49 | 97 | 84 |
| - Dominica | 78 | 28 | 58 | 86 | 75 |
| - Grenada | 97 | 18 | 78 | 96 | 97 |
| - Haiti | 26 | 0 | 46 | 46 | 16 |
| - Jamaica | 90 | 30 | 60 | 90 | 91 |
| - Puerto Rico | 100 | 60 | 40 | 100 | 100 |
| - Dominican Republic | 90 | 31 | 64 | 96 | 79 |
| - Saint Kitts and Nevis | 96 | 0 | 96 | 96 | a |
| - St. Vincent and the Grenadines | 96 | 3 | 93 | 96 | 96 |
| - Saint Lucia | 89 | 7 | 83 | 89 | a |
| - Trinidad and Tobago | 100 | 19 | 80 | 100 | a |
| <i>Sub-total</i> | 79 | 37 | 54 | 91 | 56 |
| Central America and Mexico | | | | | |
| - Belize | 48 | 39 | 32 | 71 | 25 |
| - Costa Rica | 94 | 47 | 41 | 89 | 97 |
| - El Salvador | 68 | 64 | 22 | 86 | 50 |
| - Guatemala | 79 | 93 | 2 | 95 | 71 |
| - Honduras | 70 | 55 | 39 | 94 | 50 |
| - Mexico | 72 | 75 | 12 | 87 | 32 |
| - Nicaragua | 76 | 32 | 61 | 93 | 56 |
| - Panama | 93 | 64 | 35 | 99 | 87 |
| <i>Sub-total</i> | 74 | 72 | 15 | 88 | 46 |
| South America | | | | | |
| - Argentina | 84 | 55 | 34 | 89 | 48 |
| - Bolivia | 63 | 45 | 37 | 82 | 35 |
| - Brazil | 85 | 59 | 35 | 94 | 53 |
| - Chile | 93 | 90 | 4 | 93 | 94 |
| - Colombia | 83 | 79 | 18 | 97 | 51 |
| - Ecuador | 58 | 61 | 9 | 70 | 37 |
| - Guyana | 85 | 33 | 64 | 97 | 81 |
| - Paraguay | 67 | 13 | 72 | 85 | 47 |
| - Peru | 74 | 67 | 23 | 90 | 40 |
| - Suriname | 86 | 0 | 99 | 99 | 56 |
| - Uruguay | 94 | 51 | 45 | 95 | 85 |
| - Venezuela | 69 | 62 | 9 | 71 | 48 |
| <i>Sub-total</i> | 81 | 62 | 28 | 90 | 50 |
| Total | 79 | 63 | 27 | 90 | 50 |

Source: PAHO (2001a).

^a Not available.

financial sustainability of the sector. In the large cities in the region, the amount of the initial delivery of water to the distribution network that is not accounted for as billed to users is estimated at 42%, or even higher (for example, between 40% and 75% in Venezuela) (WHO/UNICEF, 2000; González, 2000). In many cases, the high levels of unaccounted for water are the result of poor commercial management, and are not exclusively due to the high percentage of losses caused by physical leaks in distribution systems.

The proportion of the population covered by adequate systems of monitoring and control of drinking water quality is very low in urban areas and insignificant in rural areas: only 24% of the urban population in the region is covered by effective systems for monitoring drinking water quality (PAHO, 2001b). It is estimated that 94% of drinking water in the large cities of the region is effectively disinfected, but almost 18% of the samples violate national standards for microbiological, chemical, physical and organoleptic properties (WHO/UNICEF, 2000). As a result of the cholera epidemic in 1991 (see Box 1),⁴ the monitoring of drinking water quality and its disinfection has increased in most countries, and efforts are being made to achieve 100% disinfection in the region (PAHO, 2001a).

4. The Millennium Development Goals

At the Millennium Summit of the United Nations (September 2000), it was agreed to halve by 2015 the proportion of people without access to safe drinking water. At the World Summit on Sustainable Development (26 August to 4 September 2002) this commitment was reaffirmed, and an additional goal was added to the latter: to halve, by the same year, the proportion of people without access to basic sanitation.

According to the preliminary estimates of the Inter-American Development Bank (IADB) (2003), in order to comply with the goal of halving the proportion of people without drinking water supply services, access would have to be provided to over 121 million persons. This would require investments for a total of 16.5 billion dollars, or 1.1 billion per year between 2000 and 2015.⁵ Of this amount, 93% is investments in the urban sector and 7% in the rural sector.

As for sanitation services, access would need to be provided for almost 140 million persons in order to achieve the Millennium Goals (IADB, 2003). This would require a total investment of 22.0 billion dollars between 2000 and 2015, or 1.5 billion per year. Of this investment, 95% would be destined to providing improved sanitation services to the urban population and the remaining 5% to the rural population.

A comparison of these estimates with the investments made by the countries of the region in the 1990s (see Table 5) suggests that achieving the Millennium Development Goals should not be an insuperable challenge for the region. There are, however, significant disparities between countries within the region.

In terms of investment needs as a percentage of the gross domestic product (GDP), the countries which will have to make the greatest efforts to achieve the Millennium Development Goals are Nicaragua, Haiti, Paraguay, Honduras, Santa Lucia, Bolivia, Guatemala, Guyana, Ecuador, the Dominican Republic, El Salvador and Colombia. It seems that some of them will not

⁴ The onset and spread of the cholera epidemic of 1991 are closely related to the deterioration in drinking water supply, sanitation and health services brought by the economic crisis of the 1980s (Brandling-Bennett, Libel and Miglónico, 1994). The epidemic caused serious losses in tourism, agriculture, fishing and the external trade of countries in the region (see page 23).

⁵ It should be noted that these estimates refer only to net investment, that is, they refer only to the construction of new systems and expansion of existing ones in order to expand coverage to the levels set out in the Millennium Development Goals. Consequently, the investments needed to comply with the specified targets are underestimated, as they ignore the investments needed to repair, rehabilitate and maintain in good condition the existing infrastructure, so that those persons who currently have access to services do not lose them or experience a serious deterioration in their quality.

be able to achieve the goals, even if conditions became more favourable. An additional difficulty is the fact that a large proportion of the investment needs are required to expand coverage of the services to the poorest segments of the population. This means that many of the new investments would have to be financed by low-income groups, or, if that is not possible, by governments, which gives an idea of the level of subsidies required.

Box 1**THE CHOLERA EPIDEMIC OF 1991**

Cholera is a diarrhoeic illness caused by a toxigenic bacterium of the *Vibrio cholerae* species. In its fullest form, it appears as profuse and acute diarrhoea which causes dehydration, shock and even death. The Americas were afflicted by cholera for a large part of the nineteenth century. With the construction of drinking water supply and sanitation systems in large cities, however, cholera disappeared from the continent at the end of the nineteenth century and the hemisphere was free from cholera epidemics for the first 90 years of the twentieth century.

In Peru in January 1991, *Vibrio cholerae* set off one of the greatest epidemics ever recorded, with a total of almost 323,000 cases and 2,900 deaths by the end of the year. All departments were affected and it is estimated that at least 1.5% of the Peruvian population was infected. Subsequently, various other countries (Bolivia, Brazil, Canada, Chile, Colombia, Ecuador, El Salvador, French Guyana, Guatemala, Honduras, Mexico, Nicaragua, Panama, the United States and Venezuela) were affected, with a total of 391,000 cases (70% of cases worldwide) and 4,000 dead at the end of the year.

Cholera is almost always introduced in new areas by infected travellers. It is rare that the infection appears because of commercial food products or coastal or river waters, although local food and waters may be infected in that way. In infected areas, the disease is transmitted between people through contaminated water and foods. Direct infection from person to person is probably very rare, although this may occur in close contacts within the home.

According to research carried out in urban areas of the Peruvian coast, the following are risk factors for contracting the disease: drinking unboiled water from municipal systems and surface wells; consuming foodstuffs and drinks purchased from itinerant vendors, especially drinks with ice; eating foodstuffs that have been more than three hours at room temperature without reheating them; and drinking water from a recipient in which other persons have placed their hands. In Ecuador it was also shown that the disease is linked to the consumption of raw fish or shellfish, as well as drinks purchased from itinerant vendors. In Chile, the disease appeared to be associated to the consumption of raw salads and vegetables grown in irrigated fields outside Santiago. At that time, the irrigation water was highly contaminated by wastewaters produced in Santiago and discharged into the surrounding rivers.

The studies carried out in Peru showed that many municipal drinking water supply systems had high indices of coliform faecal bacteria, owing to pollution and insufficient chlorination of the water. *Vibrio cholerae* was detected in at least three drinking water supply systems, and in river and coastal waters at various places in Peru. Epidemic strains of *Vibrio cholerae* were also found in rivers in Chile, Mexico, Guatemala and El Salvador.

Some countries were at first reluctant to report the cases detected, for fear of adverse effects on tourism and exports (see page 23). Indeed, despite the fact that tourists usually run a low risk of contracting cholera and the disease is rarely transmitted through foods exported commercially, the loss of income from tourism and the restrictions imposed on food products resulted in substantial economic losses for the infected countries. At the onset of the epidemic, there were some instances of unjustified rejection of imports from the infected countries, but they subsequently diminished. At the very least, commercial firms had to invest large sums to be sure that their exports were free from *Vibrio cholerae*.

Cholera can only be eliminated from the region by means of substantial investments to improve drinking water supply, sanitation and health services, and by extending them to the large proportion of the population that still has no access to them.

Source: Brandling-Bennett, Libel and Migliónico (1994).

Table 5

**LATIN AMERICA AND THE CARIBBEAN: INVESTMENT NEEDS TO ACHIEVE
THE MILLENNIUM DEVELOPMENT GOALS**
(Billions of dollars per year)

| | Drinking water supply | | Sanitation | |
|---|-----------------------|------------------|------------------|------------------|
| | Urban population | Rural population | Urban population | Rural population |
| Investments made (1990-2000) | 1,9 | 0,5 | 1,4 | 0,1 |
| Investments needed to achieve the Millennium Development Goals (2000-2015) | 1,0 | 0,1 | 1,4 | 0,1 |

Source: IADB (2003).

B. Wastewater treatment

There is very little information available on wastewater treatment systems in the countries of the region. In 1962, it was estimated that in the countries most advanced in this area, only 10% of sewerage systems had wastewater treatment facilities (PAHO, 1990). Since then, except for a few isolated cases, including the water decontamination plan of Chile, which is notable for its scale and progress (see page 21), the situation has in general not changed significantly in regional terms. This is mainly due to the high costs of wastewater treatment facilities and the chronic lack of financing in the sector. Other countries which have made progress in expanding their wastewater treatment systems include Argentina, Brazil, Colombia, Mexico and Venezuela.

It is estimated that at present only 13.7% of wastewaters from the 241 million inhabitants whose homes are connected to sewerage networks, receive some degree of treatment (see Table 6). Assuming that each urban inhabitant with a household connection for drinking water and sewerage generates on average 200 litres of wastewater per day, 229.6 million persons would produce about 530 cubic metres per second, of which only 70 would receive some degree of treatment.⁶ The urban inhabitants who have household connections for drinking water but not for sewerage (87.0 million), at a rate of 50 litres of wastewaters per person per day, would produce another 40 cubic metres per second of wastewaters. These estimates suggest that the urban areas of countries in the region generate approximately 510 cubic metres per second of wastewaters which are discharged into the environment without prior treatment. The situation becomes even more worrying in view of the fact that a large number of treatment plants have been abandoned or function precariously (PAHO, 2001a). As a result of this, many bodies of water close to urban areas are little more than open sewers and watercourses crossing large cities are frequently anaerobic owing to the heavy load of sewage. If it were possible to offer universal access to drinking water supply and sewerage services to the urban population (for example, by 2010 or 2015), the current levels of discharge of wastewaters would be doubled —both because of the increase in coverage and the increase in the urban population.

C. Socio-economic impacts of the shortfall in coverage

In all of the countries of the region, drinking water supply and sanitation services are consumed almost exclusively by household users and by commerce. All irrigation agriculture, all of mining and a high proportion of industries, with the exception of the smallest ones located in urban centres, usually have their own water supplies (that is, they extract it from natural sources); even in

⁶ The estimates are based on PAHO (1990). These figures should be considered only as indicators of the order of magnitude of the demand for wastewater treatment.

areas covered by drinking water supply systems, many industries have abandoned the public service because:⁷

- They have access to alternative sources of water of acceptable quality (direct extraction of water from rivers, lakes and other surface sources or of groundwater), which in many cases are available free of charge or at a nominal cost and with little regulation.
- In many cases, industrial users required large volumes of water, but of a lower quality than water treated for human consumption.
- The quality of the service provided by many public drinking water supply systems in the region is poor, especially with regard to supply continuity and water quality.
- Many countries have a policy of subsidizing the consumption of low-income groups, or of all residential clients, by means of higher tariffs for industrial and commercial users (see page 51).

Table 6
LATIN AMERICA AND THE CARIBBEAN: SEWERAGE EFFLUENTS WITH SOME DEGREE OF TREATMENT, AROUND 2000
(Percentage)

| Less than 10% | From 10% to 20% | From 20% to 50% | More than 50% |
|----------------------------|-----------------|------------------------|---------------------------|
| Costa Rica (4) | Argentina (10) | Bolivia (30) | Antigua and Barbuda (100) |
| Dominica (0) | Brazil (10) | Guyana (50) | Bahamas (80) |
| Ecuador (5) | Chile (17) | Nicaragua (34) | Barbados (100) |
| El Salvador (2) | Colombia (11) | Dominican Republic(49) | Belize (57) |
| Grenada (0) | Cuba (19) | Santa Lucia (46) | Montserrat (100) |
| Guatemala (1) | Mexico (15) | | Puerto Rico (100) |
| Haiti (0) | Panama (18) | | Trinidad and Tobago (65) |
| Honduras (3) | Peru (14) | | Uruguay (77) |
| British Virgin Islands (0) | Venezuela (10) | | |
| Paraguay (8) | | | |
| Suriname (1) | | | |

Source: PAHO (2001a).

