

The Role of Private Sector Participation (PSP) for Sustainable Water Supply and Sanitation Sectors

— The Case of Latin America — *

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Abstract

In the world, more than 1.1 billion out of 6 billion people are without access to safe drinking water. Most of them live in developing countries. 80% of their diseases are caused by poor sanitation system. For the purpose of improving this situation, the UN Millennium Development Goals (2000) set the target, “halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation.” In order to attain the goal, water and sanitation sectors must be sustainable; and it would be effective for governments of developing countries to set a long-term vision and concrete targets for the sectors.

Private sector participation (PSP) can be useful to ensure the sustainability of the sectors. In considering PSP, it is worth emphasizing two types of policy sequences. The first is sequence of improving financial aspects of service providers. For example, service providers must first implement self-efforts, such as improvement of user charge collection and unaccounted for water, before raising tariff. The second is related to sequence of introducing PSP in accordance with countries' circumstances. More concretely, governments should select appropriate PSP options ranging from moderate ones such as service contract to radical ones including asset sale, depending on their countries' political, economic, social and institutional situations about PSP.

The results of Contingent Valuation Method (CVM) Survey conducted in Iqitos City (Peru) show that affordability-to-pay (ATP) of the residents for water and sanitation services was almost equivalent to their current average payment; and that their willingness-to-pay (WTP) was about twice as high as

their current payment. It seems difficult to raise the tariff level in view of payment ability of the users in the City in spite of the high WTP. Before imposing financial burden on the users, the supplier in the City should improve its tariff collection rate, unaccounted for water rate, recurrent cost rate, etc.

Regarding water and sanitation sectors, radical privatization approach may not be appropriate. Public service suppliers must first make best efforts in solving their own problems. In parallel, national governments should set up institutions and regulations and long-term support policy such as subsidy. If these important changes are made, governments should select appropriate PSP options and steadily realize gains of PSP. Such policy approach is considered to contribute to sustainability of water and sanitation sectors in Latin American countries.

Chapter 1. Introduction

This paper is aimed at suggesting effective measures for the introduction of Private Sector Participation (PSP), by examining how the introduction of Private Sector Participation (PSP) can contribute to building up sustainable water and sanitation sectors in developing countries, and extracting essential features from the successes and failures of actual PSP cases that have taken place in Latin America.

Chapter 1 ascertains the deterioration of the water environment on a global scale and the features of water and sanitation services, and outlines various problems underlying the sector and the roles of PSP to solve the problems, all of which will be analyzed in detail in the subsequent chapters.

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1. The deterioration of the water environment on a global scale

Water is indispensable for the continued existence of human beings. Problems either in drinking water or in sewerage systems will threaten our existence. Although the former must be supplied safely and continuously, 1.1 billion out of approximately 6 billion people on the earth had reportedly no access to safe drinking water as of 2003¹. Where sanitation is concerned, water contamination has been spreading largely in developing countries due to lack of adequate sewerage systems. According to a U.N. report (1998), since appropriate sanitation facilities are not available for half of the world population, 80 percent of diseases in developing countries are attributable to water contamination and 20 percent of species of freshwater fish are on the edge of extinction. The current state concerning sewerage systems not only accelerates the global-scale deterioration of the water environment, but also has deleterious effects on human life, particularly in developing countries. Thus, water supply and sanitation systems must be adequately developed in such countries as soon as possible with active support of the international community.

2. Features of water supply and sanitation services

Electricity, gas, water and other fundamental services for the proper operation of economies and societies are, in many cases, provided as public services by governments, public corporation, or other public sectors. Above all, the water supply and sanitation services are counted as (i) a basic human need² for the continued existence of human beings, are (ii) a universal service³ which has to be equally provided to the population as a whole. In this sense, the water supply and sanitation services are of public nature in the broadest sense, and thus must continue to be improved into the future.

Accordingly, the water supply and sanitation services ought to be provided constantly with a certain level of quality for the long term (sustainable operation and maintenance) at an affordable tariff level for users and require timely capital investment

necessary for achieving the long-term objective of 100% coverage that is, equitable accessibility (sustainable investment). This principle of sustainability must be followed by developing countries, as well as developed countries, and the establishment of a sustainable framework is absolutely essential for achieving long-term, stable development, which is a primary objective of yen-loan projects and other development projects.

3. The roles of PSP in sustainable development

The development of the water and sanitation sector in developing countries has to be carried out in accordance with the global environment and the features of the water supply and sanitation services stated above. In fact, however, improvement of the coverage ratio and the collection ratio have been at a slow pace, while utilities - that is, public agencies or public corporations - suffer from serious financial problems, due to shortage of tariff revenues, and cannot afford appropriate operation and maintenance and the necessary capital investment. The chronic state of deficit and insufficient facilities in the water and sanitation sector leads to the stagnation of progress with people's access to water and sanitation services, and even results in deterioration of the water circulation. In short, the water supply and sanitation sector in many developing countries is not yet in a sustainable state.

In order to make a breakthrough with this situation and develop a sustainable water and sanitation sector, the introduction of Private Sector Participation (hereinafter referred to as PSP) can be regarded as a powerful device, in addition to efforts for improvement made by policy makers, utilities and other public entities. Since the water supply and sanitation sector is chargeable, participation by the private sector is quite active, following the electricity and telecommunication sectors, and in fact the Philippines, Indonesia, Argentina, and Chile have already adopted PSP activities.

In general, various theories on PSP options and introduction methodologies, as well as case studies, are available, with regard to the introduction of PSP

1 Source: "Final Report, Kyoto, Japan, 22-23 March 2003," the 3rd World Water Forum, Ministerial Conference.

2 Basic Human Needs: BHN

3 Universal Service

into the public sector. Regardless of the PSP option adopted, the implementation procedure (sequence) of policy measures is extremely crucial. In the case of the water and sanitation sector, two types of sequence will be taken into consideration.

The first type concerns the “order of implementation of measures to improve the management in the sector”, regardless of whether or not PSP is introduced. For example, in the four Latin American countries focused in this study where only about half of the users pay for the water supply and sanitation services, any increase in water tariffs will be inappropriate unless fairness of financial burden (i.e. collection of charges from non-payers) is secured. Otherwise those who currently pay for the services will be charged more. Under such circumstances, the authorities or the utilities must undertake measures to increase the collection ratio, which does not require any bold political decisions or alterations to the existing policies, and subsequently measures to increase the tariff can be examined.

The second type of sequence is the “order of selecting PSP options that match individual service environments”, which must be considered when introducing PSP into the water supply and sanitation services. If a radical PSP option is to be applied to an environment where there is no mechanism that enables PSP to work smoothly, the PSP introduction will generate strong resentment and resistance from users, and may likely collapse the services themselves, rather than securing the sustainability of the services. In order to take full advantage of PSP for sustainable development, it is important to carefully examine the environment surrounding individual utilities, choose an appropriate PSP option, and implement PSP activity steps one at a time after confirming the success of each step.

However, there seem to be few studies or reports of research carried out with regard to assuring “sustainability” in the water and sanitation sector (not at individual utility or project level) that attempt to study issues of the introduction of PSP both systematically and demonstratively, from a viewpoint which emphasizes the importance of the two types of

policy sequences and the subsequent need for securing the effects of projects on the development. This paper is based on the foregoing viewpoint and aimed at investigating various issues in the following chapters and providing some suggestions. An outline of the subsequent chapters is as follows:

In order to examine conditions, options, methodologies, and case studies of the introduction of PSP into the water supply and sanitation sector in developing countries, Chapter 2 presents a long-term vision (i.e., an ideal picture) for the creation of a sustainable sector, and specify a series of parameters to gauge the degree of achievement of the long-term objectives (e.g., the coverage rate, the collection ratio, etc.), together with the target values for these parameters and the current state. Chapter 3 is devoted to the understanding of the current situations and problems of four Latin American countries - Mexico, Peru, Panama and Costa Rica (hereinafter referred to as the focused Four Countries) - in the light of the evaluation parameters selected in the preceding chapter, and presents future challenges in the water and sanitation sector in individual countries. Chapter 4 outlines the current status of the introduction of the private sector in each of the focused Four Countries, and its advantages and disadvantages, and examines and suggests effective PSP options to attain objectives set in each country. Chapter 5 highlights new and existing ODA loan projects in two of the focused Four Countries⁴; examines the feasibility and conditions for the introduction of PSP in these projects from the viewpoint of assuring sustainable realization of development effects; and estimates the user charges which beneficiaries should bear for the water and sanitation services on the basis of the findings of a questionnaire survey⁵ carried out in Iquitos City in Peru to consider a reasonable tariff level. Finally, taking into account all the analyses made in the previous chapters, chapter 6 attempts to provide some recommendations concerning possible roles for the introduction of the private sector in establishing sustainable water and sanitation sectors in Latin America.

4 Provincial Cities Water Supply and Sewerage Improvement and Expansion Project (II) (Ongoing); and Panama Bay and Panama City Sanitation Project (New)

5 The questionnaire survey made use of the Contingent Valuation Method (CVM), addressed to 1,000 users of water supply and sanitation services in Iquitos City in Peru concerning the Affordability to Pay (ATP) and the expressed Willingness to Pay (WTP). (See Chapter 5.)

Chapter 2. Requirements for Establishing Sustainable Water Supply and Sanitation Sectors in Developing Countries

Water supply and sanitation services is a Basic Human Need (BHN) for the continued existence of human beings, and must be provided equally to all the population. However, the access to such systems is not at an adequate level in developing countries because of shortage of funds and insufficient technology. In the water and sanitation sectors of those countries, it is therefore necessary to take action to provide water and sanitation services widely to the population in a long-term and stable manner.

This chapter, first of all, presents long-term visions that the water and sanitation sectors should provide the services on a sustainable basis. Then, in order to grasp and clarify problems arising in the entire sector and at the government, utility, and project levels, appropriate quantitative indicators for evaluation (e.g., water and sanitation coverage ratios, collection ratio, etc.) will be selected⁶. In addition, this chapter attempts to identify ideal values and status for individual indicators as targets to be achieved, thereby presenting future challenges in the sectors.

1. The current situation in the water and sanitation sectors in developing countries

Currently, on a global scale, 2.4 billion people have no access to appropriate sanitation facilities, and 1.1 billion people have no access to safe drinking water. As these problems are widely observed in developing countries, the United Nations has set an objective that the proportion of people who have no access to safe drinking water should be halved by 2015 (Target 10) within the context of Goal 7 of its “Creating a Sustainable Environment” program, which is a part of its Millennium Development Goals (MDGs)⁷.

In fact, a comparison of the water coverage ratios in the world shows that, while the ratios in developed countries exceed 90%, those in countries in Asia, Africa, and Latin America are below 50% in many cases, showing an obvious inferiority to the advanced countries. This indicates the fact that, although water supply service is counted as a BHN, it is not provided sufficiently to the population of developing countries.

This tendency is far more conspicuous in sanitation coverage. From the standpoints of improvement of the sanitary conditions in the living environment and conservation of the natural environment, many countries have begun emphasizing the promotion of sewerage works in recent years. However, since the implementation of sewerage works requires a large amount of investment, and individual developing countries are short of funds for this investment, they tend to attach more importance to water supply works, rather than sewerage works from the viewpoint of BHN. All this contributes to the hovering of the sanitation coverage ratio below 50% in most countries in developing countries, and to no sign of the rapid improvement.

The water and sanitation sectors in developing countries face not only the problem of low coverage ratio but also various other problems related to the quality of service provided by the utilities and raising of funds necessary for continuous development of the sectors. In order to achieve the goal of improvement of sanitary conditions and elimination of poverty, immediate improvement of performance of the entire water and sanitation sectors is vital.

2. The long-term vision of the water and sanitation sector

As described above, the MDGs set a numerical target concerning water supply systems that the proportion of people who have no access to safe drinking water should be halved by 2015, and at the same time emphasized the importance of sewerage systems with

⁶ Items which cannot be evaluated with quantitative indicators were evaluated with qualitative indicators (e.g., “establishment of accountability” which cannot be numerically expressed.)

⁷ A United Nation Millennium Summit (held in September 2000) adopted a UN Millennium Declaration whereby Millennium Development Goals (MDGs) were set. There were eight goals which the international society must achieve by 2015, and 18 more specific targets and 48 indicators required to accomplish the goals.
http://www.developmentgoals.org/About_the_goals.htm

a specific numerical target to gauge the impact of water contamination caused by the absence of proper sewerage systems. This is because the absence of sewerage systems results in the direct discharge of untreated wastewater into rivers, which will contaminate public water and ground water. Therefore, the establishment of both water supply and sewerage systems is a prerequisite for long term, sustainable provision of the services in the water and sanitation sectors.

In line with this, the long-term vision for the water and sanitation sectors will be presented. More specifically, three requirements are focused on for the water and sanitation sector to assure sustainability - (1) securing a suitable level of service quality, (2) increasing the coverage ratio, and (3) making the expenditure and benefits at appropriate levels - and specific objectives which should be attained in the long term have been set (in Table 1). The contents of the three long-term objectives are as follows.

(1) Assuring a Adequate Level of Service Quality

The service quality required for a water supply system is to provide a sufficient volume of water at a with adequate quality. The target water quality is assumed as that meeting the drinking water quality standards set by the World Health Organization (WHO)⁸ upon the belief that, in developing countries, so long as water satisfies the WHO standards, it should be supplied as drinking water. On the other hand, where the water volume is concerned, the ultimate target is to supply water 24 hours per day to individual households whenever they need it.

The required service quality of a sanitation system is to assure suitable drainage of rainwater and wastewater and secondary treatment of wastewater before discharging into public water areas. (This is because it is desirable to treat wastewater collected via drainpipes into clean water before it is discharged into public water areas.) This treatment should ideally be adopted in local areas, too. But standards for water treatment in such areas are adjustable in accordance with the economic and social situations of individual regions.

Table 1: Long-Term Vision of Water and Sanitation Sectors

Item	Class	Long-Term Targets	
		Urban areas	Rural areas
(1)Quality of service	Water Supply	Water supply to individual households with safe water quality to meet WHO water quality standard 24 hours per day	
	Sanitation	Appropriate elimination of rainwater and polluted water, and implementation of secondary treatment of polluted water	Being able to provide services that are tailored to the social and economic circumstances
(2)Coverage ratio	Water Supply	A coverage ratio of nearly 100%	
	Sanitation	Conforming to the drinking water coverage ratio	Achieving a coverage ratio that is tailored to the social and economic circumstances
(3)Sound financial situation and tariff policy	Water Supply	(i) To realize benefits appropriately corresponding to the magnitude of expenditure on the sectors.	
	Sanitation	(ii) The amount and use of subsidies, long-term loan, funds raised by bond floatation must be reasonable, and must not suppress funds required in other sectors.	

Source: SADEP Study Team

8 The drinking water quality standards set forth by WHO: the standards of water quality which is free from problems as drinking water, although the level does not reach the quality of drinking water in developed countries.

(2) Increase in Coverage Ratio

In order for the population to live in a sanitary living environment, it is required that the entire population can access water from the water supply system at any given time. However, it is difficult to achieve the 100 % water coverage ratio due to difficulty in water supply through pipes in areas such as isolated islands and mountainous areas. The goal was therefore set at “nearly 100%.”

Where the sewerage system is concerned, it should ideally be provided interdependently with the water system for the purpose of achieving sustainable water circulation (at least, this system is essential in urban areas), so the sanitation coverage ratio was set at the proportion corresponding to the water coverage (nearly 100% at a maximum). In rural areas, however, inexpensive methods, for example, installing septic tanks, are more effective than sewerage systems in some cases, and thus consideration should be given to the social and economic situation, in developing a sanitation system.

(3) Realizing Benefits Appropriately Corresponding to the Magnitude of Expenditure

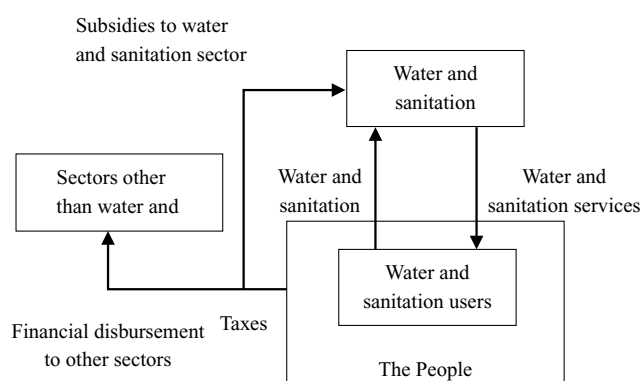
Where the financial situation of the water and sanitation sector is concerned, the utilities levy water supply and sewerage tariffs on their users in return for the services, but in many developing countries, the revenue from the tariffs falls extremely short.

Therefore, a part of tax revenue is used to subsidize the water and sanitation sectors to make up the deficits in the current account (insufficient revenue) and to compensate for insufficient funds for capital investment (insufficient capital)⁹ (Figure 1).

As for the expenditure, on the other hand, the water and sanitation sectors cannot afford downsizing of its services simply because of the shortage of collected charges, in that drinking water is essential for human existence and wastewater, unless processed, does substantial harm to substantially on the sanitary conditions and environment. Therefore, when needed, a possible reasonable policy option is to maintain the scale of expenditure by means of actively injecting subsidies and raising funds through long-term loans and bond floatations as a means to provide quality water supply and sanitation services to people. It must be borne in mind as to whether the people can benefit from the services sufficiently to meet the scale of expenditure (that is, the sum of revenue from tariffs, subsidies, borrowing/funds raising by bond floatation, plus other income.).

More specifically, in light of income redistribution policies (paying attention to the poverty group and gaps between urban and rural areas), geographical unbalance between beneficiaries and those who bear costs (e.g., residents near the downstream of rivers can benefit from an upstream sewerage system without bearing costs) and fair

Figure 1: Financial flow in the water and sanitation sectors



Source: SADEP Study Team

⁹ In this study, the financial analysis of the water and sanitation services is made based on the so-called “accounting method for public corporations” (for details, see Box 1 in Chapter 2). Subsidies are granted by the government or municipalities to make up for the deficits of the current account balance or insufficient revenues from the investment balance.

allocation of burdens among generations concerning expenditure on investment (e.g., costs of facilities with a useful lifespan of many years should be borne by several generations in accordance with the actual lifespan), the government will be able to gain the understanding of the people concerning measures such as active injections of subsidies into the sector and fund raising through long-term loan and bond floatation. On the other hand, the amount of subsidies, funds raised by borrowing or bond floatation may expand far more than the scope of the policies due to inefficient operation or inappropriate investment activities. In such cases the benefits are not brought to the people despite the massive amount of expenditure and the government may fall short of funds required for other sectors. Then the financial situation is obviously inappropriate, and fails to gain support from the people. Taking all this into account, the long-term objectives of the water and sanitation sectors have been set at (i) realizing benefits matching the scale of expenditure in the entire sectors and (ii) making reasonable use of the right amount of subsidies and funds raised by borrowing and bond floatation, together with avoiding excessively increased pressure on funds required in other sectors.

3. Problems and Future Challenges in the Water and Sanitation Sectors and at the Levels of Three Components

In order to clarify problems and future challenges which the water and sanitation sector has to tackle, the problems and challenges will be examined in the sectors as a whole (i) and by dividing the structure of the sectors into three components: the government level (ii), the utility level (iii), and the project level (iv). However, some countries have only one single utility which is responsible for the management of the water and sanitation sectors, whereas others have more than one. The basic components of the structure at each level, despite some differences among countries, are as shown in Figure 2.

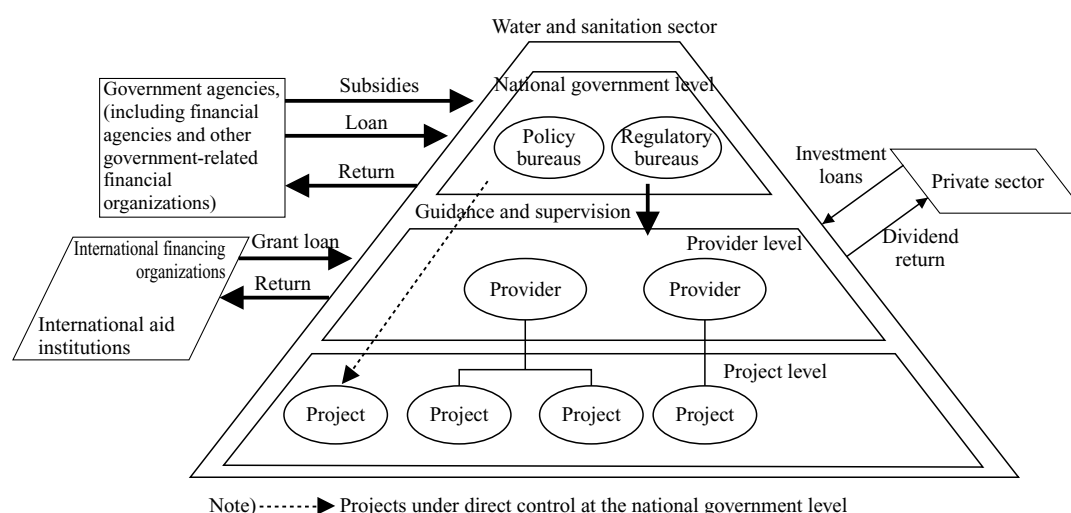
(1) Water and sanitation sectors

This is the collective unit consisting of all concerned organizations, such as agencies in charge of policy-making or regulations in conjunction with the water and sanitation services, water and sanitation utilities (local governments, public corporations and private firms), and other organizations related to projects being implemented and planned.