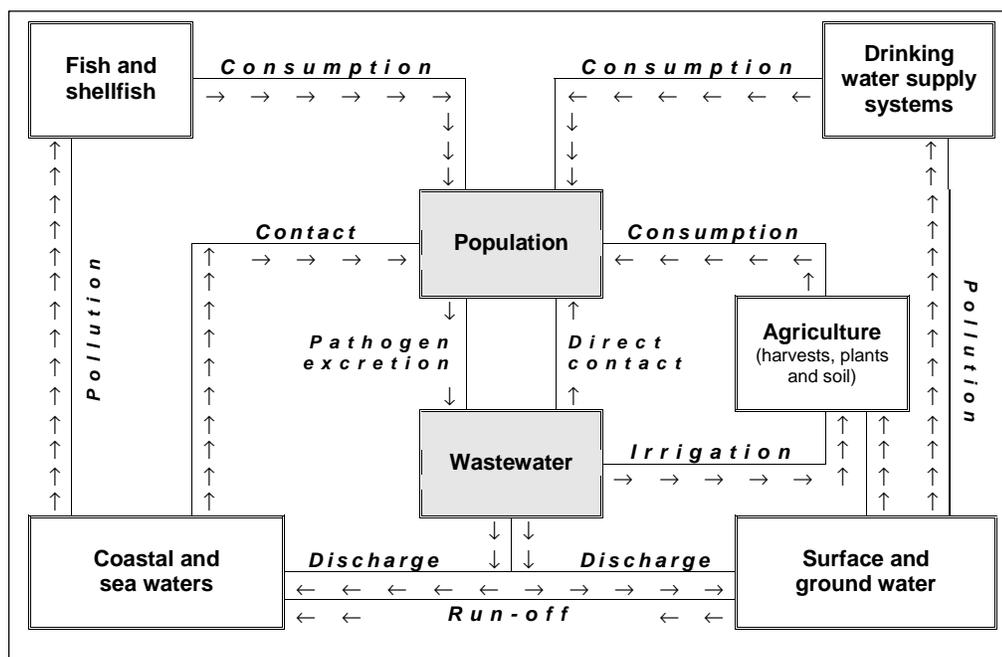
As drinking water supply and sanitation services are consumed almost exclusively by household users, the most important effect of the coverage shortfall is on public health. It has long been recognized that proper access to efficient and safe drinking water supply and sanitation services considerably reduces morbidity and mortality caused by water-transmitted diseases (see Figure 1).

According to Lvovsky (2001), about 5.5% of the loss of disability-adjusted life years (DALY) in Latin America and the Caribbean is due to deficiencies in drinking water supply and sanitation services, compared to 1.0% in the industrialized countries and 7.0% in the developing countries. In the countries of the region, these deficiencies are the most significant risk factor of all those relating to the environment (air pollution, vector-borne diseases and agricultural and industrial pollution).⁸

⁷ For example, in Colombia, in the case of drinking water supply and sanitation services, "self-provision" is significantly higher than in other public utility services. Nationwide, there are more than 65,000 industrial users in other public utility services, whereas in drinking water supply and sanitation there are less than 25,000 (Colombia/CONPES, 2003).

⁸ In Chile, the total health expenditure related to wastewater pollution in the Metropolitan Region is estimated at between US\$ 41 million and US\$ 53 million per year (Aguas Andinas, 2003).

Figure 1
MAIN FORMS OF HUMAN EXPOSURE TO POLLUTION CAUSED BY WASTEWATER DISCHARGES



Source: adapted from Bosch and others (2000).

Hutton and Haller (2004) estimated the costs and benefits of expanding the coverage of drinking water supply and sanitation services (see Table 7). According to their analysis, the benefits of an expansion of coverage in the countries of the region vary between US\$ 2.2 and 69.2 billion per year, depending on the scale of investment and the technological solutions adopted, with an estimated profitability of from 5 to 20 dollars for each dollar invested. These potential benefits represent the opportunity cost of not improving access to drinking water supply and sanitation services.

Table 7
LATIN AMERICA AND THE CARIBBEAN: COSTS AND BENEFITS OF EXPANDING COVERAGE OF DRINKING WATER AND SANITATION SERVICES BY 2015

(Billions of dollars per year)

| Type of intervention | Benefits | Costs |
|---|----------|-------|
| Halve the proportion of people without access to drinking water supply | 2.2 | 0.2 |
| Halve the proportion of people without access to drinking water supply and sanitation | 9.6 | 0.8 |
| Universal access to improved drinking water supply and sanitation | 22.5 | 1.6 |
| Universal access to improved drinking water supply and sanitation, plus water disinfection at the household level | 38.1 | 1.9 |
| Universal access to drinking water supply with a household connection and sewerage with a household connection | 69.2 | 14.1 |

Source: Hutton and Haller (2004).

The deficit in coverage of services has socio-economic impacts not only in terms of health, but also in terms of the availability of water for various uses associated with productive development. Perhaps the most important aspect is that the provision of sanitation services,

especially wastewater collection, treatment and disposal, affects the quality of the water resources available for other water users downstream in the same river basin. Apart from the obvious effects of water pollution (see Box 2), the main problems encountered are the following:

- **Effects on irrigation crops.** The reuse of domestic wastewaters for irrigation is a very common practice on the periphery of cities located in arid and semi-arid zones of the region, where there is intense competition for water between agriculture and urban uses. In many cases, this practice has given good economic results —as the sewage contains nutrients which replace artificial fertilizers— and also does not involve significant risks for human health when appropriate production and treatment techniques are used.⁹ Nevertheless, as adequate hygiene and treatment standards are rarely respected, irrigation with raw wastewaters increases the risk factors for the health of the population, and results in endemic situations of diarrhoea, cholera, parasitism, typhoid fever, salmonellosis and other diseases. According to estimates, there are over 400,000 hectares in the countries of the region (2% of the irrigated surface), mainly in Mexico (350,000 hectares) and Peru (4,300 hectares),¹⁰ which are irrigated directly with wastewaters, in many cases without prior treatment (REPIDISCA, 1995). Yet this situation is only the tip of the iceberg. Many areas are irrigated with river waters which contain far in excess of the maximum permitted level of fecal coliforms recommended for the irrigation of vegetables for consumption in their raw state.¹¹
- **Effects on urban uses.** In the region's densely populated river basins, the wastewater discharge areas of an urban centre are frequently located just a few kilometres upstream of other cities' water intakes, so that there is insufficient time for the action of natural decomposition and dispersion processes. The obvious negative effects are the higher treatment costs for water for human consumption and for other uses sensitive to water quality, or, when such treatment is not carried out, damage to public health and other uses of the resource, or higher costs for supply from more distant sources. There are even cases of population centres which take water from such polluted sources that their inhabitants are at risk even when there is a conventional technology plant, as there is no guarantee that such polluted water can be brought to the appropriate standards (PAHO, 1992).

It is important to note that water pollution does not only affect public health, the environment and local economic activities, but also national competitiveness, mainly owing to the increasingly close relationship between external market access and the environment, and the increase in disputes relating to the use of environmental standards as non-tariff barriers in international trade. Perhaps the most dramatic example of the effects of deficient provision of drinking water supply and sanitation services on competitiveness, and especially on access to external markets (see Box 3), is the cholera epidemic of 1991 (see page 17). It is estimated that in Peru alone, the main country affected, the losses in fish product exports exceeded US\$ 700 million (WHO, 1999).

The need to protect access to external markets was apparently one of the factors which motivated the Government of Chile to initiate an ambitious investment programme for wastewater

⁹ The main instances of reuse of treated residual water are in Peru (the bioecological complex of San Juan de Miraflores; systems at La Molina and Las Pampas de San Bartolo, close to Lima, for aquaculture and crop irrigation), Argentina (Campo Espejo, Palmira, Rivadavia and San Martín, in the Mendoza Province, for crop irrigation for 15,000 hectares; and Comodoro Rivadavia and Puerto Madryn in the Province of Chubut for forest irrigation) and Bolivia (in the area of Cochabamba) (GWP, 2000).

¹⁰ It is estimated that cleaning up of 100% of wastewaters from the Santiago basin in Chile would provide enough clean water for agricultural cultivation of more than 130,000 hectares (Aguas Andinas, 2003).

¹¹ It is estimated that over 4,300 hectares on the Peruvian coast are irrigated with residual waters, 86% of which receive no treatment, and are used to grow vegetables which are consumed raw (Moscoso, 1993). Another 125,000 hectares receive river water with higher than acceptable levels of pollution.

ECONOMIC IMPACTS OF POLLUTION OF THE BOGOTÁ RIVER, COLOMBIA, CAUSED BY UNTREATED WASTEWATER DISCHARGES

- **Impacts on land value:** about US\$ 61 million per year. This is the increased value of the land in connection with reduction of bad smells, improvement in the quality of groundwater and other effects connected with water pollution control. This increased value is for the potential for more extensive and profitable uses of the land.
- **Impacts on agricultural production:** about US\$ 35 million per year. The use of contaminated water from the river and its tributaries for irrigation of pasture, vegetables and other similar crops has significant negative impacts on the quality of the food produced. If water of acceptable quality was available, the irrigation coverage could be extended, and the quality of the agricultural products would be improved in those areas which are currently irrigated with contaminated waters.
- **Impacts on the health of the population directly exposed:** about US\$ 4 million per year. Persons living close to the river and to the lower part of its urban tributaries are exposed to water pollutants through a large variety of mechanisms: (i) consumption of untreated water; (ii) consumption of foods produced with contaminated irrigation water or from livestock farms that use such water; (iii) direct physical contact in recreational, bathing or work activities; and (iv) the wastewaters are an ideal breeding ground for flies and mosquitoes, which, when coming into contact with utensils and foodstuffs of persons who live or work in areas close to the river, contaminate them with pathogenic micro-organisms.
- **Impacts on municipal public services:** about US\$ 9 million per year. Water from the Bogotá river is not fit for human consumption with conventional treatment, or for uses that involve direct contact with persons. Improvement of the river water quality could allow some communities to use the river as a water source for their water supply systems. The benefit would then be equivalent to the reduction of costs for obtaining water for the community supply system, and the reduction in rationing and in river water treatment costs incurred by some communities which have no alternative sources.
- **Impacts on sedimentation of river and lake beds:** approximately US\$ 1 million per year. The discharge of residual waters from the city on the beds of the river Bogotá and of the Muña reservoir generates sedimentation, owing to the processes of sedimentation of the solids present in the waters and the slow processes of biological decomposition that take place. This increases the costs of dredging the river and the reservoir and also impedes the natural drainage of waters to the river, whenever the level of the bed has been raised by this gradual sedimentation, which has also created the need to construct dikes along the length of the river. The drainage difficulties increase the problems of public health of the population close to the river, as well as the costs of using the water.
- **Impacts on fishing:** less than US\$ 1 million per year. One of the biotic components most greatly affected by river pollution is the ichthyofauna. In the past, the course of the river Bogotá and its tributaries were rich in fish. With the increasing pollution, the fish have disappeared from the middle and lower courses of the river, and are now found only in the high and turbulent sectors, which are pollution-free, and in some reservoirs and lagoons.

The total annual value of pollution-related damage to the river Bogotá in the region directly affected can be estimated at close to US\$ 110 million. It has not been possible to estimate, for lack of information or methodological problems, some of the damages caused by pollution, including: (i) health impacts on the population indirectly exposed; (ii) impacts on the operation and maintenance costs of the hydroelectric plants of the river Bogotá chain (higher costs for pumping wastewaters and for corrosion of electromechanical equipment); (iii) impacts on the benthic and avifauna biodiversity; and (iv) impacts on the landscape and odours in the vicinity of the river.

Source: Foster Ingeniería Limitada (2001).

Box 3

IMPACT OF THE CHOLERA EPIDEMIC ON THE FOREIGN TRADE OF PERU

On 4 February 1991 the National Institute of Health (a decentralized entity of the Ministry of Health) isolated *Vibrio cholerae*, confirming the presence of a cholera epidemic along the central and northern coast of Peru. Since then there has been a significant level of fear at the international level, which has resulted in a number of prohibitions on the entry of persons and goods arriving from Peru. Initially, the prohibitions extended to virtually all products of marine and vegetable origin. Some countries even applied them to fish meal and conserves. Quality controls were required (to detect any bacteria present in accepted shipments), and also the fumigation of vessels and aircraft arriving from Peru.

The scale of these prohibitions has caused great alarm in the Peruvian export sector for two main reasons. First, they affect exports of fish products, which constitute 15% of Peruvian exports. Secondly, although vegetable and fruit exports were low in relation to total exports, they constituted a growth activity with good future potential. The loss in fruits was lower as the onset of the epidemic coincided with the end of the export season. The restrictions became more technical in subsequent weeks, which reduced the initial estimate of losses and led to reflection on the need to make technical changes based on the sanitary requirements of the importers.

The epidemic also led to substantial indirect costs in the export sector which included costs due to:

- sales agreements not fulfilled (lost shipments);
- the penalty of lower prices for Peruvian products on the international market;
- higher export costs due to a longer storage period in foreign ports caused by delays in acceptance by the purchasing countries;
- higher export costs because of more exigent quality controls to guarantee the absence of cholera;
- technical studies on cholera prevention and the dissemination efforts of exporters to guarantee safety and improve their image in the international community; and
- the lower level of production caused in sectors economically connected with the exporters, in view of losses incurred for the reasons described above.

In addition to the direct and indirect costs, the cholera epidemic brought about a process of restructuring in view of the more stringent sanitary requirements of the importers, the increase in exporters' costs for hydrobiological products, vegetables and fruit, and also the temporary loss of income owing to lower international prices. Because of the epidemic, the European Economic Community required exporters of fresh and frozen Peruvian products to adapt to the sanitary and quality control standards of the European market.

This process of adaptation required investments in facilities, as well as significant technical and technological changes for the packaging and refrigeration processes, in an adverse situation of reduced demand. Taking into account this situation, it is expected that small-scale exporters will be unable to cover the higher export costs resulting from the epidemic, and this may have initiated a process of modernization in terms of centralization and concentration.

Source: Petrera and Montoya (1993).

treatment. In the words of the former President of Chile during whose mandate the decision was taken: “if we continued irrigating with wastewaters we were going to have serious problems in placing our agribusiness and agricultural products [on external markets]” (Frei, undated). The investment requirements for wastewater treatment were estimated at about US\$ 2 billion (Peña, Luraschi and Valenzuela, 2004). In order to accelerate this process, and to enable fiscal resources to be concentrated on social programmes, the government opted for financing these investments through private participation. All the companies of the sector have already been privatized (beginning with the Valparaíso Sanitary Works Company (ESVAL) in 1998, the Metropolitan Sanitary Works Company (EMOS) in 1999 (now known as Aguas Andinas), and subsequently various other companies, until the process was completed in 2004). As a result of investment in wastewater treatment plants, coverage grew from 8% in 1989 to 71% in 2003, and it is expected to reach 82% in 2005 and exceed 98% in 2010 (Chile/SISS, 2003). In Santiago, Chile, the tariff impact of investments in wastewater treatment plants is estimated as 25% (Gómez-Lobo, 2003).¹²

¹² It is interesting that in Chile, many of the benefits of the water decontamination plan were suggested not only in terms of public health, quality of life and protection of the environment, but also in terms of positive effects on the economy. The investments in wastewater treatment are expected to lead to: clean irrigation water for thousands of hectares of irrigated land; social and economic savings, by improving the health of the population; promotion of the tourist industry, because of clean water bodies; reduced economic impact of the risk of lower exports levels due to a possible campaign or complaints in relation to wastewater irrigation; promotion of the qualities of pollution-free Chilean products in external markets; generating more employment associated with exports and the tourist industry; and ensuring the quality of the water bodies used as sources for drinking water supply (Chile/SISS, 2003).

II. The results of the reforms in the drinking water supply and sanitation sector

At the beginning of the 1980s, as a result of the efforts made in the 1960s and 1970s, most of the countries of the region were well provided with drinking water supply and sanitation services compared to other developing regions (ECLAC, 1990b). Prior to that time, the priority for services provision had been to achieve universal coverage, with little or no attention to economic efficiency and the financial sustainability of the providing entities: “in this century [the twentieth], this objective had a significant impact on the decisions and actions of many of the governments in this sphere, demonstrating social values that recognized the merit of extending coverage and gave priority to access rather than the financial and economic balance of the operating companies” (Corrales, 2000). The State was mainly responsible for the institutions of the sector at that time, both in direct administration of the service providers and in their financing. In many cases the management model was highly centralized.

The serious recession of the 1980s (“the lost decade”) came at a time when the countries of the region had drinking water supply and sanitation services that were highly dependent on contributions from government budgets, both for capital investments and, in many cases, for operational and maintenance costs. The negative macroeconomic environment had a strong negative impact on the allocation of resources for services provision, which was relegated to a secondary level, in view of the magnitude of the crisis and the pressures generated by the need to stabilize the economy (ECLAC, 1994).

When there was a strong economic recession in a country in the region, where typically the bulk of drinking water supply and sanitation services provision was the responsibility of the State, a whole range of economic adjustment instruments were applied (ECLAC, 1994). This was accompanied by a lag in the real value of rates charged for delivering public services. These lags in rates led to a drastic reduction in the operating capacity of the providing entities. As a result, in some cases it was not even possible to finance operating and maintenance costs.

When conditions had been relatively stable, the deficit financial periods of the drinking water supply and sanitation companies had been resolved to some extent by allocating State funds, either in the form of subsidies or as temporary financing to resolve immediate problems (ECLAC, 1994). In periods of growing adjustment needs, however, the governments reacted by limiting and reducing their expenditure as far as possible. This meant that the financial requirements of public companies were no longer met, and for lack of resources, they had to incur debts (thus contributing to the overall problem), postpone or suspend investments and neglect operating and maintenance activities. This, in turn, led to a process of growing unmet demand, a reduction in the quality of services, and an overall deterioration of existing infrastructure.

Meanwhile, salaries declined in the public sector, which to some extent caused an exodus of qualified personnel trained in the exercise of institutional, technical or business functions at the management level (ECLAC, 1994). Accordingly, the quality of human resources in administration of the sector also deteriorated. This loss of human resources and the general deterioration in the administrative context had a long-term effect, as a long period of time was subsequently needed in order to return to certain standards of management efficiency.

This syndrome of decay in the quantity and quality of drinking water supply and sanitation services led to a profound crisis in the sector (ECLAC, 1994). The sector had fallen to such a level of public discredit that in many countries there was a political and social consensus with regard to the need for profound and radical changes. As a result of this consensus, as well as the external influences of international financial agencies, significant reforms have recently taken place in the institutional framework of the drinking water supply and sanitation sector in most of the region's countries.

Despite some differences in the content of the sectoral reforms and in the speed at which they took place, the current trends of public policies in the drinking water supply and sanitation sector in the countries of Latin America and the Caribbean are surprisingly uniform and, at the same time, mainly opposed to those followed in the past. The common trends or elements of the reforms carried out in the region include the following:

- Reform of the institutional structure of the sector, the corner stone being the institutional separation of functions of sectoral policy-making, economic regulation and systems administration.
- Reform of the industrial structure of the sector, where there has been an evident deepening and consolidation of the processes of decentralization in the provision of services.
- The general interest in promoting the participation of the private sector in the provision of services and, when this is not possible, in ensuring the non-politicized administration of services by autonomous public organizations or local governments, following more technical and commercial criteria.
- The formulation of new regulatory frameworks, both as a necessary condition for facilitating the participation of the private sector and as a way of improving the efficiency of the public provision of services.

- These reforms are accompanied by the requirement, born of the crisis of the 1980s, that services should aim to be self-financing and when that is the case, that subsidy systems should be created for low-income groups.

Reforms relating to changes in the institutional and industrial structure of the sector, to the approval of the new legal and regulatory frameworks, to the institutional establishment of the responsible entities and, in some cases (mainly Argentina and Chile), to the participation of the private sector, have generally made more rapid progress, while reforms relating to tariff adjustments towards levels that guarantee the economic and financial sustainability of services, the creation of effective subsidy systems, the implementation of regulatory frameworks and the modification of the behaviour of public service providers, have shown significant lags.

Despite the significant differences between the countries of the region, according to Corrales (2004), the reforms may be grouped into four very broad categories in terms of speed and depth:

- **Advanced change.** This group consists essentially of Argentina and Chile, where the reform process has made the most progress, both in the construction, implementation and improvement of the new regulatory frameworks and in the self-financing of services and participation of the private sector. In the case of Argentina, there has been an accelerated process of privatization through a system of concessions (normally for 30 years) in the main jurisdictions of the country (City of Buenos Aires, the provinces of Buenos Aires, Catamarca, Córdoba, Corrientes, Formosa, Mendoza, Misiones, Salta, Santa Fe, Santiago del Estero, San Luis and Tucumán, although in some of them the privatizations later failed); regulation by contract rather than by a general law; and the creation of provincial-level regulatory bodies, together with, or subsequent to, the incorporation of the private sector, without prior consolidation of those organizations (Calcagno, Gaviño and Mendiburo, 2000). It is estimated that private operators provide services to more than 60% of the urban population of Argentina. In the case of Chile, the process was more gradual, and included the following successive stages: (i) approval and implementation of the new legal and regulatory framework, and creation of a national-level regulating body; (ii) gradual adjustment of tariffs to reach a level that is self-financing (over a transition period of up to four years) and the creation of a direct subsidy system for low-income groups; (iii) improvement of the legal and regulatory framework, and of the subsidy system; and only after all of this, (iv) the incorporation of private capital, mainly through the sale of shares, in all companies in the sector. Between 1998 and 2004, all State-owned companies were transferred to the private sector. In the case of both Argentina (until the devaluation of 2002)¹³ and Chile (see page 21), the sector attracted significant levels of private investment.
- **Partial change, with emphasis on updating the regulatory frameworks.** This group includes countries (such as Bolivia, Colombia, Costa Rica, Nicaragua, Peru, Panama, Paraguay and Uruguay) which have approved new legal frameworks and created national-level regulatory bodies, although there are still significant problems in ensuring compliance with and operation of the approved regulatory frameworks. The processes of private participation have been rather scarce and essentially limited to a few experiences in Bolivia and Colombia, and isolated cases at the local level in Uruguay. In some of the countries in this group (mainly in Colombia, but also in Peru), the regulatory task has been made more difficult by the excessive fragmentation of the sector into service units with very different characteristics, as well as conflicts of competence with the local authorities (as in Peru).

¹³ For example, Aguas Argentinas, the Buenos Aires concessionaire, has made investments of US\$ 1.7 billion, reinvesting 76% of profits and obtaining external financing of US\$ 0.7 billion (Aguas Argentinas, 2003).

- **Partial change, with emphasis on private participation.** This group includes countries such as Brazil, Ecuador and Honduras. Despite the fact that the new legal frameworks have not yet been approved, there are already some isolated instances of private participation, mainly in the form of regulation by contract at the local level. In many of these countries, the search for consensus regulatory solutions is hindered by the persistence of serious problems of competence between the different levels of Government (as in Brazil).
- **Change incomplete or under discussion.** In the rest of the region's countries (such as the Dominican Republic and Venezuela) the reforms have been slower and the process of reaching a national agreement has been difficult. The case of Venezuela is interesting as, despite having approved the Drinking Water and Sanitation Services Provision Organization Act on 31 December 2001, the law has not yet been fully implemented (Corrales, 2004). This group also includes many of the Caribbean countries, where the sector's industrial structure is generally concentrated in a national commission, private participation is the exception rather than the rule, and apart from in a few cases (such as Jamaica, Bahamas and Trinidad and Tobago), no regulatory entities have been created (Avendaño, 2003).

A. Reforms to the institutional structure of the sector

In the majority of Latin American and Caribbean countries, the role of the State in the economy in general, and in the use of water and the provision of water-related public utility services in particular, has changed radically since the recession of the 1980s. The objective has been to reduce and reorient public expenditure in a context of fiscal austerity measures, particularly with regard to capital investments, and increase efficiency in the provision of public utility services. One of the main results of these reforms has been that, with the decade of the 1980s, the functions of the State have begun to shift from the direct water use, construction and operation of works and direct provision of public utility services, to the regulation, control and promotion of activities by third parties, whether autonomous public entities, local governments or the private sector (ECLAC, 1992).

As a result of these policies, many countries in the region have already reformed the institutional structure of the drinking water supply and sanitation sector, while in others this process has reached different degrees of development. The reforms invariably involve an explicit institutional separation between the following three functions, which are assigned to different organizations with the rights and obligations clearly defined: (i) definition of sectoral policies and strategic planning; (ii) economic regulation, supervision and monitoring of the service providers; and (iii) provision of services and systems administration.

This differentiation, which is the corner stone of the restructuring process in the sector and which is usually observed in all public utility services, represents a significant institutional advance. Experience in the region indicates that this division of functions is essential in those cases where services provision is to be privatized, but is also highly recommendable even when services provision is to remain in public hands (ECLAC, 2000).

The functions of sectoral policy-making and strategic planning are usually separated from the regulatory function and are left as the responsibility of the sectoral ministries (of public works, housing, infrastructure, health, etc.). The monitoring and economic regulation functions are institutionalized through regulatory commissions and bodies, which are usually assured technical and financial capacity, and independence. The function of service provision is transferred to

autonomous public agencies, local governments or the private sector, in order to ensure the non-political administration of the systems in accordance with technical and commercial criteria.

Most of the countries in the region, such as Argentina (at the provincial level), Bolivia, Brazil (only in some states), Chile, Colombia, Costa Rica, Jamaica, Nicaragua, Panama, Paraguay, Peru and Uruguay,¹⁴ have already created economic regulatory bodies for drinking water supply and sanitation services, while various others (such as Honduras and Venezuela) are in the process of doing so. In most of the countries the intention is to regulate each sector of the public utilities services separately, and so specialized bodies have been created for the regulation of drinking water supply and sanitation services (for example, in most cases in Argentina (the city of Buenos Aires and the provinces of Buenos Aires, Corrientes, Mendoza, Misiones, Santa Fe, Santiago del Estero and Tucumán), Chile, Colombia, Honduras, Nicaragua, Paraguay, Peru and Venezuela), while in others, usually the smaller countries, only one regulatory agency is created for all public utility services (for example, Costa Rica, Jamaica, Panama and Uruguay, as well as in some provinces in Argentina (Formosa, Chubut, Córdoba and Salta)).

An effort has generally been made in the institutional design of the regulatory entities to provide them with greater degrees of autonomy and independence, mainly with regard to political interferences. In practice, however, the organizations created have in many cases been weak and lacking in any real authority, with very limited degrees of discretionary action and inadequate conflict resolution mechanisms, thus impeding the regulatory function of the State (see Box 4). They have been subject to *ad hoc* interventions from the executive power¹⁵ and conflicts of competence with local governments, and have had unstable management —the “average life expectancy” of a regulator of drinking water supply and sanitation services in the countries of the region has been less than three years and only a minority manage to complete their legal mandate of 5 to 6 years (Foster, 2001). They have tiny budgets that do not allow them to carry out their work effectively and with limited legal capacities for performing their functions: “Thus is born the notion of a minimal State which is in permanent tension with growing regulatory needs” (Lara, 2002). These are generally new organizations, lacking experience, in some cases created subsequent to the privatization of the regulated companies,¹⁶ and whose officials come in large part from the former public companies or had a significant role in the privatization processes. Now they are trying to control companies managed “by operators who have many years of experience ... [and] are the clients of major lawyers’ offices” (Llop, 2001). There have already been various

¹⁴ Some of these entities are: in Bolivia, the Basic Sanitation Superintendency; in Chile, the Sanitary Services Superintendency (SISS); in Colombia, the Regulatory Commission for Drinking Water and Basic Sanitation (CRA); in Costa Rica, the Regulatory Authority for Public Services (ARESEP); in Jamaica, the Office of Utility Regulation (OUR); in Honduras, the Regulatory Entity for Drinking Water and Sanitation Services; in Nicaragua, the Nicaraguan Institute for Aqueducts and Sewerage (INAA); in Panama, the Regulatory Entity for Public Services (ERSP); in Paraguay, Regulatory Entity for Sanitary Services (ERSSAN); in Peru, the National Superintendency for Sanitary Services (SUNASS); in Uruguay, the Energy and Water Services Regulatory Unit (URSEA); and in Venezuela, the National Superintendency of Drinking Water and Sanitation Services.

¹⁵ For example, although in Argentina the regulators “were organized in the form of independent agencies, in some cases the lack of autonomy in relation to political power has been evident and the subject of much criticism” (Oszlak and Felder, 1998). So, when in 1997 the national government initiated the renegotiation of the concession for drinking water supply and sanitation services in the city of Buenos Aires, it was “remarkable that ETOSS [Tripartite Entity for Sanitation Works and Services], which is responsible for monitoring, inspecting and verifying compliance with current standards and the concession contract and is also responsible for approving periodic plans for improvements and extensions, was not called on to participate ... With that exclusion, the natural control body, which was the specialist in the area and possessed all the information and technical staff to make the best and most accurate evaluation of the working of the contract and the effects and consequences of any modifications, was eliminated” (García, 1998). The experience in Argentina would seem to show that the lack of independence in relation to the political power is more harmful for the users than for the regulated utilities (Oszlak and Felder, 1998).

¹⁶ This can lead to situations – as seen for example in Argentina – where the regulated utilities employ “the strategy of applying their specialized technical resources and wealth of experience in these issues, to formulate a regime that meets their interests” (Falótico and others, 2001). They take action earlier than the regulator, and in unequal conditions with regard to the availability of resources. It may be recalled that the experience of the United States with regulation by contract (from the end of the nineteenth century until about 1920) was similar: “in the main the franchise, as actually used, proved a defective instrument for ... regulation ... franchises ... tended to be poorly drafted ... And even when they were well-drawn, the company often benefited, since it was common for the utility’s lawyers to draft the franchise and then present it to the city council for approval” (Phillips, 1993).