(2) National government level

This indicates policy bureaus (such as the Ministry of Health) that are the top-level decision-making organizations in the sectors, overseeing the policies

Figure :2 Relationships in the water and sanitation sectors



Note) Government organizations, international development financial organizations, and the private sector each provide direct supportive financing for government, providers and projects.
Source: SADEP Study Team

and laws governing the sectors. It includes the regulatory monitoring agencies that approve tariffs and various other matters for which petitions are submitted by utilities, financial agencies (such as the Ministry of Finance) that are in charge of the distribution of subsidies, and so on.

(3) Utility level

This indicates the implementing organizations that develop water and sanitation facilities and provide services using the facilities. Included are local governments, public utilities that have jurisdiction over the water and sanitation services under local government authorities, licenced or commissioned private utilities, and public entities that manage and supervise the water and sanitation services regardless of the administrative area.

(4) Project level

This indicates the smallest element in the water and sanitation sectors, that is, individual projects, including a project as a whole and parts of projects from construction to operation and maintenance of water and sanitation facilities. Projects are usually implemented by utilities.

4. Selecting indicators for evaluation

In order to make water and sanitation sectors sustainable, problems involved in the sector and at each component level (national government, utility and project levels) must be clarified and solved for the improvement of the sectors. For this purpose, certain criteria are needed to evaluate the presence of or the extent of such problems if any. Thus, a number of indicators are selected for the sector itself and the individual sector components, for which ideal numerical figures or statistics are presented as targets¹⁰. (In Chapter 3, the water and sanitation sectors in the focused Four Countries will be analyzed in accordance with these evaluation indicators to the extent possible.)

(1) Water and sanitation sector

The long-term visions pursued in the water and

sanitation sectors in one country are, as stated before, to achieve three goals: “assuring a adequate level of service quality”, “increasing coverage ratios”, and “Realizing benefits appropriately corresponding the magnitude of expenditure”. These are used as evaluation indicators (Table 2). Since the definitions of selective indicators and ideal numerical figures and conditions must be common among all the countries concerned, those have been taken from standards and criteria used in the U.N. Millennium Development Goals, the World Bank, and the WHO. In terms of contribution to public sanitation, the number of waterborn infectious disease cases is set as an indicator. This would enable overall evaluation of whether water quality and sewage treatment rates in the country to be studied are adequate and appropriate.

(2) National government level

The four parameters were selected as the national government level indicators to be used for evaluation, by assessing the circumstances of institutions, investment, subsidy and tariff systems, whether the government has succeeded in realizing sustainable water and sanitation sectors and constructing a system in which utilities can provide their services on a sustainable basis (Table 3). Because the organizational structures of central governments, and the economic and social conditions vary from one country to another, it is difficult to carry out straightforward comparisons of countries making use of quantitative numerical values. Thus, these indicators are compared on a qualitative basis as stated before. The outline of governmental subsidy policy is presented in Box 1, and the outline of tariff policies in Box 2.

(3) Utility level

In order for the water and sanitation sectors to be sustainable, the three areas, (i) “provision of services”, (ii) “operation and maintenance” and (iii) “financial management”, need to be sound at the utility level. The evaluation indicators were selected taking into consideration the following with regard to

¹⁰ For indicators, qualitative ones (establishment of accountability, etc.), in addition to quantitative ones (coverage ratios, etc.) have been included as many as possible.

Table 2: Indicators and Ideal Numerical Figures for Conditions in the Water and Sanitation Sectors

No.	Indicator	Description	Ideal Conditions
a	Water Coverage Ratio	Water coverage ratio (%) = (Actual population with access to water / Total population) x 100	Nearly 100%
b	Quality of Supplied Water	Supply of good quality water	Water quality that meets WHO water quality standards.
c	Quality of Supplied Water	Sanitation coverage ratio (%) = (Actual population with access to sanitation services / Total population) x 100	Nearly 100%
d	Wastewater Treatment Ratio	Wastewater treatment ratio (%) = (Volume treated at sanitation facilities / Total wastewater volume discharged from area with sewerage system) x 100	The wastewater treatment ratio to be 100%.
e	Unaccounted for Water (UFW)	UFW rate (%) = [(Physical losses + commercial losses) / Total water distributed] x 100	An average of about 30% throughout developing countries (World Bank TWUWS ¹¹ , 1996).
f	Statistical Data on the Occurrence of Waterborne Diseases	Trends in the number of occurrences of waterborn infectious diseases Trends in the medical expenses on waterborn infectious diseases	No occurrence of waterborn infectious diseases. A small proportion of medical expenses on waterborn infectious diseases to all medical expenses (the target is the level observed in developed countries.)

prerequisites for soundness (in Table 4). The definitions of the indicators at the utility level and a description of the ideal conditions are given below.

(i) Provision of services

Criteria to evaluate the content of services provided is necessarily required to be able to measure how many people the services cover in practice. Thus, the “coverage ratio of water supply” and the “coverage ratio of sanitation services” were selected as the indicators.

As for indicators to assess the quality level of the services provided, “quality of supplied water,” “supply continuity” and “water pressure” can be evaluated to grasp a rough idea about the water services quality. As for sewerage, on the other hand, “wastewater treatment ratio” was selected, in that it can evaluate whether wastewater is appropriately treated with secondary treatment in the sanitation

facility.

(ii) Operation and maintenance

The operation and maintenance is the routine work for which the utility is responsible in order to maintain the quality and quantity of services and to provide the services continuously and steadily. A primary task in the operation and maintenance is to minimize the leakage (physical losses) likely to occur in the service of supplying water. At the same time, if the volume of non-metered water (commercial losses) is substantial, it causes, like water leakage, a reduction in the collection of water tariffs, so that appropriate maintenance is needed. Supplied water that does not result in revenue, such as that which has leaked out or is non-metered, is called “unaccounted-for water” (UFW), and this can serve as an appropriate indicator for the level of operation and maintenance.

11 TWUWS : Transportation, Water, and Urban development department’s Water and Sewerage division

Table 3 Sustainability Indicators and Ideal Conditions at Government Level

No.	Indicator	Definition and Description	Ideal Conditions
a	Establishment of an accountability system	Degree of clarity and establishment of roles, functions and supervisory authorities of policy-making agency, supervisory agency, financing agency in the central government.	<p>* The functions and accountability of the administrative organizations – the central government, local governments and semi-governmental organizations must be clearly established.</p> <p>* In order for the utilities to implement services smoothly, the legal and regulatory systems must be appropriately established.</p>
b	Trend of Investments	The presence or absence of any national investment plan based on the long-term visions of the water and sanitation sector (including plans related to overseas economic assistance).	* Long-term investment plans must be formulated which take into consideration a balance in overall national revenue and expenditure, and the investment activities in the sector must be appropriately made at the right timing with the right balance of distribution.
c	Trend of Subsidies	<p>* The amount of governmental subsidies allocated to new and continued investments in fixed capital stock in the water and sanitation sector.</p> <p>* The amount of governmental subsidies allocated to the current account income.</p>	<p>* Subsidies allocated to capital investment necessary to form fixed capital stock must be assured.</p> <p>* The proportion of subsidies to the balance of the current account should not be excessively large compared to the revenues from water tariffs.</p>
d	Tariff Policy d-1 Tariff Structure	<p>(Tariff Structure)</p> <p>* Metered tariff system making use of water meters.</p> <p>* Tariff system which provides incentives for water savings.</p> <p>* Tariff system which pays careful attention to low-income customers as necessary.</p>	<p>* The structure must comprise basic fees for maintenance costs required even when facilities are not used and increasing metered tariffs (progressive tariff structure).</p> <p>* Tariff categories must be simply divided into general household and business.</p> <p>* A separate tariff structure is provided for low-income customers as necessary.</p>
	d-2 Tariff Level	<p>(Tariff Level)</p> <p>* Degree of transparency in the procedures of setting and revising the tariff level.</p> <p>* Degree of political and social considerations</p>	<p>* Tariff system must be established and revised in the manner that the people involved can clearly understand the procedure.</p> <p>* The setting and revision of tariff levels must be conducted on a reasonable basis (e.g., ATP, WTP, etc.).</p>

== Box 1. Financial Accounting for Water and Sanitation Services ==

Water and sanitation services are a revenue-oriented public service. In Japan, for example, the provider of the services classifies its balance of payments into an investment balance (the capital revenue and expenditure) and a current account balance (the balance of revenue and expenditure of a profit-making business) in accordance with the accounting method for public corporations, so as to run on a standalone basis. The accounting method for public corporations, unlike a method for public agencies, is similar to that for private companies, and is aimed at making up for the depreciation of fixed capital stock (depreciation allowance) with revenues of the public firm itself.

In general, the establishment of the infrastructure of water and sanitation systems requires a massive amount of investment in facilities, which include construction of water supply piping networks, ground burial of sewerage pipes, and construction of water filtration and wastewater treatment facilities. This investment expenditure on fixed capital stocks with many long years of depreciation is normally financed by subsidies and funds raised by long-term loans (including floating bonds). The injection of tax revenues means that the cost is borne by the people as a whole if it is a national tax income, or by people in particular regions if it is a local tax income, and the governmental subsidies are granted to the provider of the water supply and sanitation services.

On the other hand, the current account balance (operation and maintenance cost, payment of interest on loans and debentures, depreciation costs, etc.) should, in principle, be ideally financed by revenues from charges levied on the users, so that securing of tariff collection becomes essential. However, utilities in some areas cannot expect sufficient collection due to, for example, water leakage, absence of water meters and a large number of non-payments, and thus the balance of their current account may, in many cases, be in the red. In such cases, the shortage of funds is normally compensated by tax revenues (local tax) from the citizens concerned, but at the same time the utilities themselves are required to make efforts to balance the budget via, for example, streamlining the operation and maintenance cost (cost reduction). Where a sewerage system is concerned, beneficiaries of the service include not only those who discharge water through the system (users) but also a wider range of people. That means the system contributes to the improvement of the local environment as a whole. Hence, the construction of sewerage systems may be financed by public subsidies from national or local tax funds.