THE CONFLICT RESOLUTION SYSTEM IN THE CHILEAN SANITATION SECTOR

According to the Chilean regulatory framework, if a regulator and a regulated company do not reach an agreement (which happens in most cases), a commission of three experts must be formed: one nominated by the company, one by the regulator and the third chosen from a list of experts agreed between the two parties. The judgment, which is definitive and binding for both parties, is adopted by a simple majority, must be well-founded and must include the reasons and decisions for the votes of the majority and the minority. Half of the fees are paid by the regulator and half by the company. The experts must be persons of known repute and technical expertise, and must act impartially, restricting themselves to an objective analysis of the discrepancies and the reasons or information on which they are based. Any person who has a contractual link of dependency or is providing services for the regulator or with the relevant company or who is part, either as a partner or a shareholder, of the latter or of consultancy companies that provide services to either of the parties involved in the corresponding rate-setting process, may not be designated as an expert by joint agreement.

One important aspect of the system is that the commission of experts must make a decision with regard to each of the parameters concerning which there is a discrepancy, opting in a well-founded way for one of the two values, without adopting intermediate values. The obligation to choose one of the two positions has the purpose of generating incentives for the company to declare costs as close as possible to the real costs. This procedure represents progress compared to the situation in the electricity distribution subsector, where an average is taken from the results of both studies. This procedure tends to aggravate the asymmetry of information, because the company has strong incentives to declare high costs, while the regulator does the opposite. As a result, the rate-setting processes in the electric sector have been extremely confrontational and the studies have yielded figures where the companies declare costs that in some cases are double the estimates of the regulator. The approach adopted in the drinking water supply and sanitation sector, however, has also not had the desired effect, in part owing to the fact that the decision is not taken on the final rate, but parameter by parameter on the rate formula. The number of parameters is so high that any value between the values proposed by the parties may be reached. In fact, in a recent rate-setting process, the commission of experts chose the parameters in such a way that the final result was close to the average of the proposals.

Although some believe that this system of conflict resolution has significant advantages, analysis also indicates that it is not free of problems:

- It minimizes prolongation of the conflict (the commission must reach a decision in 30 days), although it might be wondered what capacity such a small group of people could have to decide on multiple and complex technical issues in such a short period of time. For example, in the last rate-setting process for Aguas Andinas, there were close to 300 parameters showing a discrepancy.
- The discrepancies are supposed to be resolved by experts in the relevant area, although there is no guarantee of accountability, representativeness and thus legitimacy. Another significant concern is to what extent the experts can actually be independent, as they would obviously always be concerned that their decisions should not jeopardize their future employment possibilities in other organizations or companies.
- The system has proved to be fairly resistant to political pressures, although it is also claimed that it has become the potentially most significant channel for regulated companies to influence the regulatory process. As a result, by means of a kind of direct negotiation of the parameters of the rate calculation, the regulated companies have managed, in all the rate-setting processes that have been completed, to achieve a final approved rate higher than that initially set by the regulator.

Source: Jouravlev (2003), Gómez-Lobo and Vargas (2001) and (2002), Sánchez and Sanhueza (2000), Galetovic and Sanhueza (2002).

instances of regulatory capture of a given agency or even of the regulatory process as a whole (ECLAC, 2000).

In short, many of the entities created in the countries of the region still do not have sufficient independence, capacity and resources, nor do they have effective regulatory frameworks (see page 41), which could, on the one hand, effectively protect the interests of consumers and society in general and ensure efficiency in the provision of services, and on the other hand, offer guarantees of independence and objectivity in the face of service providers and attract investments to the sector. In general, this aspect continues to be one of the weakest in the regional experience.

One of the important lessons of the reforms of the 1990s is that the definition of the regulatory framework, as well as the design and institutional establishment of the responsible entities, must precede the process of privatization (ECLAC, 2000). If this is not done, the reforms may be unstable, may result in unjustified transfers of assets and income, sometimes in very high quantities, and may neither ensure the efficiency in the provision of services nor attract new investments to the sector.

As for the provision of services and systems administration, the operating agencies (mostly public) in almost all the countries of the region continue to show serious operating inefficiencies and a precarious financial situation (see page 50). There are still serious institutional and political problems which are reflected in the lack of administrative independence of many operating bodies and the predominance of political criteria, both in their administration, including staff selection, and in rate-setting. It is also important to note that the experiences of several countries, especially Chile, have shown that high levels of efficiency can be attained in the provision of drinking water supply and sanitation services through public-sector companies (ECLAC, 1998c).¹⁷

One of the main challenges facing the countries of the region is that, on the one hand, services are provided mainly by public-sector entities but, on the other hand, the new regulatory frameworks have been designed with the specific objective of using economic and financial incentives to regulate private companies (Corrales, 2004). The problem is that such incentives are not necessarily effective, and in some cases even have the contrary effect, in the context of public provision of services (Avendaño, 2003; Foster, 2001). It is also difficult to guarantee the independence and authority of the regulator in relation to public operators which are usually dependent on the same authority and in many cases have “more power in terms of generating financial resources and in terms of forums or tools for political lobbying” (Corrales, 2004).

B. Reform of the sector’s industrial structure

1. Reform of the sector’s vertical structure

Providing drinking water supply and sanitation services involves various separate economic activities to deliver the final product or service to customers. These activities, or successive stages of the production process, are:

- production of drinking water (capture and treatment of raw water for subsequent distribution via supply networks);
- distribution of drinking water (conveying the water to users through the distribution network);

¹⁷ With regard to these achievements, in the case of Chile, the main elements seem to have been the following: (i) strict rules for the presentation of financial information, similar to those applied to private companies; and (ii) the creation of a rigorous and independent regulatory authority (ECLAC, 1998c). Other elements seem to be well-qualified staff, competitive salaries, autonomy of the companies, clear objectives, depoliticized administration, and accountability.

- collection of wastewater (conveying wastewater from the user's residence to place of disposal); and
- wastewater disposal (in water bodies or treatment systems).

During the 1990s, some countries cast slight doubts over the suitability of vertical integration in drinking water supply and sanitation services. However, not only does vertical integration remain the main form of industrial organization in the sector, but it has also been strengthened in all the region's countries. The few countries where drinking water supply and sanitation services were provided separately have integrated the two sectors, with only one significant exception: Montevideo, Uruguay.¹⁸

The main cases that could be considered a new limited form of vertical separation are associated with build, operate and transfer (BOT) contracts, mainly for wastewater treatment (like in Mexico) and, in some cases, production of drinking water. They tend to be small-scale projects that use this approach for financial reasons or contractual necessity.

The traditional and widely recommended approach to the structure of the drinking water supply and sanitation sector consists of the vertical integration of all stages of the production process. This is mainly due to the following reasons:

- **Impossibility of significant competition in any stage of the production process.** One of the main differences between drinking water supply and sanitation services and other public utilities (such as electricity and telecommunications) is that the economies of scale at each stage of the production process are so significant that they turn into natural monopolies and direct competition becomes unfeasible. In activities where economies of scale are less important (production of drinking water and wastewater treatment), an additional obstacle is that most areas offer extremely limited opportunities to supply water from new sources or treat wastewater elsewhere.
- **Vertical integration generates considerable economies of scope.** Given that the equipment and workforce used and the experience of producing and distributing drinking water are also useful for the collection and treatment of wastewater, vertical integration considerably reduces costs. Also, the demand for wastewater collection and treatment services goes hand in hand with the demand for the production and distribution of drinking water. Both services should therefore be extended simultaneously and their infrastructures should operate in a coordinated way.
- **Difficulty of charging rates at various stages of the production process.** The only viable way of obliging users to pay for drinking water production and wastewater collection and treatment services is to have the option of cutting of the drinking water supply.

2. Reform of the sector's horizontal structure

In many of the region's countries, local governments (mainly municipalities) have traditionally been responsible for drinking water supply and sanitation services. Furthermore, the general trend of reforms carried out since the 1980s has been towards decentralization, often to the lowest jurisdictional level (municipal). The main arguments for this type of reform were based on

¹⁸ The only significant exception is Montevideo, Uruguay. In 1952, Act N° 11907 transferred drinking water supply services from the Water Works Limited to the Administration of Sanitary Works of the State (OSE). The Act also transferred ownership of all goods previously assigned to the Sanitation Directorate of the Ministry of Public Works, except those included in the department of Montevideo, which were transferred to the Municipality of Montevideo (Yelpo and Serrentino, 2000).

the need to bring local problem solving closer to grass roots level, with a view to taking advantage of local initiatives and proximity to users.

In Argentina, the national company National Sanitation Works (OSN) was decentralized to provincial level in 1980; in Mexico, the transfer of services to municipalities began in the early 1980s; in Peru, the affiliates and operative units of the National Drinking Water and Sewerage Service (SENAPA) were transferred to provincial and district municipalities in 1990; and in Venezuela, in 1989, the National Institute of Sanitation Works (INOS) was dissolved and the services were temporarily decentralized to regional water companies responsible for the process of transferring services to municipalities. As a result, local governments (mainly at the municipal level) are responsible for or involved in supplying services in the overwhelming majority of countries, acting either as direct suppliers or as the authority responsible for ensuring supply or for monitoring, oversight and supervision of services.

A widely accepted recommendation is that local governments should not supply services directly, but through autonomous bodies or by delegating this responsibility to entities at other levels of government. In any event, service provision should be separate and financially independent from general municipal management. However, this is not yet common practice in most countries, where rapid decentralization processes and transfers of competence to local level have often resulted in operationally and financially weak entities:

- In **Argentina**, municipal entities “tend to be centralized and come under the executive power of the municipality. They are not autonomous or self-sufficient ... tend to be highly bureaucratic, somewhat inefficient, relatively poor service managers and highly influenced by the political situation of the municipality” (Calcagno, Gaviño and Mendiburo, 2000).
- In **Colombia**, with the exception of companies providing services in the largest municipalities such as Barranquilla, Bogotá, Cali, Cartagena and Medellín, the small area of operation of municipal entities does not lend itself to economies of scale and does not even qualify as providing services in what could be described as a “business” manner (Dupré and Lentini, 2000).
- In **Honduras**, it has been noted that, “at the operational level, municipalities lack technical resources and strengthening support mechanisms ... Added to this is low profitability, which is also affected by political and employee capture due to the high political influence of this type of operator” (Honduras/SERNA/SIC, 2003).
- In **Mexico**, operators usually “have low operational margins and are unable to cover their debts or finance new investments. There are also institutional and political problems reflected in the lack of administrative continuity, the domination of political criteria in rate setting and collection and the lack of administrative independence” (Hernández and Villagómez, 2000).

In several countries, there are isolated examples of good drinking water supply and sanitation services provided by local governments. They tend to be limited to large, high-income, politically important municipalities that have succeeded in creating autonomous companies with a relatively stable, professional and non-political management. Generally speaking, however, decentralization to the “lowest appropriate level” (municipal) has not led to the most efficient provision of services and has often generated serious problems —according to Avendaño (2003), “decentralization has had a negative effect on the structure of the drinking water industry by fragmenting it and compromising its viability”— including the following:

- **Loss of economies of scale.** Experiences outside the region indicate that economies of scale can be achieved with at least 500,000 customers (World Bank, 1997; Cowen and Cowen, 1998). Within the region, there is concrete proof that drinking water supply and sanitation services for communities of up to 150,000 or 200,000 inhabitants could be provided more efficiently and cheaply if supplied by regional companies (Yepes, 1990). It should be pointed out that the population of the vast majority of municipalities in the region is significantly lower than the minimum level required to achieve economies of scale, and that only about 0.1% approach that level.¹⁹
- **Mismatch between the industrial structure of the sector and the jurisdictional level responsible for regulation.** In some cases, the sector's excessive horizontal fragmentation makes efforts to regulate ineffective (Corrales, 2003). In Colombia, for instance, "it is impossible for the central entity to regulate" the more than 1,000 service providers due to their large number and heterogeneity (Corrales, 1998). Any regulator would clearly be overwhelmed by the need to monitor and supervise so many companies.
- **Reduced possibilities of cross subsidies.** When decentralization involves reducing the size of service areas and making them more homogenous, this limits the possibilities for cross subsidies and facilitates "cream skimming" that marginalizes low-income groups from service provision (Corrales, 2003).
- **Reduced private-sector interest.** A smaller drinking water supply and sanitation company is probably less attractive, individually at least, to the private sector.
- **Systems administered and operated on the basis of political rather than technical criteria.** Through the process of municipalization, the relationship between service provision and local governments has often led to the politicization of essentially technical decisions or to the misuse of public resources and funds (Solanes, 1999). For instance, one of the main reasons for the chronic lack of finances in drinking water and sanitation services in many of the region's countries is that municipal governments tend to think it inappropriate to raise rates, mainly due to fear of adverse political reactions.²⁰ Rate levels have therefore remained excessively low, with little or no relation to the cost of services provided, the financial needs of service providers or customers' capacity to pay.
- **Confusion of institutional roles.** When municipalities have the two-fold role of operator and granting authority, this tends to create a confusion of roles and competences, as is the case in Peru (Salinas, 2003). Several countries still have problems of competence between central and local government. In some cases, such as Brazil, Ecuador and Honduras, the bulk of impediments that have precluded or hampered the adoption of new legal frameworks have to do with conflicts of competence between regional and local powers and central or national governments (Corrales, 2004).
- **Lack of attention given to rural areas.** "Because of the political realities in many municipalities, the locally elected government will usually address the needs of the urban population ... at the expense of rural communities, which tend to have less political influence" (Lockwood, 2002). It has also been demonstrated that municipalities often lack the technical capacity needed to provide adequate support to rural communities.

¹⁹ According to Victory (1997 and 1998), Latin American municipalities are extremely rural: about 80% have less than 25,000 inhabitants and only 0.1% (about 70 municipalities) have over 500,000 inhabitants.

²⁰ In Costa Rica, for instance, systems run by the Costa Rican Water Supply and Sanitation Institute (AyA) have excellent quality standards, whereas systems in the hands of municipalities have serious problems in terms of service quality, quantity and continuity (Leiva, 2003). The main reason is that "municipalities are political entities, whose members are interested in 'votes' in the next elections and who do not want to upset the public. Approving a water rate that can cover the construction of an aqueduct is therefore not a priority ... not even of interest".

- **Obstacles to protecting water sources and lack of incentives for the control of water pollution.** The fact that the political and administrative boundaries of local governments are usually intertwined and do not correspond to natural river basins tends to hamper rather than facilitate the internalization of externalities linked to the protection of water sources and the control of water pollution.
- **Lack of preparation.** Many of the decentralization processes were so rapid and sudden that they were carried out without sufficient analysis of existing local capacities and without “ensuring that there was staff with the appropriate technical skills and attitudes at the new level of decentralization” (Solanes and Getches, 1998).