Another element that requires operation and maintenance cost is workforce, which has to be the right number within the organization of the service provision (neither overstaffed nor understaffed). If the organization is understaffed, they may be unable to detect water leakage or disabled meters, or collect water tariffs. On the contrary, if it is overstaffed, the operation may become inefficient. As an indicator to gauge the appropriate number of staff members of the utility, a “Staff per Thousand Water Connections” (SWC) made use of by the World Bank will be

considered.

(iii) Financial management

In assessing the appropriateness of the financial management¹², it is necessary, above all, to see how much the revenue from water tariffs can finance the current account expenditure. It is ideal at individual utility level if the revenue arising from the collection of water tariffs can finance all the current account expenditure, but in practice as described earlier, the utilities are in many cases in deficits (most of which

12 The financial management will be assessed in accordance with the accounting method for public corporations (see description in Box1). For references of the same method applied in Japan, see homepages (financial and account reports) of the financial reports of municipalities and public firms, such as the Bureau of Water Works of Tokyo Metropolitan Government; Bureau of Sewerage of Tokyo Metropolitan Government; Water Bureau, Corporate Agency, Kanagawa Prefecture; and Bureau of Sewerage, Yokohama City.

== Box 2. Three important criteria for setting water supply and sewerage tariffs ==

There are several criteria for setting a tariff level for water supply and sanitation services. First, it is necessary to set a tariff level in accordance with the income levels of users so that they can actually afford to pay. The upper limit of the charge is normally called "Affordability to Pay" (ATP). (See Chapter 5) Second, it is also important to recognize "Willingness to Pay" (WTP) as a reference, which is obtained by a questionnaire survey which asks users how much they are willing to pay at a maximum for the services (See Chapter 5) A tariff level in excess of ATP or WTP may make it impossible for many users to pay their tariffs, or may even make them refuse to pay. Third, a tariff level may be determined from the viewpoint of profitability. The utility is required to pay their operation and maintenance costs for everyday services, and thus it is appropriate to finance the cost by the tariffs collected from users in consideration for the service provided. At the same time, the payments for interest on loans and debentures (capital costs for facilities accrued in the fiscal year in question) and depreciation costs should ideally be financed from revenues accrued within the same fiscal year as much as possible. Hence, it is necessary, when profitability is being taken into account, to set a level which can support the operation and maintenance cost and the payments for interests and depreciation costs.

Accordingly, it is vital to set a tariff level for the water supply and sanitation services, taking all factors into account - (i) ATP, and (ii) WTP - and at the same time, (iii) trying to make the tariff such that it is possible to finance the current account expenditures as much as possible under the principle of profitability.

is made up for by governmental subsidies, etc.). Such chronic states of deficit can be gauged by the proportion (Working Ratio, WR) of operation costs (operation and maintenance cost) to the revenue from water tariffs as a whole, and the proportion (Operating Ratio, OR) of management costs (the total current account expenditure which is the sum of operation and maintenance cost, costs for the payments of interest for loans and bonds and depreciation costs) to the tariff revenue. In other words, a 100% working ratio suggests that all the operation and maintenance costs are financed from tariff revenue, and a 100% operating ratio indicates that all the current account expenditure is financed from tariff revenue.

In evaluating the financial position of the water supply and sanitation utility, it is important to grasp whether water tariffs are appropriately collected. In developing countries, quite a few utilities fail to collect water tariffs although the meters installed indicate the volume of consumed water (in some cases, the amount of collected tariffs cannot reach even half of the amount claimed). Therefore, it is essential to grasp the Collection Ratio (CR) to enhance the financial strength of the utilities.

(4) Project level

Problematic projects are those that are not carried out as planned, that are implemented despite their lack of profitability, and that have a negative impact on society. With that in mind, the following three parameters have been selected as indicators for evaluating project sustainability. (Table 5)

(i) Adequacy of project plan

Projects to be carried out must bring about adequate socio-economic benefits to the population for the burden to be incurred by them. Sufficient consideration must be given to the necessity and effects of a project as well as to the scale required for the project.

(ii) Financial situation

It is essential to assure profitability in terms of costs, such as investment and O&M funds, to be spent on new construction, expansion, maintenance or repair work on facilities.

(iii) Social impact

It is vital to ensure that the project appropriately satisfies the demand for the service provided, avoids any harmful impact on society, and users and function properly to contribute to society.

Table 4: Sustainability Indicators and Ideal Conditions at Utility Level

	No.	Indicator	Description	Ideal Conditions
(i) Provision of Service	a	Water Coverage Ratio	Water coverage ratio (%) = (Actual population with access to water / Total population) x 100	nearly 100%.
	b	b-1 Quality of Supplied Water	b-1 Quality of Supplied Water	Water quality that meets WHO water quality standards.
		b-2 Supply Continuity	Ensured hours of water supply	Continuous 24-hour supply of water to every household.
		b-3 Water Pressure	Optimal water pressure	Minimum 0.2 MPa.
	c	Sanitation Coverage Ratio	Sanitation coverage ratio (%) = (Actual population with access to sanitation services / Total population) x 100	nearly 100%. (However, in rural areas, expansion of sanitation should be promoted by means other than sewerage systems with consideration socioeconomic conditions.)
	d	Wastewater Treatment Ratio	Wastewater treatment ratio (%) = (Volume treated at sanitation facilities / Total wastewater volume discharged from area with sewerage system) x 100	The wastewater treatment rate should be 100%.
(ii) Operation and Maintenance	e	Water to sewerage Coverage Ratio	Sewerage coverage / water coverage (%) = (Sewerage coverage / water coverage) x 100	100% (The sewerage coverage ratio must be the same as the water coverage ratio.)
	f	Un-accounted-for Water (UFW)	UFW rate (%) = [(Physical losses + commercial losses) / Total water distributed] x 100 Physical loss means water leakage; commercial loss means non-metered water and water consumption for parks, public spaces, and firefighting.	An average of about 30% throughout developing countries (World Bank TWUWS, 1996)
	g	Staff per Thousand Water Connections (SWC)	Staff per 1,000 Water Connections = Total Staff / (Number of water connections / 1,000)	5 persons per thousand connections (according to a World Bank data)
(iii) Financial Management	h	h-1 Working Ratio (WR)	Working ratio = Operational cost / Tariff revenue Where operational cost includes electricity charges, repairs, repair materials, and labor, but not depreciation.	Not exceeding 100%. (A recommended value is 70% or less)
		h-2 Operating Ratio (OR)	Operating ratio = (Total operating costs / Tariff revenue x 100 Where total operating costs = operational costs + depreciation + interest repayment.	Not exceeding 120%. (A recommended value is 100% or less.)
	i	i-1 Collection Ratio (CR)	Collection ratio (%)= (Amount of money collected from water and sanitation bills / Total value of billing) x 100	90%. (100% is recommended.)
		i-2 Tariff Level	Same as shown in Table 3	Same as shown in Table 3

Table 5: Sustainability Indicators and Ideal Conditions at Project Level

	No.	Indicator	Description	Ideal Conditions
(i) Adequacy of Project	a	Progress against the project plan	* Progress of project compared to the planned schedule	Project is undertaken according to the plan from the perspectives of the national plan, priority, appropriate scale, efficiency, project effects, and spillover effects.
	b	Appropriateness of scale of project	<ul style="list-style-type: none"> •Scale of project in the light of its purpose, effect, and cost and benefit •Political consideration, requests from social policy viewpoint, and economic situation 	<ul style="list-style-type: none"> •The scale of project is appropriate in the light of revenue from the tariffs accrued from the operation of the project. •If any subsidies or other available funds are invested in the project, apart from the revenue from water tariffs, its scale is appropriate when the benefit meets the total costs.
(ii) Financial Situation	c	Financial Internal Rate of Return (FIRR)	Financial internal rate of return (FIRR) (Discount rate where the revenue and the cost become equal at the present value.)	FIRR = 12% or above. (FIRR must be greater than the opportunity cost of the capital.)
(iii) Social Impact	d	Prevalence rate for waterborne infectious diseases	Prevalence rate for waterborne infectious diseases	The prevalence rate for waterborne infectious diseases within the beneficiary areas of the project must decline (At the same time, mortality rates for infants and adults must decline the medical expenditures reduce and absentee rate due to illness reduce.)

Chapter 3. Analysis of the Water Supply and Sanitation Sectors in the focused Four Countries

This chapter analyses the water supply and sanitation sectors in the focused Four Countries (Mexico, Peru, Panama, and Costa Rica) included in this study in terms of (i) the sector as a whole, (ii) national government level, and (iii) utility level, based on the evaluation items and evaluation indicators set up in Chapter 2. (Issues at the project level will be studied and analyzed in Chapter 5.) It first illustrates the present situation and structures of the sectors in the focused Four Countries, and then specifies problems lying at the central government level, and at the utility level in those Countries, thereby extracting future challenges to be addressed in the sectors.

1. Mexico

(1) The Present Situation and Structure of the Water Supply and Sanitation Sectors in Mexico

Mexico covers an area of some 1,970,000 square kilometers and has a population of about 103.2 million, 70% of which resides in urban areas, mostly on the central and the northwest parts of the country. Although the water demand in these geographical parts is thus high, the regions suffer from frequently occurring droughts and lack sufficient water supply.

Although the coverage ratios of the water and sanitation sectors in Mexico are relatively high - 89% (urban area: 95%, rural area: 68%) for water coverage and 76% (urban area: 89%, rural area: 36%) for sanitation coverage (see Table 6), there is a wide disparity in coverage between urban and rural areas as is the case with many other countries. Since the nationwide sanitation treatment ratio is somewhat low at 28% (of which approximately 10% is for Mexico City), the government established a standard to legally prohibit discharge of untreated wastewater.

The structure of the water and sanitation sectors

in Mexico, the roles of relevant organizations and the relationships among them are shown in Figure 3. The main authority in relation to water supply and sanitation is a Comision Nacional del Agua (CNA)¹³ - the National Water Commission, which was established under SEMARNAT (Secretaria del Medio Ambiente y Recursos Naturales)¹⁴ for the management and operation of water services, in order to achieve sustainable use of the national asset. The main functions of CNA are (1) control of water demand and supply in municipalities, (2) provision of permission and approval for water supply and sanitation services to either public or private utilities, (3) provision of water and sanitation services covering more than one state, and (4) regulation and supervision of agencies in accordance with four official standards related to water pollution control [(i) the standard for discharge of wastewater to water courses, (ii) the standard for discharge of wastewater to municipal sewerage networks, (iii) the standard for reuse of wastewater, and (iv) the standard for disposal or reuse of sludge and biosolids]. While CNA administers the overall water supply and sanitation in the country, it is local governments that are responsible for the management of the water and sanitation services. The Ministry of Health (Secretaria de Salud) is in charge of formulating policies and plans for the services and drafting relevant bills.