On the other hand, it is also important to point out that, with the exception of the smallest countries, centralized national companies are not usually the best solution. Experiences from the 1960s and 1970s indicate that centralized structures were enormously useful in developing and implementing projects to extend coverage (PAHO, 2001a). However, excessive centralization overburdened management capacity to such an extent that serious inefficiencies in service provision became widespread. This approach has therefore been abandoned in many countries including Argentina, Chile, Colombia, Mexico, Peru and Venezuela (Yepes, 1990 and 2001).

The above suggests that, “rather than a problem of radical alternatives, it is more importantly a question of structuring balanced systems, where legal and political powers are assigned to the appropriate level of government” (Peña and Solanes, 2002). In other words, solving the problems of decentralization to the lowest level requires a consolidation of the sector’s horizontal structure at a happy medium between the excessive centralization of the 1960s and 1970s and the extreme fragmentation of the 1980s and 1990s. Chile, probably the most successful country in terms of efficiency and coverage of drinking water supply and sanitation services, adopted a model based on regional companies covering a significant area in order to achieve economies of scale and take advantage of the benefits of decentralization.

C. Private sector participation

Practically all the region’s countries have adopted policies aimed at increasing private sector participation in the provision of drinking water supply and sanitation services. In the first half of the 1990s, there was much enthusiasm for privatizing drinking water and sanitation companies and many governments adopted ambitious plans in this respect (ECLAC, 1998a and 1998b).

To date, however, Argentina and Chile are the only two countries that have succeeded in privatizing the drinking water supply and sanitation services provided to most of the urban population. In Argentina (see page 27), the privatization process has been seriously affected by the country’s economic crisis and the negative public assessment of several concessions (see Box 5). The process has been more successful in Chile, and has therefore been extended to all of the sector’s companies. Meanwhile, the results of the first rate-review processes following the privatization of the sector’s main companies show that public opinion is concerned about the effectiveness of the regulatory framework in the new context of private property (Gómez-Lobo and Vargas, 2001).²¹ The general feeling is that, in order to “legitimize the management of private companies, their supposedly more efficient use of resources should be reflected in the gradual reduction of rates” (Stranger and Chechilnitzky, 2003).

²¹ According to Gómez-Lobo and Vargas (2002), “the first rate-review processes since the privatization of EMOS and ESVAL were completed at the beginning of 2000. The reviews showed that EMOS rates increased by an average of 20% in real terms, without taking account of the wastewater treatment process that will imply an even greater increase in the next few years. For ESVAL, the rate review also resulted in an average rise of 20% in real terms”.

THE DRINKING WATER SUPPLY AND SANITATION SERVICES CONCESSION IN THE CITY OF BUENOS AIRES, ARGENTINA

In 1993, the Argentine government signed a 30-year concession contract with Aguas Argentinas for the provision of drinking water supply and sewerage services in the Federal Capital and 17 districts of Greater Buenos Aires. Prior to privatization, the drinking water supply and sanitation services were on the verge of collapse, with operating deficiencies resulting from a long period of disinvestment. Privatization has reversed disinvestment, boosted expansion, increased coverage, improved service quality and resulted in operational profits. On the other hand, the targets set in the concession contract have not been met, while tariffs (which were not to be significantly adjusted during the first 10 years of the concession) have increased considerably.

The results of privatization were predictable considering the combination of shortcomings in the design of the concession, insufficiencies of the regulatory framework and its own institutions, repeated contractual renegotiations (always in the interests of the concessionaire to the detriment of the public), evidence of regulatory capture by the regulated company and political power, weak regulations in the face of non-compliance and lack of real incentives to attend to the most deficient areas of service provision (lowest income groups). The main lessons to be learned from the Buenos Aires concession include the following:

- The need for the privatization decision to be preceded by a social and parliamentary debate that, on the appropriate technical and economic basis, results in the adoption of a specific law that provides legal certainty and predictability or that seriously conditions the possibility of manipulating the regulatory framework.
- Ensuring that there is a payment for the concession for the economic use of public property and a capital investment requirement to prevent the submission of opportunistic and predatory bids.
- Incorporating “business risk” into the regulatory framework: ensuring that there is no kind of reinsurance that can eliminate it even in the event of operator inefficiency. Provisions for “reasonable” rates and profitability should be a fundamental part of the regulatory framework.
- Encouraging service universalisation through effective operator incentives, adequate and transparent mechanisms for cross-subsidies and, if necessary, social and solidarity tariffs. This should be combined with increasing micro-metering.
- Ensuring that the regulatory agency is independent and self-sufficient to guarantee total autonomy, with a trained technical staff, a strong organizational identity and an organizational structure (legislative monitoring, external audits with active user participation) that precludes capture by the regulated company or political power.
- Ensuring that development programmes for local contractors are included in discussions concerning regulatory issues and establishing strict controls on intracompany transactions of the concessionaire.
- Implementing specific regulatory accounting that incorporates and specifies certain economic, accounting, social and infrastructure-related information that is essential for the development of monitoring and regulation activities.
- In economies with high levels of poverty and indigence, drinking water supply and sanitation services should not be considered as mere goods subject to market forces but as a basic and vital aspect of a population’s quality of life.

Source: Azpiazu (2002).

Various other countries have isolated examples of private participation, but these seem to be more the exception than the rule. The main examples are: i) cities in Bolivia (La Paz and El Alto), Brazil (several cities including Jundiaí, Limeira and Manaus), Colombia (with joint ventures operating in cities like Barranquilla and Cartagena), Ecuador (Guayaquil), Honduras (San Pedro

Sula), Mexico (Aguascalientes, Cancún, Puebla, Navojoa, etc.); (ii) tourist areas (for example in Cuba, Mexico and Uruguay); (iii) BOT contracts, especially in wastewater treatment (mainly in Mexico, but also in Brazil and Colombia), drinking water production and the desalination of sea water (various Caribbean islands); and (iv) small drinking water systems (“*aguateros*” (small-scale water entrepreneurs) in Paraguay).²² Private sector participation is slight or non-existent in other countries. In Latin America and the Caribbean as a whole, estimates on the proportion of the total urban population whose drinking water supply and sanitation services are provided with the participation of the private sector range from 8% (WHO/UNICEF, 2000) to 15% (Foster, 2001).

Although those figures may seem paltry, the region’s countries are reported to have attracted a large proportion (50% according to some estimates (Foster, 2001)) of total private investment in the drinking water supply and sanitation sector of developing countries (see Table 8), which is the equivalent of US\$ 17.7 billion between 1991 and 2002 (World Bank, 2004). It should be pointed out that these estimates refer to drinking water supply and sanitation projects with some private-sector involvement rather than private investment per se.²³ The investment peaks correspond to the Buenos Aires concession being awarded to the Aguas Argentinas consortium in May 1993 and the sale of EMOS in Chile in June 1999 (see Figure 2). The most active companies at the regional level are the French company *Suez* and *Aguas de Barcelona* (AGBAR) from Spain (World Bank, 2004).

Table 8
LATIN AMERICA AND THE CARIBBEAN: INVESTMENT IN DRINKING WATER SUPPLY AND SANITATION PROJECTS WITH PRIVATE PARTICIPATION, 1991-2002

(Billions of dollars)

| | Purchase of government assets | Investment in expansion and modernization | Total |
|----------------------------|-------------------------------|---|-------|
| Concessions | 1.0 | 10.6 | 11.6 |
| Divestiture | 2.2 | 3.0 | 5.2 |
| Greenfield projects | 0 | 1.0 | 1.0 |
| Total | 3.2 | 14.6 | 17.7 |

Source: World Bank (2004).

Note: These figures overestimate private investment in the sector (see footnote 23).

As to the how private participation has affected drinking water and sanitation services, the information available is sadly unable to answer that crucial question with any accuracy. What can be said is that some countries (mainly Argentina, Brazil and Chile but also Cuba, Ecuador and Mexico) have succeeded in attracting significant investment to the sector (see Figure 3), mainly due to regulatory frameworks that prioritize the protection of investor interests. Although private investment is concentrated “on the least risky areas of the sector, leaving aside problems of exclusion of the poorest” (Corrales, 2003), some investments have nonetheless reversed the chronic erosion of service financing and deterioration of the drinking water, sewerage and wastewater treatment systems and have improved efficiency in the supply, coverage and quality of services.

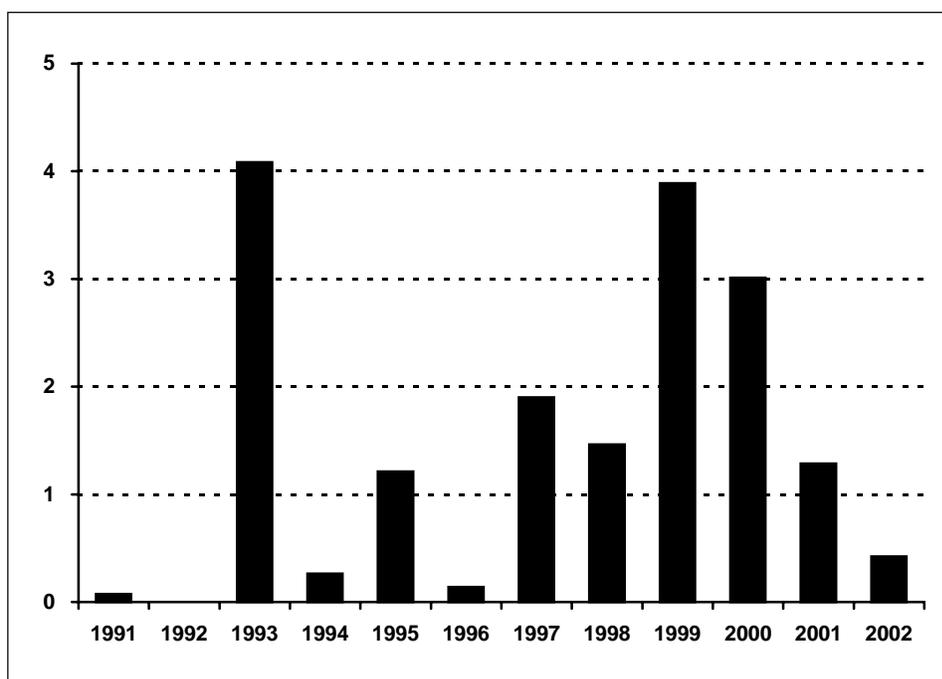
²² According to Crespo and Martínez (2000), Paraguay’s insufficient institutional capacity to provide drinking water supply services in certain areas has given rise to over 400 small private operators known as “*aguateros*” (literally, water carriers) to provide water where service is lacking. The supply systems managed by these small-scale operators mainly come from groundwater sources and they work in both urban and rural areas not covered by public services.

²³ These approximate figures considerably overestimate the real level of private participation in drinking water supply and sanitation investment. The World Bank (2004) points out that these estimates: (i) correspond to investment commitments and not investments actually carried out; and (ii) include private contributions (on average, 85% to 90% of total investment in all infrastructure sectors in developing countries) in projects with private participation plus public ones. For example, the World Bank (2003) estimated the investment commitments of Aguas Argentinas to be US\$ 4.9 billion, which would explain the peak in 1993 when the concession was granted (see Figure 2). On the other hand, Aguas Argentinas estimated its own investment in the first decade of concession to be only US\$ 1.7 billion (Aguas Argentinas, 2003).

Figure 2

LATIN AMERICA AND THE CARIBBEAN: INVESTMENT IN DRINKING WATER AND SANITATION PROJECTS WITH PRIVATE PARTICIPATION, 1991-2002

(Billions of dollars per year)



Source: World Bank (2004).

Characteristics of the process of incorporating the private sector include the speed with which privatization programmes have been carried out, prejudices and ideological notions of the regulatory role of the State (see page 43), the imbalance of power between different sectors of society, the weakness of civil society entities, macroeconomic instability, limited regulatory experience, low rates and the absence of efficient tariff systems. These aspects have given rise to numerous controversies, conflicts, renegotiations and even to a few failures, for example in Cochabamba, Bolivia (see Box 6), and the provinces of Buenos Aires and Tucumán in Argentina.²⁴ This has resulted in concerns about issues such as excessively permissive regulatory frameworks (see page 41), dissatisfaction with consumer protection mechanisms, control of transfer prices in transactions with associated companies, regulators vulnerability to capture, ambiguity concerning their independence, failure to apply the concept of reasonable returns, and also opportunistic behaviour, postponed investments, ignorance of social and environmental interests and, in some cases, technical failures (Peña and Solanes, 2002).

The drinking water supply and sanitation concession of the city of Buenos Aires is paradigmatic on account of its scale, age and influence. The Argentine experience is therefore

²⁴ In 1995, the province of Tucumán, Argentina, granted a concession for its drinking water supply and sanitation services. In 1997, however, the contract was rescinded following two years of serious dispute. "The conflict between the concessionaire and the province began in September 1995, a mere two months after privatization. Conflict broke out when users received bills with a 104% rate increase. The dispute worsened in January 1996, when the concessionaire was accused of providing unsafe drinking water" (Elsinger, 1997). These problems led the concessionaire to apply to the International Centre for Settlement of Investment Disputes (ICSID), suing the Argentine State for the value of its investment, damages, credit for unpaid bills, payments and compensation to third parties and loss of potential earnings for the 30 years of the concession.

Box 6

ATTEMPTED PRIVATIZATION OF THE DRINKING WATER SUPPLY AND SANITATION SERVICES IN COCHABAMBA, BOLIVIA

In September 1999, the Aguas del Tunari consortium was awarded a 40-year concession contract to provide drinking water supply and sanitation services in the city of Cochabamba, Bolivia. This award was made by negotiation, as the tender process was declared void. In October of the same year, Parliament adopted (despite a lack of consensus) Act N° 2029 (drinking water and sewerage services act) to provide the legal framework for sector regulation. In addition to dealing with sectoral matters, the Act also included provisions on water resources management. In Bolivia, water legislation is based on the 1906 Water Act, whose provisions, according to Mattos and Crespo (2000), "are mainly irrelevant". The Act gave broad powers to allocate water rights to the sectoral drinking water supply and sanitation authority. In addition, despite the advanced nature of discussions and analyses concerning the recognition of the rights of indigenous peoples and farmers in the formulation of a new law, Act N° 2029 included no such provisions.

The contract and the law, combined with irregularities in the tender process, brought about a strong reaction among the public in the form of protests against rate hikes in urban areas (up to 150% in some cases) without any prior improvement of services, foreign-currency indexing and the new legislation's effects on traditional rights in rural communities. Social unrest broke out in February 2000 and again in April that year, when there were several days of violent clashes between police and protestors followed by the declaration of a national state of emergency.

The economic factors that played a role in the conflict include:

- The concession was linked to the implementation of a costly, long-delayed and possibly unviable project, which had a significant effect on rates.
- The concession involved taking on considerable debt from previous administrations, which also pushed up the project costs.
- Shortcomings in the public consultation and participation process and poor media management.
- Lack of confidence in the financial and institutional capacity of the consortium, plus suspicions of corruption.