(2) The Present Situation and Problems at the National Government Level in Mexico

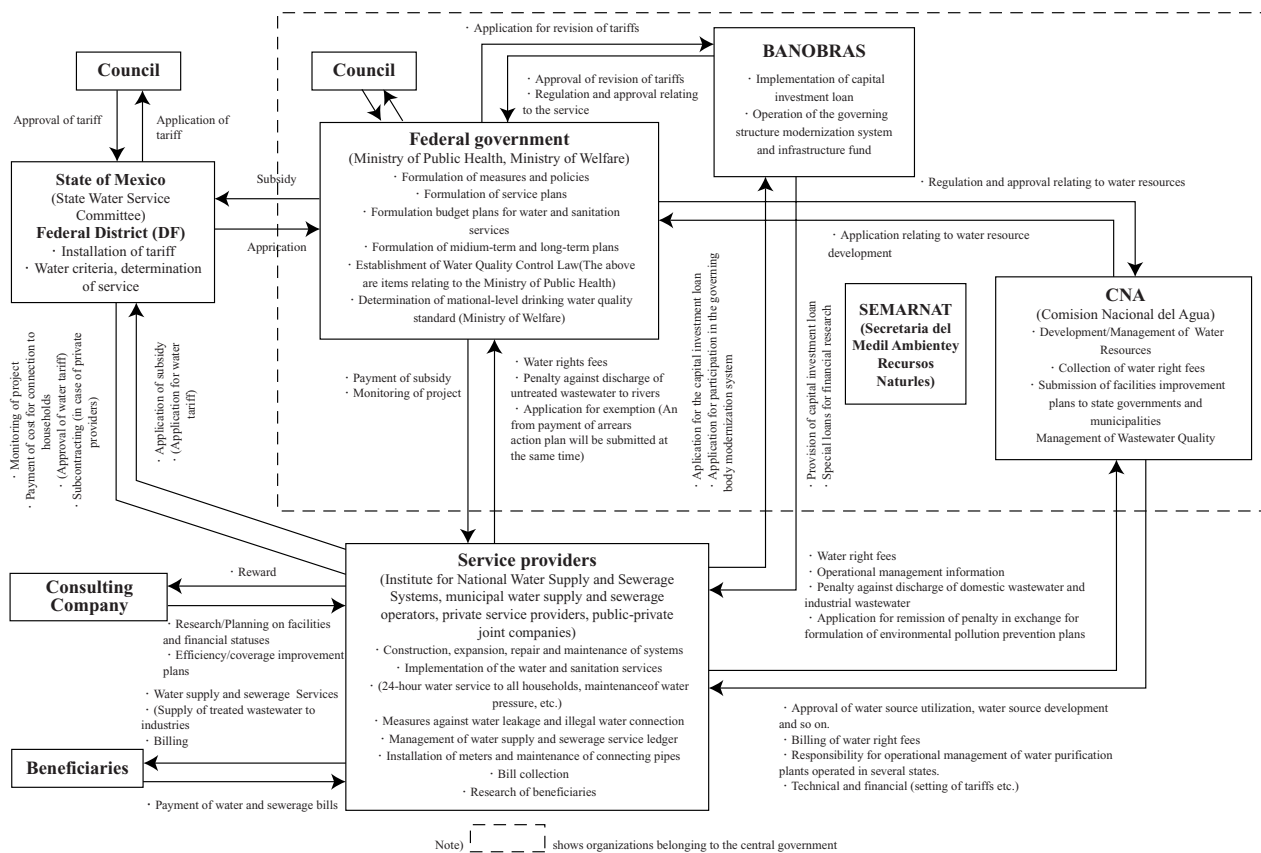
Building on the current state and structure of the water and sanitation sector in Mexico as mentioned above, this section addresses the current state and problems observable at the national government level in line with the indicators selected in Chapter 2.

(i) Accountability system

In Mexico, the state governments and ministries of the Federal Government and the state governments supervise water supply and sanitation utilities. Under current circumstances with fragile supervision by

13 Comision Nacional del Agua: CNA, consists of the Enforcement Department, the Construction Department, the Water Administration Department, the Planning Department, the Technical Department, and the Administration Department.

14 Secretaria del Medio Ambiente y Recursos Naturales: SEMARNAT was established in 1989.

Figure 3: Structure of the Water and Sanitation Sector in Mexico

Source: Prepared by SADEP Study Team based on reference materials

authorities, 1,000 out of approximately 2,400 operating utilities in the whole country do not pay their water rights fees to CNA. In addition, many do not even report their performance results to CNA. In summary, accountability of the supervisory authority of utilities is dispersed.

In addition, although the water resources are limited in Mexico, they are free when used for the agricultural sector, and there is no incentive for water conservation. Despite this, currently the central government cannot be accountable for improving the situation in a comprehensive manner.

(ii) Investment Plan

Despite the expectation that the demand for water and sanitation will grow with the continuous economic growth of Mexico for the next 20 years (until 2025) and the expected incidental improvement of the living

standards of the population in the future, investment in the sectors has been on a downward trend for the past ten years, with no progress in improvement of sanitation facilities and with a deteriorating balance in water circulation.

In response to this situation, the government is upgrading its investment plan in the water sector, scheduling an investment of approximately three billion US dollars in the coming two to three years (it has invested approximately one billion dollars in the sector every two to three years so far) and has already provided 12 cities with loans for capital investment through the Bank for the Development of Public Services (BANOBRAS)¹⁵.

(iii) Subsidies

In Mexico, governmental subsidies are utilized to compensate for the part of expenditure that cannot be

15 Banco Nacional de Obras y Servicios Públicos, S.N.C: BANOBRAS

covered by the water and sanitation tariffs collected by the utilities. However, too much dependence on subsidies has been a problem.

While the government grants subsidies to the Water Supply System of Mexico City (SACM)¹⁶, 70% of the subsidies were allocated to operating expenses for operation and maintenance which suppresses the supplementary injection of subsidies into investment expenditure.

(iv) Tariff Policy

The water tariff is structured with a metered tariff system as a principle, with the beneficiaries classified into low-income earners, households and industries. However, the current water tariff is not profitable enough to cover all the current account expenditure, and thus the shortage is made up for by subsidies, that is, the service does not have sufficient profitability.

In terms of the sewerage tariff, which is set at maximum 30% of the water tariff, many utilities are facing difficulties in collecting the bills due to the difficulty for beneficiaries to understand its benefits.

(3) The Present Situation and Problems at the Utility Level in Mexico

The total number of utilities engaged in water and sanitation services throughout the 31 states of Mexico and Mexico's Federal District (Distrito Federal: DF) is over 2,000. As major entities around Mexico City, the State of Mexico Water Commission (CEAM)¹⁷ and the Water Supply System of Mexico City (SACM)¹⁸ were selected for this study. The current state and problems with their services are considered in line with the assessment indicators selected in Chapter 2 (Table 6).

(i) Service Provision

<The State of Mexico Water Commission (CEAM)>

Although the water and sanitation coverage ratios have both reached levels as high as 90% (1,600,000 public water connections) and 72% respectively, the wastewater treatment ratio is limited to only 22% and most wastewater is discharged into watercourses without being treated.

<The Water Supply System of Mexico City (SACM)>

The water coverage has reached 2,100,000 public water connections (water coverage: 98%) with household, commercial and industrial uses combined. In addition, the sanitation coverage is also as high as 95%. However, with scarcity of additional water sources to cover the growing needs for water and overuse of groundwater, recovery of the aquifer water level is urgently required. Further, continuous water supply (24 hours a day) is not provided in some areas and intentional water interruption is sometimes enforced during the nighttime or on a weekly basis.

Improvement of the low sanitation treatment ratio of 10% is urgently required in the Federal District under the jurisdiction of SACM where a large number of population is concentrated and the sanitation coverage ratio is high.

(ii) Operation and Maintenance

<State of Mexico Water Commission (CEAM)>

The current UFW 40% is well above the ideal value (30%).

<Water Supply System of Mexico City (SACM)>

The current SWC (5.5) slightly exceeds the ideal value (5.0).

(iii) Financial Management

<State of Mexico Water Commission (CEAM)>

Of areas under CEAM's jurisdiction, only approximately 20% can manage to cover the

16 Sistema de Agua de la Ciudad de Mexico: SACM

17 The State of Mexico Water Commission: Comision Estatal de Agua del Estado de Mexico (CEAM)

CEAM serves 13 million people in its coverage, and is responsible not only for the management of water resources in the State of Mexico, but also for the management of purification and water distribution facilities, as well as the authorizing rights to entrust parts of services to private companies.

18 The Water Supply System of Mexico City: Sistema de Agua de la Ciudad de Mexico (SACM)

SACM was established in January 2003 as a result of a merger between a public corporation for the construction of water service facilities, which had been mainly responsible for the construction of water supply and sewerage network, and the Federal Committee for Water Supply, which had been in charge of the supervision of the service. SACM covers areas where there are 8.5 million residents. The number of its staff members totals 11,500.

Table 6: Result of Evaluation Items for Major Utilities in Mexico

No	Indicator		National average ¹⁾	CEAM	SACM	Ideal value
Service provision (water service, sanitation service)						
1	Water coverage ratio (%)	Total	89	90	98	Nearly 100
		Range 2)	72-97	-	-	Nearly 100
		Urban area	95	90	98	Nearly 100
		Rural area	68	-	-	Nearly 100
2	Quality of water supply service		N.A.	N.A.	Restricted supply	24h water service
3	Sanitation coverage ratio (%)	Total	76	72	95	Nearly 100
		Range 2)	47-94	-	-	-
		Urban area	89	72	95	Nearly 100
		Rural area	36	-	-	-
4	Sanitation coverage ratio (%)		28	22	10	100
5	Sanitation coverage ratio/ water coverage ratio		0.85	0.80	0.97	1.00
Operation and maintenance						
6	Unaccounted for Water (UFW: %)		40	40	N.A.	30
7	Staff per 1000 water connections (SWC: persons)		N.A.	N.A.	5.5	5.0
Financial management						
8	Working ratio (WR: %)		N.A.	N.A.	130	70
	Operating ratio (OR: %)		N.A.	N.A.	N.A.	100
9	Tariff collection rate (CR: %)		N.A.	36	50	90

Note: 1) Value as of 2000: "Water Condition in Mexico" (CNA Report, 2003), 2) Range of CNA Control Area, N/A : no data was available

Source: Prepared by SADEP Study Team based on reference materials

operation and maintenance costs with the collected tariffs, and 80% depend on subsidies from the government.

The tariff collection ratio stood at 36%, extremely low due to the deficiency in the billing and collecting system of the utilities.

<Water Supply System of Mexico City (SACM)>

The working ratio (operational cost / tariff revenue) is 130%, far above the ideal value of 70%, indicating the failure in establishing a sound financial management. Similar to CEAM, the tariff collection ratio hovers around 50% due to its inadequate billing

and collecting system.

(4) Challenges in the Water and Sanitation Sector of Mexico

Based on the above, the following challenges at the sector as a whole, national government and utility levels need to be addressed.

(i) Challenges in the Sectors

1) The water and sanitation coverage ratios are 89% and 76% respectively across the nation, and efforts should be made to increase the latter up to the

level of the former. It is necessary to improve the coverage in the rural areas to narrow the gap of the ratios observed between urban and rural areas.

2) The sewage treatment ratio, a prerequisite for sustainable water circulation, is conspicuously low (28% of the nationwide average). Therefore it is necessary to draw up a national investment plan for improvement, according to which the government should supervise individual utilities and promote sewerage services further.

3) Although investment in the sectors is required to improve both the quality and the quantity of service, the investment amount has followed a downward trend in recent years. Because of the shortage and deterioration of the facilities, it is necessary to upgrade the overall facility stocks of the sectors forthwith. The sectors need to urgently have a clear-cut vision of a long-term investment plan that portrays a picture of the sectors in the future.

4) Most subsidies have been used to make up for the deficits in the current account expenditure (operation and maintenance costs, etc.) and little has been used in investment. Hence, it is necessary to take comprehensive measures in the sectors so as to redirect available subsidies to investment as much as possible.

(ii) Challenges at National Government Level

1) It is necessary to strengthen and clarify the role and responsibility of CNA, the authority for comprehensive water management of the country, and to strengthen its capacity in information gathering and supervision concerning the water and sanitation sectors.

2) Since the water resources are limited in Mexico, CNA needs to play a more proactive role and take responsibility for effective distribution of water to the agricultural and other sectors.

3) Investments in the water and sanitation sector have been diminishing. The government should draw up a long-term investment plan and undertake supporting measures for utilities through the

distribution of funds for facilities (grants of governmental subsidies) if necessary¹⁹.

4) As for the tariff policy, an increase in the tariff level should be carefully considered²⁰. In light of the high UFW and low tariff collection rate, the increase in tariff should not be done without due care. What is required is to encourage utilities to make an effort to improve these indicators, and to put their financial position on the right track.

(iii) Challenges at the Utility Level

1) Both utilities surveyed have achieved significantly high ratios of water and sanitation coverage (water supply of CEAM stood at 90%, water supply of SACM at 98%, sanitation coverage of CEAM at 72% and that of SACM at 95%). However, there are water supply restrictions, and the water treatment ratios for sewerage are low at the utilities (CEAM 22% and SACM 10%). Thus it is still necessary to improve the quality of the services.

2) As for the operation and maintenance of the services, repair and refurbishment as a policy against water leakage must be carried out thoroughly. Also, the current allocation of personnel should be reconsidered so that excess staff members can be reallocated to augment the sections responsible for leakage reduction and improvement of the collection ratio.

3) Where financial management is concerned, in order to increase the collection ratios that are currently 36% for CEAM and 50% for SACM, urgent measures must be taken including notices, reminders and/or application of penalties to non-payers. Also, the benefits and the social significance of sewerage systems must be communicated more widely for better understanding by the users for the purpose of the appropriate collection of sewerage charges. It is necessary for the utilities to establish a system, through these measures, to increase the collection ratios, so they can afford the current account expenditure with minimum subsidies.

19 The government limits the investment amount in individual projects: the upper limits are 30% of the total project costs for the water supply, and 40% for the sewerage systems.

20 The water tariff for households in the State of Mexico is 10 peso per cubic meter. However, the current tariff is not profitable, and is scheduled to be rise by 50% in the near future (at the time of this study).

2. Peru

(1) The Present Situation and Structure of the Water Supply and Sanitation Sector in Peru

Peru covers an area of 1,285,000 square kilometers and has a population of about 27 million. About 70% of the population lives in urban areas composed of cities with a population over two thousand residents and 30% in rural areas. The country consists of 23 Departments plus the independent Province of Callao. The Departments comprises several provinces, within which there are Districts. In terms of the water service in Peru, partly because the Pacific region has little rain and is increasingly densely populated, water scarcity is a serious problem. In terms of the sanitation service, although the wastewater collection system has been developed, there is a growing concern over such problems as water pollution due to the lack of wastewater treatment plants.

The water and sanitation sector in Peru shows high water and sanitation coverage ratios at 83% and 75%, respectively, though the figures are slightly lower than those in Mexico (Table 7). However, the gap in ratios among regions is great. While such high coverage ratios are limited to the water supply and sanitation utilities (EPS)²¹ in Lima and Cuzco with large populations, smaller EPSs like in Loreto have not reached sufficient levels of water and sanitation coverage (in Loreto, the water coverage ratio is 61% and the sanitation coverage ratio is 55%). In the meantime, the percentage of sewage treatment is as low as 19% nationwide.

The structure of the water and sanitation sector (government and utility) in Peru is shown in Figure 4. The management, supervision and policy planning of the water and sanitation sectors in Peru are the responsibility of the Ministry of Housing, Construction and Sanitation (MVCS)²². The National Superintendence of Sanitary Services (SUNASS)²⁴,

established under MCVS, sets and approves water and sewerage tariffs at the request of the utilities. A special unit within the above Ministry - Support Program for the Sanitary Sector Reform (PARSSA)²³ - serves as the intermediary for national and foreign loans provided to the water supply and sanitation services. Other government agencies involved in the sector include: the Ministry of Economy and Finances, the General Controller's Office²⁵, the Ministry of Health²⁶, and the Natural Resources Institute (INRENA)²⁷.

(2) The Present Situation and Problems at National Government Level in Peru

(i) Accountability system

In the water and sanitation sectors, multiple ministries including the Ministry of Housing, Construction and Sanitation (MVCS), the National Superintendence of Sanitary Services (SUNASS), and the Ministry of Economy and Finances (DNPB) are in the position of supervising EPSs - Empresas Prestadoras de Servicios (Service Providing Companies). With this structure, sometimes there is no coordination among them, probably due to the lack of a clear definition of the roles of respective entities against the EPSs. In addition, their sector policy, which all entities superior to the EPSs should follow, has not been clearly established. From the above situation, there is a concern over the redundancy and lack of role definition in the entities.

(ii) Investment Plan

No investment plan in the sectors has been clearly defined. Although approximately six million people, mostly in rural areas, of the total population of 27 million have no access to water supply and sanitation services and approximately 11 million people have no access to the sanitation service (including latrines) in Peru²⁸, government-led development of water supply

21 Empresas Prestadoras de Servicios : EPS

22 Ministerio de Vivienda, Construcción y Saneamiento: MVCS was established in 2002.

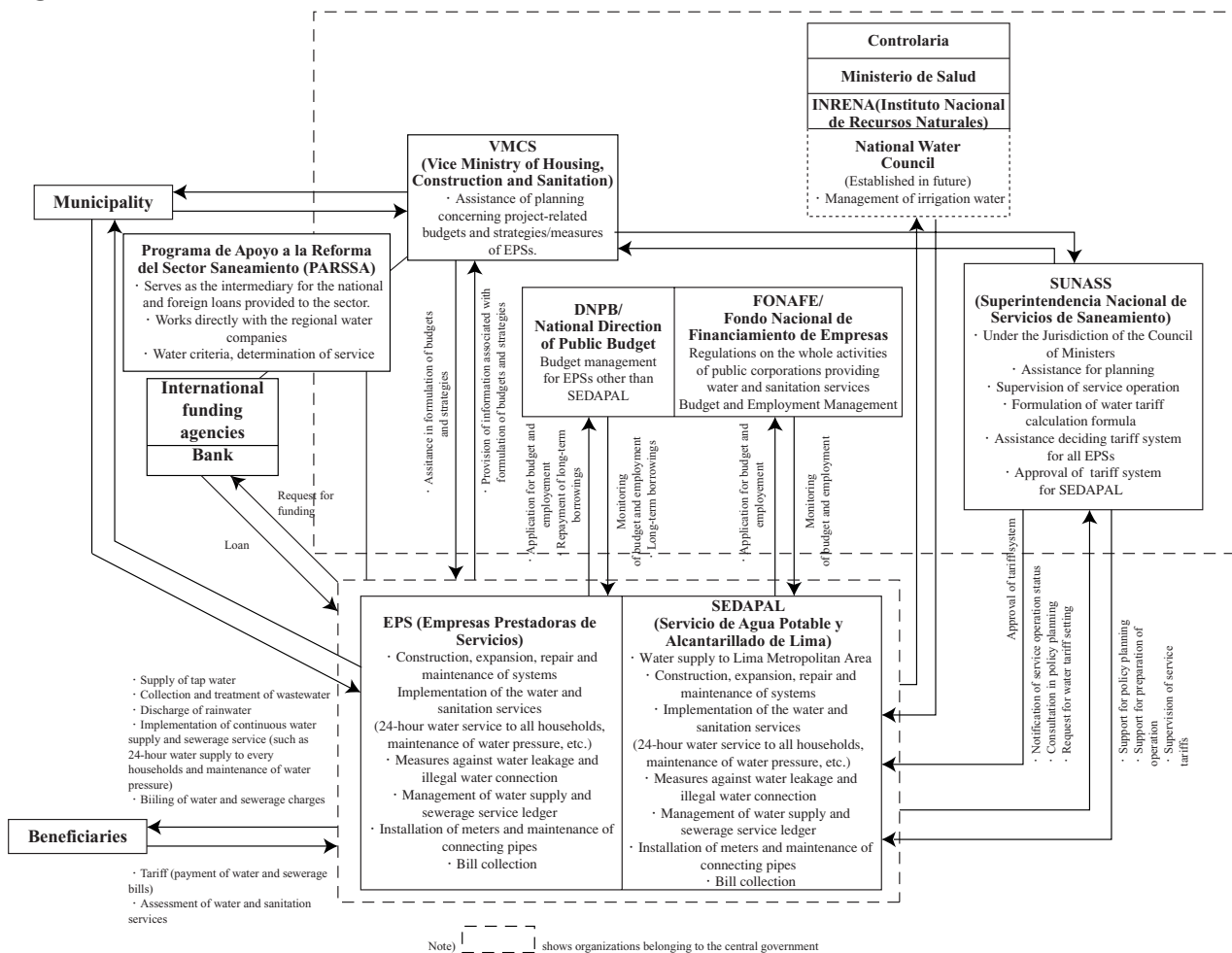
23 Programa de Apoyo a la Reforma del Sector Saneamiento : PARSSA

24 Superintendencia Nacional de Servicios de Saneamiento : SUNASS was established in 1992.

25 Contraloría General de la República

26 Ministerio de Salud

27 Instituto Nacional de Recursos Naturales : INRENA

Figure 4: Structure of the Water and Sanitation Sector in Peru

Source: Prepared by SADEP Study Team based on reference materials

and sewerage systems is not being actively implemented.