Social discontent was such that it was only quelled when the contract signed with Aguas del Tunari was terminated and over 30 articles (almost half) of Act N° 2029 were amended to subsequently become Act N° 2066. The consortium applied to the International Centre for Settlement of Investment Disputes (ICSID) for US\$ 25 million in compensation for the breaking of the contract.

The main lessons to be learned from this experience are:

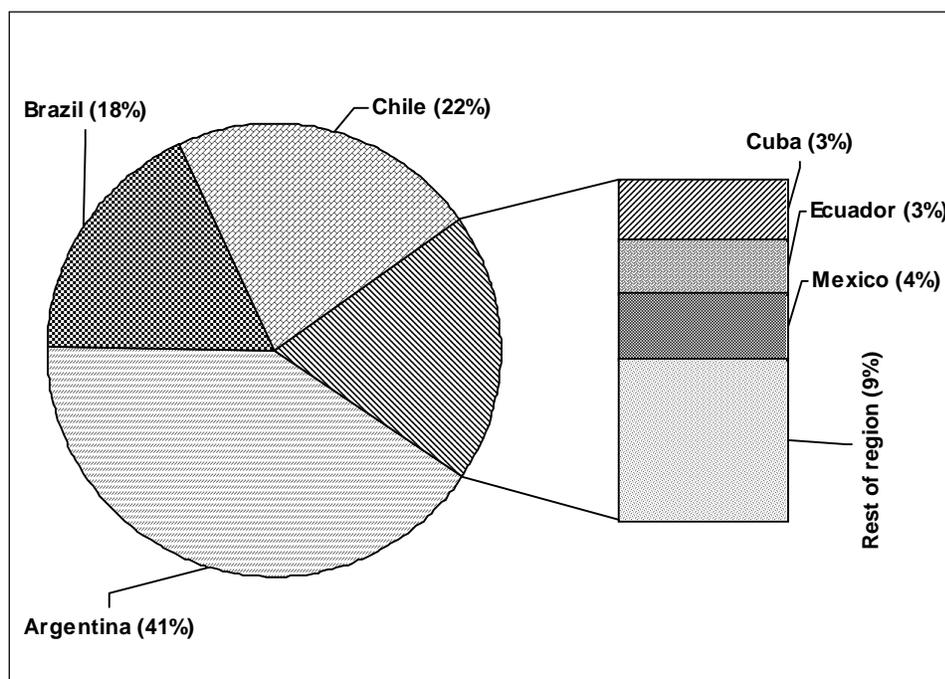
- There is a need to be flexible about the principle of complete cost-recovery in certain cases, especially in poor countries where the drinking water supply and sanitation sector requires public investment including subsidies.
- The sector's regulatory framework should be strengthened in the interests of more efficient regulation. Otherwise, any weakness allows companies to impose conditions that eventually affect users.
- Social participation, public access to information and transparent management of services and of the resource itself are clearly fundamental.
- The conflict might have been avoided if the process had included more participation, dialogue and consultation between all those involved.

Source: Bustamante (2002); Crespo (2000).

useful for illustrating the main achievements and problems of private participation in drinking water supply and sanitation services (Lentini, 2004):²⁵

- Although service provision is better than under the former State management, the concessionaire has not met the targets set in the concession contract. There have been serious cases of non-compliance with the investment plan for service expansion and in the level of service quality, particularly in terms of wastewater treatment.
- Between May 1993 and January 2002, the average bill for residential users has increased by 88%, much more than the increase in retail prices during the same period (7%). This was due to various rate reviews carried out because of increased costs resulting from inflation, and demands of the service provider that resulted in what could be described as contractual renegotiations.
- In terms of accounting profitability, rate increases have resulted in highly satisfactory figures for a company operating in a regulated market and with guaranteed average demand. This is borne out by the ratio of profitability to sales (13%) and to net assets (21%) between 1994 and 2001.
- The company opted for a capital structure with a high level of indebtedness. Although this structure involved lower capital costs, the resulting composition was different from that in the bid, which stipulated a proportion of capital from accumulation of results that was much higher than the level actually recorded. Stipulated debt levels were also much lower than those recorded during the contract.

Figure 3
LATIN AMERICA AND THE CARIBBEAN: INVESTMENT IN DRINKING WATER AND SANITATION PROJECTS WITH PRIVATE PARTICIPATION, BY COUNTRY, 1991-2002
(Percentage)



Source: World Bank (2004).

²⁵ Only data up to 2001 was used, given that data from subsequent years would result in distorted interpretations owing to the devaluation of the exchange rate and relative prices.

It should be pointed out that some strategies adopted by the region's countries to attract foreign private investment to the drinking water supply and sanitation sector involve a high level of risk in terms of the generation of contingent liabilities for the State (Solanes, 2003). This not only affects service sustainability, but also results in regressive distribution and reduces the possibility of economic growth because payments for services are not adjusted to local conditions. The most common examples of this type of strategy are foreign currency indexed rates, take-or-pay contracts and stabilization clauses prohibiting the amendment of national laws and regulations.

Even if the State is not responsible for non-collectable debt, these practices provide an open door for pressuring governments into offsetting losses (ECLAC, 2000). One of the most worrying aspects is that national budgets do not usually take full account of these government decisions whose effects are tantamount to granting subsidies, yet without being submitted to the legislature for review and approval (Solanes, 2003). In extreme cases, when such strategies are combined with foreign investment protection treaties, the system can give rise to hefty foreign claims (like the US\$ 15 billion claimed from Argentina) with little control or concern for the situation of the country affected (see Box 7).

As a result, the excessive enthusiasm for private participation from the first half of the 1990s has given way to a more realistic vision, on the part of both governments and investors: "In the 1990s, all of them duly piled into the developing world, but none of them has had a happy time there ... if any water company were to announce that it was quitting emerging markets, its share price would go up. The companies have learnt that the risks of setting up in a developing country are greater than they thought — and the rewards lower than they hoped" (The Economist, 2003).

The general opinion now is that, apart from large cities and countries with greater institutional and political stability, a high percentage of services will continue to be provided by public companies (Corrales, 2004). The reasons behind the difficulties of private sector involvement in the provision of drinking water supply and sanitation services have as much to do with sector-specific characteristics (limited payment culture and payment capacity, absence of effective subsidy systems, large social groups with low incomes still lacking proper service, excessive horizontal fragmentation of industry structure, absence of local sources of financing, conflicts of competence between different levels of government, unconsolidated regulatory frameworks and bodies, etc.) as with social, economic and global political aspects.²⁶

D. Regulatory frameworks

The regulatory frameworks adopted by Latin American and Caribbean countries for the drinking water supply and sanitation sector are generally weak, especially compared with the regulatory practices of countries with a long tradition of public utility services being provided by the private sector.²⁷ There are various reasons for this situation.

²⁶ According to AFI (2004), the view of regulatory and institutional risks in the drinking water supply and sanitation sector of the region's countries as held by Spanish investors is that "the specific problems experienced by surveyed companies are similar to those identified by electricity distribution companies, but aggravated by two factors: the absence of a payment culture is even more acute than for electricity and the service supply is under municipal authority. The authorities always aspire to universalize services at the expense of the private operator, without compensating the high marginal costs of expanding the basic supply network to outlying districts which, in the absence of public subsidies, require high rates that the lowest-income groups find difficult to afford. In terms of sanitation and wastewater treatment, the companies surveyed stated that the undeniable wish of the authorities to increase the percentage of wastewater that is treated clashed with the firm social refusal of citizens to pay the rates needed for private investment to finance such services. This leads to the conclusion that a significant increase in wastewater treatment would require public subsidy schemes that the public sector does not seem to be able to viably finance in the short term".

²⁷ According to ECLAC (2000), "The region has received much international guidance on economic issues and for developing specially designed manuals on how to approach different problems; but little information has been forthcoming on the dynamics of regulation and the existing jurisprudence in mature systems, such as the United States, the United Kingdom and France".

INTERNATIONAL FOREIGN INVESTMENT PROTECTION TREATIES

There is a growing trend among Latin American and Caribbean countries to sign foreign investment protection treaties. These treaties provide guarantees in substantive matters (non-discrimination, fair and equitable treatment and non-expropriation) and in procedural aspects (use of arbitration tribunals with secret procedures, no appeals and no obligatory precedent). These guarantees provide foreign investors with the assurance that their investments will not be affected by decisions of the countries concerned. These agreements can sometimes have perverse effects, given that the tribunals do not always have the composition or procedures to deal with issues linked to development and the well-being of society:

- Some have argued that their worst fears regarding faceless and secretive government have been confirmed by such treaties. Critics of the system assert that each challenge submitted to arbitration tribunals erodes public policy.
- The lack of a traditional appeals system, transparency and legally obligatory precedent has meant that many people are cautious and guarded regarding this conflict solving method.
- Only foreign investors may sue governments, which means the former have rights but apparently no responsibilities. Notably absent from the situation are the checks and balances normally present in any legislation that has a significant impact on general well-being.
- Given that at least one member of arbitration tribunals is chosen by one of the parties, that person cannot really be expected to be unbiased. In addition, serving on an arbitration panel is not an exclusive undertaking; hence these investment law specialists can be arbitrators in one case at the same time as serving as legal counsel on another. There is therefore an omnipresent and serious potential for conflicts of interest.
- Arbitration tribunals are based on commercial arbitration that was originally designed to hear disputes between private parties. Their only purpose is to protect investors, which is why they do not consider the effects of the overall situation from the viewpoint of the common good.

Another relevant issue in the context of the role these agreements play in the long-term growth and competitiveness of countries is their impact at the time of crises. The problem is that the claims submitted to these tribunals are usually aimed at protecting the public utility service providers from the effects of the crisis. This creates two classes of economic actors: those who benefit from all guarantees irrespective of changes in circumstances, and those (usually ordinary citizens and local investors) who have no such protection.

This can give rise to potential regressive effects since maintaining a constant return during a recession increases the relative participation of some sectors to the detriment of others. However, the same cannot be said of all countries. During the 1929 depression in the United States, the courts recognized a nationwide drop in interest rates and company profits during recession, and agreed to accept lower returns for public utility services. This demands a two-fold effort: on the one hand, to adjust the procedures to the nature of the problems, and on the other hand, to adjust the solutions to experience with similar cases.

When signing investment protection agreements, it is therefore vital for the countries of the region to identify areas and situations in which the mechanisms are not applicable, or establish criteria wider than simply protecting investor interests for the guidance of arbitration tribunals. First at the regional level and second in the context of these tribunals, the region should also establish principles that the tribunals should apply in cases relating to public utility services, regulation and natural resources.

Source: Solanes (2003).

The first explanation is linked to a **prejudiced view of governments as inevitably inefficient and corrupt and whose powers must be limited, whereas private participation is perceived as an end to be achieved at any cost** (Solanes, 2002). Furthermore, there are reasons to believe that the design of regulatory frameworks may have been influenced by ideological factors.²⁸

The second reason is that **regulatory frameworks were often designed at a time when, for various reasons, the need to ensure efficient regulation was not high on the list of governments' priorities**. In Argentina, for instance, “the policy of asset divestiture was more a macroeconomic tool to stabilize the economy than part of a structural reform policy aimed at increasing economic productivity in the long term” (Gerchunoff and Cánovas, 1993). More specifically, the government’s haste to transfer public utilities to the private sector — closely linked with the need to give clear signals concerning the direction of its economic policy — “was given priority over any other criterion, especially over factors concerning the subsequent regulation of the markets involved” (Azpiazu and Schorr, 2001).

In Chile, regulation by means of a model company (see Box 8) was devised at the beginning of the 1980s in response to the “concrete problems of public companies at the time” (Bustos and Galetovic, 2002), hence regulatory procedures were not designed for the need for regulation in the context of private participation. Time and increasing private participation “have shown that, in practice, the efficient company cannot be used as a model without information provided by the real company” (Bustos and Galetovic, 2002). This was one of the factors behind the need to strengthen the regulatory framework prior to privatization by means of Act N° 19.549 (19 January 1998) that modified the legal system governing the drinking water supply and sanitation services sector.

Third, **the formulation of regulatory frameworks and the incorporation of the private sector in many countries of the region have taken place in a context of weak or poor institutions and problematic State finances**. This “has limited the bargaining power of government structures in their dealings with transnational economic groups that provide considerable funds to finance the sector. Institutional weakness, sometimes aggravated by corruption, encourages a waterfall effect in which large economic groups, often supported by the government in their countries of origin, press government structures and limit the independence and impartiality of regulatory bodies to carry out their mission of improving efficiency and balancing the private and social benefits of the services provided” (Lentini, 2004).

The fourth aspect worth mentioning is the belief — **often related with the strict and inflexible application of ideological models — that regulators in modern systems such as price-cap regulation can use relatively limited and simple information on costs and demand and have no need to measure the rate base or rate of return or to allocate common costs. There is therefore thought to be no need to develop information access methods** (such as regulatory accounting and controlling transfer pricing in transactions with associated companies) **that are usually applied in traditional regulation (particularly rate-of-return regulation) in the United States**. This assumption has had a huge influence on the definition of regulatory frameworks in many countries of the region.²⁹ The fact is that, the rate-setting procedures are

²⁸ For instance, Sappington (1993) suggested that, in order to overcome the commitment problem, it might be advisable to make it more difficult to measure the true level of profits, for example by developing accounting systems that reduce the visibility of profits or encouraging vertical integration of the regulated company in order that “creative” transfer prices may be used for reducing observable profits. This is a real and worrying problem affecting private infrastructure investment in many countries: “In order to compensate for risk ... investors often insist on high rates of return. But ... managers often recognize that high rates of return can, in politically sensitive industries, actually increase the risks. As a result, investors often try to lower visible returns by transferring profits to affiliated entities through prices charged for inputs, loans from related companies, expenses for home office, and technical and management fees” (Wells, 1999).

²⁹ According to a study on the determining factors of contractual arrangements for private participation in infrastructure projects in Peru, “the general practice has been to apply price-cap rules” because of “the low information requirements associated with that system” (Macroconsult, 2000).

REGULATION BY MODEL COMPANY IN CHILE

Regulation by model company has been adopted in all public utility service sectors in Chile. This approach uses an efficient virtual company known as the “model company” as a standard of comparison. This hypothetical company providing optimum satisfaction of projected demand is created by the regulator from scratch, as if the real utility did not exist.