Investment amounts allocated to the sectors, including foreign loans, have been diminishing in the last few years. (The investment of 120 million dollars in 1998 was down to 80 million dollars in 2002.)

(iii) Subsidies

In Peru, EPSs rely on loans from the government and commercial banks for capital investment concerning the water supply and sanitation services, but reportedly they face difficulty in the repayment due to their high interest rates.

Under such circumstances, in the 1991-2000

decade, the Government of Peru invested in the sectors, mostly in urban areas, some US\$2 billion as a special grant for the purpose of assisting EPSs to improve their financial standing. This subsidy helped improve the water coverage to a certain extent. However, it was not effective enough to improve the financial standing of the EPSs.

(iv) Tariff Policy

The water and sewerage tariffs include operation and maintenance costs required for wastewater collection, but do not include a tariff for wastewater treatment.

Revisions of tariffs get finally approved at meetings when local government representatives and

28 A decline in the quality of the services provided by the utilities, low coverage ratios, and, above all, the absence of wastewater treatment facilities lead to the discharging of unprocessed wastewater to areas near water sources. This causes the deterioration of the quality of drinking water and sanitary conditions in many cities. In the 1990s, cholera incidents were found in rural cities in Peru.

politicians are present, after an EPS has proposed a tariff and SUNASS has examined it. SUNASS, which plays a central role in reviewing the tariffs, is apt to consider the political influence. EPSs hoping for revision of the tariffs are not positive in raising the tariff due to political consideration. As a result, no new tariff proposal has been made to SUNASS in the last two years.

(3) The Present Situation and Problems at the Utility Level in Peru

There are EPSs of various sizes operated by the 45 municipalities, which provide services under the supervision of SUNASS. EPSs are incorporated in municipalities and run on a stand-alone basis. In some rural areas, the water and sanitation services are provided by Administrative Associations of Sanitary Services (JASS)²⁹, which are smaller than EPSs, as well as by other types of community organizations and NGOs³⁰. Currently, SEDAPAL³¹ and the other municipal EPSs provide service to about 65% of the population, and the remaining 35% is serviced by JASS and other organizations, mostly in rural areas.

Analysis will be focused on representative utilities in Peru, Servicio de Agua Potable y Alcantarillado de Lima (SEDAPAL) and the Institute for National Water Supply and Sewerage Systems in Loreto Province (EPS Loreto) (see Table 7).

(i) Service Provision

<Servicio de Agua Potable y Alcantarillado de Lima (SEDAPAL)>

The water coverage of the area covered by SEDAPAL is 88%, higher than the national average of 83%. (However, the coverage is not particularly high when compared with the mean coverage of cities of a similar size in other countries.) The sanitation coverage of the area covered by SEDAPAL is 83%, also higher than the national average of 75%. However, the sewerage coverage is extremely low, a

mere 5%.

As opposed to the average continuity of water supply in Peru of 17 hours, that in the area covered by SEDAPAL was 20.4 hours (as of 2002), indicating that continuous 24-hour service has not yet been achieved.

<Institute for National Water Supply and Sewerage Systems in Loreto Province (EPS Loreto)>

The water coverage of the area under the jurisdiction of EPS Loreto is 61%, considerably lower than the national average (83%). The average number of hours with continuous water supply provided by EPS Loreto is 15 hours per day, less than the national average (17 hours). Also, some regions can enjoy water supply for only several hours a day, the others suffer from low water pressure, hence the regional gap existing in Peru.

Although Loreto Province is favored with abundant water because it relies on the Amazon River for its water source, the water treatment ratio is zero and thus wastewater is discharged into the river without treatment. This is a serious problem in terms of sustainable water circulation.

(ii) Operation and Maintenance

<Servicio de Agua Potable y Alcantarillado de Lima (SEDAPAL)>

Although the UFW of SEDAPAL stood at 42%, slightly better than the national average of 45%, it is still far from the ideal figure (30%) set as a target.

SEDAPAL seems to implement an effective service operation in terms of the staff per 1000 water connections (SWC), with a total number of employees of 2,100, corresponding to 2.0 employees per 1,000 connections, well under the ideal figure (5.0). However, the shortage of staff members may cause inadequate handling of UFW (water leakage) and collection of tariffs.

<Institute for National Water Supply and Sewerage Systems in Loreto Province (EPS Loreto)>

29 Juntas Administradoras de Servicios de Saneamiento : JASS

30 Until 1991, water and sanitation services were provided by a central government agency - SENAPA. In 1991, a sector decentralization reform was implemented, whereby SENAPA was liquidated and the services became independent and were transferred to the municipalities. At present, the water and sanitation services are operated by EPSs owned by the municipalities. The only exception is SEDAPAL - the company that provides services to Lima Metropolitan Area, which remained under the direct jurisdiction of the central government.

31 Servicio de Agua Potable y Alcantarillado de Lima: SEDAPAL

Table 7: Result of Evaluation Items on Major Utilities in Peru

No	Indicator	National average ¹⁾	SEDAPAL	EPS Loreto	Ideal value
Service provision (water service, sanitation service)					
1	Water coverage ratio (%)	83	88	61	Nearly 100
2	Service quality of water supply	17h water service	20h water service	15h water service	24h water service
3	Sanitation coverage ratio (%)	75	83	55	Nearly 100
4	Sewerage treatment ratio (%)	19	5	0	100
5	Sanitation coverage ratio/ water coverage ratio	0.90	0.94	0.90	1.00
Operation and maintenance					
6	Unaccounted for Water (UFW: %)	45	42	63	30
7	No. of staff per 1000 water connections (SWC: persons)	1.6~8.0(Note 2)	2.0	5.0	5.0
Financial management					
8	Working ratio (WR: %)	68	59	94	70
	Operating ratio (OR: %)	N.A.	79	99	100
9	Collection ratio (CR: %)(Note 1)	77	87	55	90

Note: 1) Value as of 2000: "Water Condition in Mexico" (CNA Report, 2003), 2) Range of CNA Control Area, N/A : no data was unavailable

Source: Prepared by SADEP Study Team based on reference materials

The extremely high UWF of EPS Loreto, which amounts to 63%, is considered chiefly attributable to water leakage caused by damage to existing pipes and drains.

The ratio of metered connections to total connections for EPS Loreto quite low at 36%. They bill regions not equipped with water meters for water supply in accordance with the average water consumption, which is less than the quantity actually consumed.

(iii) Financial management

<Servicio de Agua Potable y Alcantarillado de Lima (SEDAPAL)>

SEDAPAL shows a good performance in terms of the working ratio and the operating ratio, 59% and 79% respectively, both of which have reached far under the ideal values (100% and 120% respectively). The collection ratio also stood at 87%, which is relatively high.

<Institute for National Water Supply and Sewerage Systems in Loreto Province (EPS Loreto)>

A high UWF (63%) and a low tariff collection rate of EPS Loreto (55%) seem to tighten its financial standing, and thus EPS Loreto's working ratio and

operating ratio are obviously bad, 94% and 99%, respectively. The marginal difference between the two ratios (+5%) suggests that the utility has not reserved sufficient funds for the depreciation costs (shortfall in depreciation), and there is a possibility that EPS Loreto has not assured capital funds necessary for the improvement of UWF.

(4) Challenges in the Water and Sanitation Sectors of Peru

Taking all the analyses above into account, problems that should be solved at the sectors, National government and utility levels are summarized below.

(i) Challenges in the Sector

1) Although both the water and the sanitation coverage ratios are relatively high (a national average of 83% and 75%, respectively), the ratios for rural areas are somewhat lower (61% and 55%, respectively in the areas covered by EPS Loreto) and should be improved. In addition, waterborne infectious diseases still remain in the country and the water quality must be improved, too. For this, the currently low level of sewage treatment ratio (the national average of 19%) has to be improved

immediately.

2) While the investment status in the metropolitan area is generally acceptable, the investment in rural areas lags behind (EPS Loreto lacks depreciation costs and thus seems unable to make sufficient investment in repairs and new facilities). It is necessary to fill in the regional gap in the sector by increasing the investment amount in the rural areas.

(ii) Challenges at the National Government Level

1) The role sharing among multiple bodies involved in the water and sanitation sectors needs to be clearly defined.

2) Central government policies need to be formulated for improvement in the water and sanitation coverage ratios in rural areas and support and guidance need to be given to EPSs for the purpose of realization of those policies.

3) Wastewater treatment costs need to be incorporated into the water and sanitation tariff structure as they are currently not included.

(iii) Challenges at Utility Level

1) SEDAPAL has demonstrated a certain achievement in coverage ratios, but the area which SEDAPAL covers (Metropolitan area of Lima) faces the Pacific Ocean, is short of rainfall, and thus cannot take full advantage of the water supply and sewerage piping networks. Thus, it should make efforts to secure water with an eye to the development of new water resources.

Due to the responsibility for the protection of the environment surrounding the densely populated metropolitan area of Lima, SEDAPAL should be proactively committed to the construction of water treatment facilities for the sake of sustainable water circulation and improvement of sanitary conditions. More precisely, it needs to improve the water treatment ratio from the current 5% to the national average of 19%.

2) EPS Loreto recorded water and sewerage coverage ratios of 61% and 55% respectively, substantially lower than the national average of 83%

and 75%, and so it should, first of all, aim to improve the ratios up to the national average levels.

The UFW of EPS Loreto stood at a significantly high level of 63%, the main reason being the water leakage. Thus, EPS Loreto is required to take immediate action for repair or renewal of the existing water supply piping system.

The low installation rate of meters within the region covered by EPS Loreto (36%) makes it difficult to secure collection of charges for actually consumed amounts of water, so the utility is urgently required to install and utilize meters as the first step towards the improvement of the collection ratio.

3. Panama

(1) The Present Situation and Structure of the Water Supply and Sanitation Sectors in Panama

Panama has a population of approximately 3 million, its total land area being almost 76,000 square kilometers. About two thirds of the population reside in urban areas, mostly in Panama State.³² The major water sources in Panama are using surface water. The water utility, IDAAN³³, procures water sources to supply to the Panama Metropolitan Area from the Panama Canal Authority (ACP - Autoridad del Canal de Panama) and private companies.