In Chile, there is a consensus that regulation by model company “is based on solid microeconomic principles” (Bustos and Galetovic, 2002; Galetovic and Sanhueza, 2002) and provides “an indication of prices in keeping with the rational use of resources” (Saldivia, 2001). It is acknowledged, however, that “the system ... has certain problems” (Gómez-Lobo and Vargas, 2002), and that “the regulation by model company has not been effective enough to extract rents from regulated utilities ... Although it is well known that asymmetrical information implies that rates will be higher than the average long-term cost, this discrepancy is probably unjustifiably high in Chile” (Bustos and Galetovic, 2002). The Chilean experience of regulation by model company has demonstrated the following limitations of the system:

- Some experts state that the advantage of this approach is that “the regulator does not need to know the current costs of the companies it regulates” (Spiller, 2000). Time has shown that, in practice, this system cannot be applied without information provided by the real company. The problem is that the original regulatory framework was based on the assumption that the regulator could model the relevant parameters of the efficient company without using information from the real utility.
- The idea behind regulation by model company is the complete separation of rates and costs of the regulated utility. Economic theory suggests that such systems do not tend to work well in the face of cost uncertainty and asymmetrical information, and that they increase the ability of regulated companies to take advantage of regulatory ignorance or favourable variations in costs (Schmalensee, 1989).
- Although some experts consider the design of a model company to be “relatively simple” (Morandé and Doña, 1997), this approach “has in fact led to the design of an excessively detailed model in which each aspect of the company’s performance is subject to analysis and projections in a context of negotiation” (Moreno, 2000). The need to identify, document and justify how the regulated company could reduce costs in a highly technical and excessively detailed way makes for a very time- and resource-intensive system that places the regulator at a disadvantage compared with the utility, which can easily manipulate information to defend its position.
- Linked to this is “the difficulty of incorporating general increases in economic productivity” (Gómez-Lobo and Vargas, 2001). Although general increases in productivity are potentially significant, the fact that they are not directly related to specific projects or management changes that can be identified and supported by a model company study means that they are not taken into account. As a result, the application of benchmarking is limited to a few specific cost categories.
- Since rates are based on the design of an efficient company beginning its operations, regulation by model company obliges the regulator to develop a new virtual utility from scratch for every rate-setting process, without being able to take into account the model company designed for the previous rate review. This tends to aggravate the asymmetry of information and the burden on the regulator.
- A fundamental aspect of rate setting is valuing existing assets. Chilean legislation establishes the use of replacement costs, which correspond to the current financial cost of acquiring facilities to provide the same service. Although this reflects the opportunity costs of resources, it tends to generate income higher than the actual costs of investors. This is the case, for instance, with water rights, which were mostly granted to companies free of charge. It is worth mentioning that, in mature systems, regulators have tended to avoid regulating on the basis of replacement cost in favour of the corrected historical net cost, i.e. the original investment value adjusted by the value of money in time and updated by net investment.

Box 8 (Concluded)

- The model company must be designed in compliance with existing norms, whereas, in practice, real utilities are allowed to gradually incorporate changes to those norms. This can result in problems of income being above normal levels.
- Although the model company's maintenance policy is efficient in time, real companies (in practice) usually delay maintenance, resulting in higher returns in relation to the lower expenditure actually incurred.
- Basing rates on the design of an efficient company beginning its operations has resulted in conflicts over whether this implies that the model company is replacing an existing network or operating in a new city. This has obliged the regulator to define methodologies to determine the initial investment of breaking and replacing road surfaces. This could result in excessive profitability on investments that only have to be made at the end of networks' service life, given that works are usually carried out before roads are paved.
- For the purposes of rates, the size of installations must be based on demand annualized over the next five years. When building infrastructure for the long term, companies also make investments considering the growth in demand and economies of scale. This has produced conflicts when companies claim that rates determined in that way prevent them from financing investments that would result in economies of scale. According to the regulator, real demand and the no-memory tariff model would result in excessive profits for companies using the design horizon associated with economies of scale.
- The investment of a model company beginning its operations may not be the same as the optimum investment of a real utility that is already operating. Given the existing investment, it may be more reasonable for a real company to introduce gradual changes to its production process rather than immediately replace old technologies with new. This has resulted in controversy over whether optimized expansion projects should be based on the real or model company.

What can be concluded from the above analysis is not that the model company approach is intrinsically wrong, but that it fails to resolve or ignores and perhaps aggravates the asymmetry of information. The Chilean experience of model company regulation has shown that the regulator cannot achieve its objectives without the internal information of the utilities it regulates. The problems faced by the regulator have obliged it to develop various methods to obtain systematic and constant access to information from real companies.

Source: Ramírez (2002); San Martín and others (2001); Gómez-Lobo and Vargas (2001); Jouravlev (2003).

essentially the same in all regulatory systems: prices are fixed to generate expected profits that are sufficient to generate a normal rate of return on assets employed, to remunerate efficient levels of operating expenditure and to finance efficient levels of capital expenditure.

Empirical experience of price-cap regulation in England and Wales shows that “original idea that regulation would be a simple matter of capping prices, avoiding all the problems of profit control, has proven illusory”, and as a result, the regulator “has found himself dragged into a complex mass of detail — covering the intricacies of business plans and fixing the cost of capital and the value of shareholders’ assets” (Helm, 1994). A similar experience was witnessed in Argentina where, “despite initial claims that the price cap system did away with the dependence on information provided by the regulated company ... reality shows that the conclusions are hurried at best and effective control always comes down to the information that the regulator has on the regulated company” (Santiago, 2000).

Another factor worth mentioning is **the belief, mainly created by ideological visions, that competition** (whether competition for the market through tendering contracts as in many Argentine provinces (see Box 9), direct market competition or contestable markets) **reduces the need for**

regulation and therefore does away with the need to develop conventional regulation procedures.³⁰ In many cases, that assumption has turned out to be excessively optimistic and lacking any empirical basis, while other attempts to implement that system have been plagued by serious difficulties.

It is curious to note that many of the theories that have been the most influential in the formulation of regulatory frameworks in the region (the supposed superiority of price cap regulation, the convenience of contract regulation, bidding on the basis of lower rates, scant concern for the need to create and strengthen a regulatory agency prior to privatization, etc.), have generated constant renegotiations and regulatory conflicts (see Table 9).

Table 9

LATIN AMERICA AND THE CARIBBEAN: CONCESSION RENEGOTIATIONS AND CHARACTERISTICS OF THE REGULATORY FRAMEWORKS
(Renegotiated concessions as a percentage of the category)

| | All infrastructure sectors | Drinking water and sanitation |
|---|----------------------------|-------------------------------|
| All concessions | 29 | 75 |
| Award criterion | | |
| • Lowest rate | 60 | 82 |
| • Highest payment to government | 11 | 67 |
| • Multiple | 34 | 0 |
| Regulatory framework | | |
| • In law | 17 | 56 |
| • In decree | 28 | 84 |
| • In contract | 40 | 71 |
| Regulatory entity | | |
| • In place | 17 | 41 |
| • Not in place | 61 | 88 |
| Rate regulation | | |
| • Price cap | 38 | 89 |
| • Rate-of-return | 13 | 14 |
| Regulatory obligations | | |
| • Regulating by means (investment obligations) | 51 | 85 |
| • Regulating by objectives (performance indicators) | 24 | 25 |

Source: Estache, Guasch and Trujillo (2003).

These problems have made the need to improve regulatory frameworks and practices a major priority on the agenda of the region's governments. Two of the most striking achievements have been the development and implementation of regulatory accounting in Argentina and Chile (see Box 10)³¹ and the monitoring of purchasing and contracting to avoid cross subsidies through transfer prices in transactions with associated companies (see Box 11). A positive development worth mentioning is the small but increasing participation of consumers in the regulatory process, mainly in Argentina and Costa Rica, but also in other countries such as Peru.

³⁰ For instance, the proposal for the new regulatory framework for the drinking water supply and sanitation sector in Colombia suggested that "the rules on interconnection and selling water in bulk mean it is not necessary to regulate production and transport. [It was also suggested that, on the basis of these rules] ... maximum charges for marketing could be deregulated [and] ... that the pricing policy should consist of establishing maximum charges for distribution" (Spiller, 2000).

³¹ In the drinking water supply and sanitation services concession in the city of Buenos Aires, Argentina, regulatory accounting will be gradually introduced during 2004.

Box 9

IS COMPETITION FOR THE MARKET (“FRANCHISING”) A GOOD SUBSTITUTE FOR CONVENTIONAL REGULATION?

The central argument for competition for the market is that although, in a natural monopoly situation, only one operator will provide the services, many operators are capable of providing them. In order to exploit competition among potential producers, the regulator announces that it will accept bids from all qualified parties, will award the contract to the competitor offering the most attractive terms, and the winner will become the monopolist. In theory at least, the competition for the market among *ex ante* producers will hold in check the potential monopoly power of *ex post* supplier by the competitively determined terms of the contract.

As a general principle, some form of competitive selection is always preferable when privatizing a public utility. Competition for the market, however, is no substitute for traditional regulation. Applying the franchising approach to drinking water supply and sanitation services gives rise to several major practical problems. The concession of Buenos Aires in Argentina is an illustrative example: “The contract ... assumed that, given that the provision targets had been established in the tender ..., the function of the regulator merely consisted of checking that the operation was run in accordance with the contract ... with the assistance of technical and financial auditors ... From 1995 ... many questions were asked about: the current value of ... not implemented projects; resulting savings in operational costs; lost income from bills that would have been received from new customers and from the boycott itself; and since operational costs, future investments, and income not received were included in the equation for determining rates, this led to the question of whether rates should remain the same, decrease or increase and by how much. This process has shown itself to be extremely confusing, laborious and lacking in transparency ... The fixed technical bid failed to avoid what it was intended to, and turned out to be the worst option owing to the changes that had to be made to the original bid on the basis of the reality of the situation” (Dupré and Lentini, 2000).

The main limitations of the competition for the market approach are as follows:

- **Bidding for the right to be a monopoly provider may not be competitive**, which is as much due to the small number of competitors as to collusion among them: “In water ... there are only a handful of firms in the international market, and competition is less fierce” (The Economist, 1998). In 60% of cases of private participation in the region’s drinking water supply services, the “competition” was only between one or two companies (Foster, 2001).
- **Opportunistic behaviour following tendering**. Given that it would be difficult and costly to replace the operator once the right to operate as a monopoly had been awarded, there is an incentive to make speculative offers and subsequently renegotiate them. The winning bid for the Buenos Aires concession, for instance, is said to have been made with a view to renegotiation (García, 1998).
- **Problems relating to contract specification, supervision and application**. Perhaps one of the main limitations of this system is that, in a constantly changing world, contractual conditions must be amended over time. It is estimated that almost 90% of contracts for the provision of drinking water supply and sanitation services have been renegotiated, and that the average period between renegotiations is about 20 months (Foster, 2001).
- **Problems relating to valuing and transferring assets once a contract has ended**. There is always the danger that the concessionaire will cease maintenance or even strip the assets towards the end of the contract or build them to become obsolete when transfer is scheduled to take place. Furthermore, at the end of a contract, the contract holder might have such strategic advantages —based on experience of the construction and operation of the system— that potential competitors give up on submitting a competitive proposal.

Source: Jouravlev (2003).

IMPLEMENTATION OF REGULATORY ACCOUNTING IN CHILE

In April and May 2002, the Chilean Sanitary Services Superintendency (SISS) issued regulated companies with instructions stating that, from March 2003, they must submit specific, detailed and standardized information on the income and costs of the activities of drinking water supply and sanitation services. This will provide the SISS with the documentary support needed to objectively define the model company, which is the basic concept for determining rates within the Chilean regulatory framework.

Aguas Andinas lodged a complaint that basically questioned the authority of the SISS to request such information and the fact that the request would mean implementing a special parallel accounting system. The first chamber of the Santiago Court of Appeals unanimously rejected the case. This decision established a precedent regarding the authority of the SISS to demand information on the accounting of costs and income of regulated activities and non-regulated activities that share infrastructure with regulated activities. The ruling considered both the principle of economic freedom and the community's legitimate general interest to be supplied with drinking water at reasonable rates.

Although the decision was important in Chile, it was not innovative within comparative public utility service law, in which the regulator's authority to define the accounting system to be used by the companies it regulates is well established in regulatory systems with a long tradition of public utility services being provided by the private sector. A century ago in the United States, for instance, little attention was paid to the accounting of regulated companies. This lack of concern resulted in serious abuse of both consumers and investors: the operational costs were artificially inflated in the accounts, it was impossible to determine investments and no distinction was made between activities related and not related to service provision.

Since then, it has been recognized that regulators cannot carry out their work effectively if they do not have the necessary power to define the accounting system to be used by the companies under their jurisdiction. The United States Supreme Court recognized the authority of regulators in 1912: "If the Commission is to successfully perform its duties in respect to reasonable rates, undue discriminations, and favouritism, it must be informed as to the business of the carriers by a system of accounting which will not permit the possible concealment of forbidden practices". It is therefore surprising that, more than a decade since the first privatizations in the water supply and sanitation sector, virtually no country in the region has a good regulatory accounting system, a fundamental tool that helps to mitigate the effects of information asymmetry. This generates the following major problems:

- Impossibility of having information compiled in a standardized and consistent way, since each company bases its classification of income and expenditure on its own definitions (and convenience), which can be strategically changed from one year (or case) to the other.
- In the case of companies that participate in non-regulated activities in addition to providing regulated services, sharing facilities and resources among both businesses, it is problematic to ensure that the rates only finance the costs of providing the regulated services.
- The limitations of conventional accounting make it difficult to: (i) disaggregate income and expenditure to the extent required for the purposes of regulation; and (ii) correctly capture certain types of costs.
- The fact that the information available is not consistent or comparable between the various companies or over time basically precludes the practical application of benchmarking as a useful source of information.

Source: ECLAC (2003b); Chile/SISS (2002); Rodríguez (2002a) y (2002b).

Box 11

RULES ON CONTRACTING WORKS INCLUDED IN THE TRUST FUND OF THE BUENOS AIRES CONCESSION, ARGENTINA

The selection documents and the annual report submitted by the concessionaire to the Tripartite Entity of Sanitation Works and Services (ETOSS) must fulfil the following requirements: (i) equal treatment for contractors and providers; (ii) application of the rules to all contracting operations funded by the trust fund; (iii) absence of cross subsidies for contractors; (iv) transfer prices at market prices or lower (with the obligation to justify any deviation from those prices); (v) compliance with the “buy Argentine” regime; (vi) providing the list of associated companies annually and whenever such entities are involved in contracting; and (vii) that the design, application and maintenance of its internal management systems is in accordance with the guidelines established by the rules.

Contractors can be selected through the following procedures: (i) call for bids or competition, used when the main selection criterion is based on economic factors; or (ii) direct contracting when the selection criterion is not financial (such as technical and scientific capacity or economic/financial, cultural or artistic conditions). The selection procedure is chosen on the basis of one or more of the following circumstances (which must be recorded in the relevant documentation), without prejudice to others not specifically mentioned: (i) characteristics of the goods or services to be contracted; (ii) estimated value of contract; (iii) market conditions and configuration; and (iv) reasons for urgency or emergency. The contract must be awarded to the most appropriate bid in terms of price, quality, suitability of the bidder and other conditions. The specific bidding terms and conditions must stipulate the bid assessment and selection criterion, either in the form of polynomial formulae or a clear definition of the relevant parameters considering the complexity, value and type of contract.

The general bidding terms and conditions are produced by the concessionaire and approved by ETOSS. The specific bidding terms and conditions are produced and approved by the concessionaire for each selection procedure and must contain the minimum requirements indicated in the general bidding terms and conditions, plus the technical specifications. The price of the general, specific and technical bidding terms and conditions must not be higher than five thousandths of the value of the contract budget. The technical specifications must clearly and categorically stipulate: (i) the characteristics and type of goods and services to be provided; (ii) the quality required and, where appropriate, quality standards for goods, services or contractors; (iii) whether elements should be new, used or reconditioned; and (iv) whether tolerances will be accepted.

The concessionaire must produce and present to ETOSS for approval a methodology to guarantee that the prices of works financed through the trust fund are in keeping with market prices. For this purpose, the rules must include, in principle, the following four mechanisms: (i) competition between independent contractors to win the contract; (ii) comparing prices with published price lists; (iii) prices assessed by qualified third parties; and (iv) benchmarking among the companies of the industry. The concessionaire should publicize the works being financed through the trust fund in the following ways: (i) publication in the official gazette; (ii) publication in the main daily newspapers; (iii) on the concessionaire’s web site; and (iv) on the web sites of the National Contracting Office and ETOSS.

Source: Argentina/ETOSS (2003).

Note: The agreed rate increases are deposited in a trust fund administered by the concessionaire and whose implementation is controlled by ETOSS. These funds are used to finance a set of water and sewerage expansion works agreed by ETOSS and the concessionaire.

Progress has also been made in terms of regional cooperation. The First Meeting of Regulatory Agencies of the Americas (Cartagena de Indias, Colombia, 16-19 de October 2001) set up the Association of Water and Sanitation Regulatory Entities of the Americas (ADERASA).³²

³² The specific objectives of ADERASA are to: (i) gain access to information on market regulation and control and the supply of drinking water supply and sanitation services in member countries; (ii) promote effectiveness and efficiency in service regulation and control processes; (iii) identify and defend the interests of member countries in international events with a view to achieving regional integration; (iv) exchange experiences on regulatory and control processes in member countries; and (v) promote the

The priorities of ADERASA include cooperation on the following four critical issues for the provision of drinking water supply and sanitation services in the region: users attention, benchmarking, regulatory accounting, and rates and subsidies.

E. Pricing policies and subsidy systems

1. Pricing policies

The application of self-financing rates has long been an accepted principle in the drinking water supply and sanitation sector in Latin America and the Caribbean (especially in urban areas), despite the fact that the principle is rarely applied effectively in practice (ECLAC, 1990a). It should therefore come as no surprise that, in most countries, the services are mainly financed by the general income of the various levels of government. The level of such financing has always fluctuated considerably in accordance with variations in political priorities and adverse macroeconomic conditions (Lee and Jouravlev, 1992).

According to the *Regional Report on the Evaluation 2000 in the Region of the Americas: Water Supply and Sanitation, Current Status and Prospects*: “In almost universal fashion, in the countries of the Region, except for [Canada and the United States] and some other countries, tariffs do not succeed in covering operation and maintenance costs, which is the reason why the services are subsidized. State subsidies have created a growing dependency on institutions providing drinking water and sanitation services in a large number of countries of the Region”(PAHO, 2001a). The factors that hamper the achievement of self-financing of drinking water supply and sanitation services in the region include the following: (i) limited payment culture and payment capacity, combined with the absence of effective subsidy systems for low-income groups; and (ii) high service costs (often due to enterprise inefficiency), high labour costs and indebtedness.

The inability of service providers to finance themselves not only seriously affects service expansion programmes but also the operation and maintenance of existing systems. In addition, low rates combined with the absence of micro-metering in many countries result in consumption that is way above normal levels (over 350 litres per inhabitant per day in Panama, the Dominican Republic and Venezuela) (PAHO, 1998).

The main cases of a high level of self-financing of services are limited to Argentina (especially prior to the devaluation in 2002) and Chile. Several other countries have made progress towards more realistic rates that are enabling them to reduce the chronic financial deficits of service providers and to decrease sectoral dependence on fiscal budgets. Progress has not been continuous, however. It rarely covers an entire country and is limited to certain urban centres (usually those with the highest income and with services provided with private sector participation). Efforts made in the following countries are worthy of mention: Bolivia (mainly La Paz), Brazil, Colombia, Costa Rica, Ecuador (mainly Guayaquil and Quito), El Salvador, Nicaragua and Peru (especially Lima). Several countries have also improved levels of collectability, which often reach 70% of service billing (GWP, 2000). Yet national experiences also suggest that, apart from the most relatively developed countries, “severely lagging investment will only be overcome with considerable contributions from public funds until such time as the basic infrastructure is completed and economies are on a more definite track to growth in order to reduce poverty in the region” (Corrales, 2003).

development, recognition and sustainability of regulatory processes of the drinking water supply and sanitation sector in member countries.

2. Subsidy systems

Latin America and the Caribbean has the worst income distribution in the world. More worrying still is that, in recent years, there have been no encouraging results in terms of income distribution within the region. According to ECLAC estimates (2003a), over 44% of Latin America's population is living in poverty, while about 20% of the region's population is indigent. In 2003, the poor are expected to number almost 227 million, including 102 million indigents. Given the above, it is obvious that rate adjustments aimed at self-financing are limited by the extremely low payment capacity of large groups of the population.

The traditional response to such problems was cross subsidies between high- and low-income users within the same service area. This redistribution is usually carried out through price discrimination based on users' socio-economic circumstances (such as, place of residence, when the residents of "rich" areas subsidize those in the "poor" areas; housing characteristics, such as surface area below a certain threshold; or economic activity) or levels of consumption.

Although the tariff policy of many countries is still based on cross subsidies, it is an approach that has been criticized partly for failing to ensure an efficient allocation of economic resources, but mainly because it has resulted in a chronic under-funding of services (Yepes, 2003). This is often due to the fact that, in order for cross subsidies to be compatible with the financial sufficiency of the service providers, the rates of those groups financing the others have to be increased to levels that are politically and economically unfeasible, failing which the deficits must be covered using resources from other components of rate formulae (investment in expansion and asset replacement, and in some cases operating and maintenance expenses):

- The number of users benefiting from subsidies is higher than the number of users financing the system. This is partly due to high levels of poverty, small service areas with homogenous socio-economic characteristics, political and social pressures, design errors, but mainly due to the administrative difficulties of accurately identifying the users to be subsidized with the indicators available. For instance in Bogotá, Colombia, the system is based on solidarity pricing, where the users with the lowest incomes (stratum 1) pay 82% of the cost of service, while the high-income groups (stratum 6) pay 253%. Yet the system is not sustainable because about 90% of users are subsidized (Rozo, 2003).
- Also, an extremely unequal income distribution in most service areas means that the medium- and high-income groups are not yet large enough to generate the necessary resources to subsidize the consumption of the poor: according to Delgado (1999), "payments received for drinking water and basic sanitation services in most Colombian cities are insufficient to cover subsidies. This results in shortfalls that departments and municipalities have often been unable to cover ... Much of the market ... is made up of strata 1, 2 and 3 [low-income groups], which means that expanding the systems requires resources from the official budget". As for business and industrial users, they can usually: (i) transfer rate adjustments to the price of their products and services, with the resulting effects on competitiveness and employment; and (ii) withdraw from the official services and use cheaper alternative sources of supply (see page 19).

To replace the cross subsidies approach, many of the region's countries have expressed an interest in sophisticated systems of direct subsidies for low-income groups financed by State contributions. To date, only Chile, has introduced the system, which was made operational in 1990 and consolidated by 1993, once several adjustments had been carried out to overcome certain operational teething problems (see Box 12). The system has been successful, in that it has enabled service providers to charge rates that make the sector financially sustainable while achieving the objective of focusing public assistance on the poorest groups of society.

THE SYSTEM OF TARGETED SUBSIDIES IN CHILE

In order to help low-income families, the Government introduced Act N° 18.778 (2 February 1989) establishing a subsidy system for water supply and sewerage services. The subsidy system is financed by the Central Government and run by the municipalities. The latter are responsible for the registration and selection of applicants and for informing the water companies of the list of beneficiaries, so that users' bills detail the amount due from the user separately from the sum that the municipality will pay directly to the company.

The selection system consists of socio-economic characterization through proxy means testing to ensure that the State's social action is focused on the poorest sectors of society. This is carried out using the CAS Survey, named after the Spanish for the Social Assistance Committees (*Comités de Asistencia Social Comunal*) set up during the 1970s. These Committees highlighted the need to create a standardized instrument to prioritise those State programmes aimed at the most needy sectors of society: thus the "Ficha CAS" (Social Assistance Card) was introduced in 1980.

At first, the subsidy system was not fully operational owing to administrative difficulties and the fact that the subsidies were not adapted to the different tariff levels existing in the various regions of the country. In 1991, the first legal amendment was made (Act N° 19.059) to facilitate the registration process and authorize the water companies to identify possible beneficiaries. The amendment also increased the subsidies and eliminated the consumption limit of 20 m³. The Government continued research into how to enhance the subsidy system, particularly with a view to guaranteeing effective allocation. Subsidy needs were established for each region and tariff level, on the condition that a 20 m³ bill could not represent more than 5% of family income. This led to a new amendment in 1994 (Act N° 19.338) that extended subsidy coverage, increased the maximum percentage subsidy to 85% and increased the consumption covered by the subsidy from 15 to 20 m³.

The subsidy is currently applied to the first 20 m³ of fixed and variable charges billed to users' permanent residences (the remainder is paid by the user at the normal rate). The subsidy covers between 25% and 85% of total consumption. The percentage subsidy must be the same for beneficiaries who live in the same region, are subject to the same maximum rates and who are in a similar socio-economic situation. The subsidy is compatible with any other municipal subsidy awarded by the respective mayors.

Subsidy applicants must: (i) be unable to pay for the service; (ii) be up to date with service payments; and (iii) request the subsidy in writing from the municipality corresponding to the residence concerned. The socio-economic level of the family group is determined using the information from the Ficha CAS, on the basis of which each family group is allocated with points. The municipality then compiles a list of applicants from lowest to highest socio-economic level according to the points system and allocates the available subsidies. The subsidy ceases when: (i) eligibility requirements are no longer met; (ii) three bills for the unsubsidized service remain unpaid; (iii) information for the municipality to review socio-economic conditions is not provided; and (iv) when the subsidy period expires (maximum 3 years). Families are free to reapply once the subsidy ceases.

Source: Ángel (2003); Orphanópoulos (2003).

While the Chilean system is apparently working well, other countries (despite some progress) have been unable to set up and consolidate similar systems. This is because the national financial, tax and administrative systems must meet certain conditions if such subsidies are to be applied. These conditions, which are far from being achieved in most countries of the region, include: (i) political will; (ii) a fiscal system capable of generating sufficient resources, even during crises; (iii) administrative capacity in terms of beneficiary identification and subsidy distribution and allocation; and (iv) legal capacity for follow-up and monitoring and possibly accountability and compulsory compliance (Solanes, 1999). It should also be borne in mind that, in Chile, these subsidies are an integral part of a wider system for social programmes financed with public funds. A similar system limited exclusively to drinking water supply and sanitation services might not prove cost effective (Yepes, 2003) or justifiable in areas with high levels of poverty.

Conclusions

The analyses carried out in this study have prompted the following conclusions **concerning the current situation of the drinking water supply and sanitation sector in the region's countries:**

- Latin American and Caribbean countries have made great efforts to improve the population's access to drinking water supply and sanitation services. Although the situation varies considerably among countries, levels of coverage can generally be considered reasonable, with the possible exception of wastewater treatment. However, there remain serious shortcomings in access to services, with low-income groups and rural areas being disproportionately affected.
- For various reasons, many reforms have been carried out in the drinking water supply and sanitation sector of most of the region's countries since the 1980s. Broadly speaking, an analysis of the situation reveals significant progress in the adoption of new legal and regulatory frameworks, the setting up of the relevant institutions, changes in the sector's institutional and industrial structure and, in some cases (mainly Argentina and Chile), the incorporation of the private sector.
- On the other hand, the most important advances have often been made in terms of policies and declarations of intentions. The majority of the region's countries are falling short in reforms associated with tariff readjustments to levels that guarantee the financial sustainability of service providers, the creation of effective subsidy systems for low-income groups, the application of regulatory frameworks and

changing the behaviour of public service providers. The combination of these problems, macroeconomic instability and the structural deficit in public finances has resulted in reforms that have been less successful than expected.

The main priorities of the countries of the region in reforming the drinking water supply and sanitation sector include:

- **Improving regulatory frameworks:** The regulatory frameworks adopted in the region are weak, especially compared with the regulatory practices in countries with a long tradition of public utility services being provided by the private sector. The main priorities for improvement are: (i) strengthening the professional, technical and financial capacity of the regulatory entities and ensuring their independence and stability; (ii) developing procedures for accessing the internal information of regulated companies, especially regulatory accounting and monitoring of purchasing and contracts with associated companies; (iii) promoting the participation of consumers and civil society in general in the regulatory process; and (iv) improving arbitration mechanisms and dispute resolution procedures. Other important tasks include: adapting regulatory practices to the specific characteristics of public service providers and deepening the analysis of the effects of international investment protection agreements on the national capacity for regulating public utility services.
- **Creating subsidy systems for low-income groups:** The financing of drinking water supply and sanitation services has been and remains a critical unresolved problem in most of the region's countries. Given that the rate adjustments needed to achieve self financing are limited by the low payment capacity of large groups of the population, the creation of effective subsidy systems, that should be based as far as practicable on direct and focused compensation mechanisms and avoid cross subsidies, is a prerequisite if the chronic lack of finances within the sector is to be reversed. In some countries, the State needs to recover its traditional role of financing investment, particularly for the purposes of extending coverage to low-income groups.
- **Consolidating horizontal industrial structure:** Many of the decentralizing reforms have left the sector with a highly fragmented industrial structure made up of numerous service providers, without real possibilities to achieve economies of scale or economic viability, and under the responsibility of local bodies that lack the necessary resources to deal effectively with the complexity of the processes involved in providing services. It is clearly necessary for most countries to consolidate the sector's industrial structure by achieving a happy medium between the excessive centralization of the 1960s and 1970s, and the extreme fragmentation of the 1980s and 1990s. Regulatory frameworks should therefore offer incentives for such consolidation and provide the means of achieving it.

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