The water coverage ratio in Panama is 70% (the ratio in the metropolitan area is 87%), most of which is provided by IDAAN. (It is more or less one utility in one country.) The remaining area is managed by regional associations JAAR). In areas where water supply systems have not been developed, water is supplied through wells and water tank trucks. Meanwhile, the sanitation coverage ratio of the country is 27% (the ratio in the metropolitan area is 53%). In areas where sewerage systems have not been developed, septic tanks are largely used. The wastewater treatment ratio is as low as 30% even in the metropolitan area. The water quality of Panama is assessed as generally good because the country has experienced no major outbreak of waterborne infectious diseases in the past.

³² National Census in 2000.

³³ Instituto de Acueductos y Alcantarillados Nacionales:IDAAN

As for the structure of the water and sanitation sectors in Panama (Figure 5), the Ministry of Health (MINSA)³⁴ is entirely responsible for the formulation of measures and plans concerning the water supply services, whereas the Institute for National Water Supply and Sewerage (Instituto de Acueductos y Alcantarillados Nacionales: IDAAN) is responsible for the provision of the actual services. The Ministry of Economy and Finance (Ministerio de Economía y Finanzas), on the other hand, is in charge of financing and budget allocation for the sector.

The agency responsible for regulation and control of the sector is the Public Services Regulatory Entity (Ente Regulador de Servicios Públicos: ERSP)³⁵, which independently controls setting and revision of tariffs.

(2) The Present Situation and Problems at the National Government Level in Panama

(i) Accountability system

A structural reform of the water and sanitation sector was implemented in 1996-1997, and the role of the central government was reorganized concerning the drawing up of water supply measures and plans and the service operating functions (as stated above). As a result, individual functions of concerned organizations in the water and sanitation sector in Panama became clearer and such problems as redundancy and deficiency have been considerably alleviated, at least institutionally³⁶.

However, although the accountability of MINSA as a policy-making agency and ERSP as a regulatory and supervisory agency has been clarified, but IDAAN still suffers from chronic deficits and thus the administrative reform has not yet demonstrated its effects on the sectors.

(ii) Investment Plan

Government's investment to the water and sanitation sectors have been increasing in recent years; the

budget allocated to IDAAN from the national treasury³⁷ was eight million dollars in FY2001, 11 million dollars in FY2002, and soaring to 205 million dollars in FY2003.

(iii) Subsidies

Although the government has been continuously granting subsidies to IDAAN to cover its chronic deficits, the cost reduction on the IDAAN side is not necessarily in progress, which obliges the government to continue granting subsidies to make up for the deficit of IDAAN.

(iv) Tariff Policy

While the water tariff includes a base rate and a escalating rate, no bill is collected for sewerage on the grounds that the sewerage system has not been sufficiently developed. IDAAN has not revised the water and sewerage tariffs for the past 20 years. This assumedly results from a concern that an increase of the tariff, and the consequent burden on the population, may develop into political criticism.

A unique feature of IDAAN's water bills is that they include, in addition to the water tariff, the fees for garbage collection and disposal, because IDAAN collects it on behalf of Panama City. This system gives the impression that the water tariffs are unnecessarily higher than they should be, and many people in fact misunderstand the bills thinking that they are all for the water supply.

(3) The Present Situation and Problems at the Utility Level in Panama

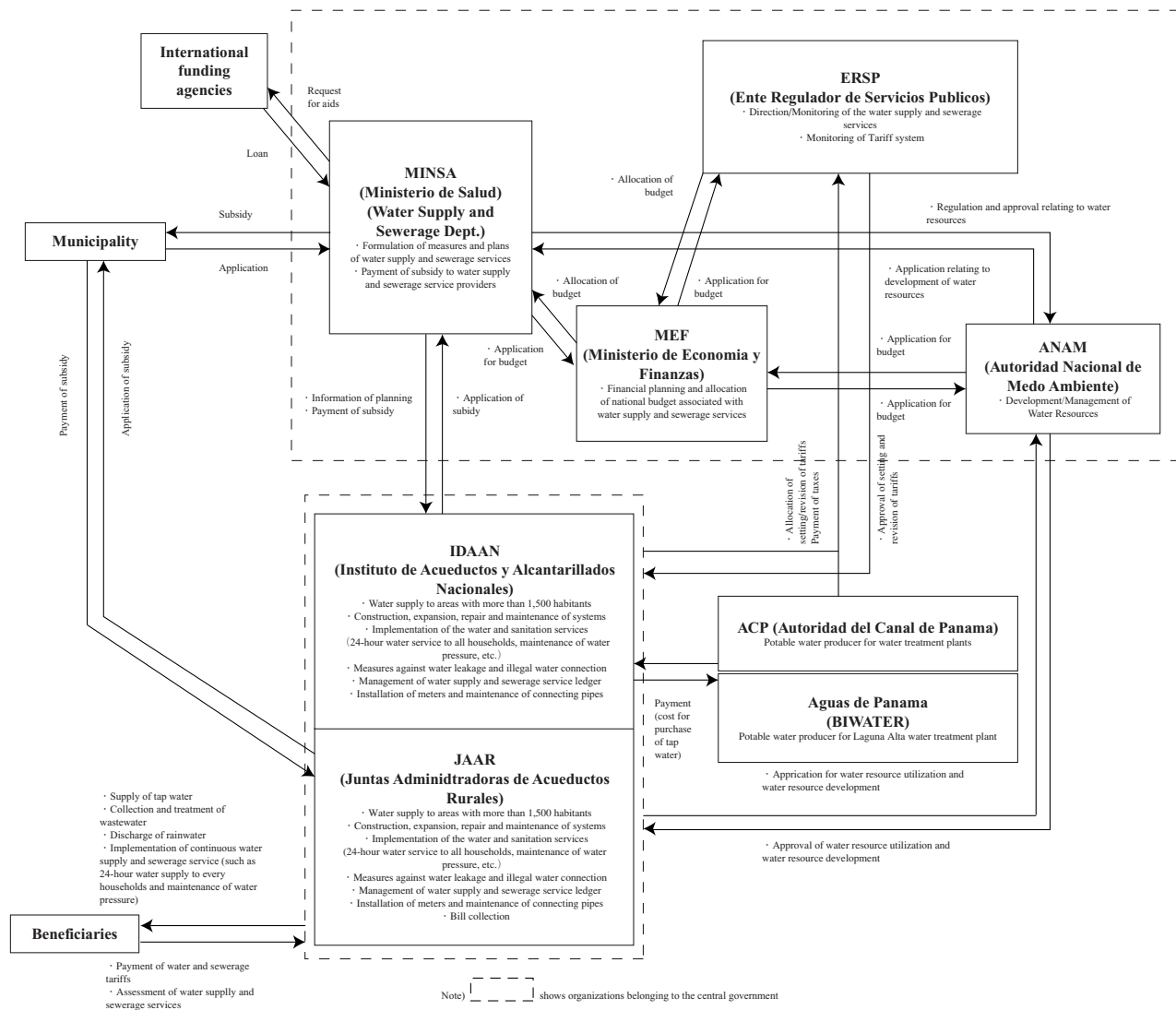
Water services in urban areas (localities with 1,500 residents or more) are provided by IDAAN and those in rural areas (localities with less than 1,500 residents) by MINSA. In the latter (rural) areas MINSA is responsible for the process of providing the services up to the construction of facilities. MINSA transfers the remaining functions - the operation and maintenance - to rural associations³⁸

34 Ministerio de Salud : MINSA

35 Ente Regulador de Servicios Públicos : ERSP was established in 1996.

36 In 1996 - 1997, the government considered the privatization of IDAAN, which was not eventually put into practice.

37 IDAAN is in practice treated in the same way as ministries and agencies of the central government, and receives revenues from the national budget.

Figure 5: Structure of the Water and Sanitation Sector in Panama

Source: Prepared by SADEP Study Team based on reference materials

(JAAR). IDAAN will be hereinafter analyzed as a representative utility in Panama (Table 8)³⁹.

(i) Service Provision

The water coverage ratio in the region covered by IDAAN is more or less acceptable and is 87%, while the ratio in regions outside its coverage (i.e., outside the Panama metropolitan area) is low. As for water service continuity in the region covered by IDAAN, 55% is supplied for 24 hours, 22% limited to daytime, and 23% supplied only intermittently, more

than half the population not having 24-hour access to water service. Similar conditions apply with the sanitation coverage ratio (53%). The wastewater treatment ratio is as low as approximately 30%.

(ii) Operation and Maintenance

The UFW ratio of IDAAN is high at 48%, indicating a possible loss of water due to leakage. The number of staff members per 1,000 connections is seven, which is considerably above the ideal figure (5 workers), so the utility is likely to be overstaffed.

38 Juntas Administradoras de Acueductos Rurales : JAAR

39 The data and information related to IDAAN are based on oral information received during the meetings held with IDAAN's personnel, and on the IDAAN's annual reports for five years (Year 2002).

Table 8: Result of Evaluation Items for Major Utilities in Panama

No	Indicator	National average	IDAAN	Ideal value
Service provision (water service, sanitation service)				
1	Water coverage ratio (%)	70	87	Nearly 100
2	Service quality of water supply	N.A.	24h water service for 55%	24h water service
3	Sanitation coverage ratio (%)	27	53	Nearly 100
4	Sanitation coverage ratio (%)	N.A.	30	100
5	Sanitation coverage ratio/ water coverage ratio	0.40	>0.76	1.00
Operation and maintenance				
6	Unaccounted for Water (UFW: %)	N.A.	48	30
7	Staff per 1000 water connections (SWC: persons)	N.A.	7.0	5.0
Financial management				
8	Working ratio (WR: %)	N.A.	100 or more	70
	Operating ratio (OR: %)	N.A.	100 or more	100
9	Tariff collection rate (CR: %)	N.A.	45	90

Source: Prepared by SADEP Study Team based on reference materials

Behind the poor management of IDAAN lies a report that it is overstaffed under inefficient management.

(iii) Financial Management

The current account balance (the balance of revenue and expenditure of a profit-making business) of IDAAN has been chronically in the red in recent years. This is because: (1) while IDAAN depends of private companies (ACP and Aguas de Panama) for its water sources (approximately 20% of all), its cost is relatively high⁴⁰, (2) the UFW ratio is quite high at 48%, (3) the collection ratio is low at 45%, and (4) the tariff level has not been updated for more than 20 years. As a measure to be used against users who refuse to pay for the services, the current regulation allows the disconnection of the water supply, but since the measure is not effective and it results in a prevalence of illegal connections to the water piping network, the measure of disconnection is seldom implemented.

(4) Challenges in the Water and Sanitation Sectors of Panama

Taking all the analyses above into account, problems that should be solved at the sector, national government and utility levels are summarized below.

(i) Challenges of the Sectors

1) The nationwide average of the water supply coverage (currently 70%) must be improved further. While the rate is relatively high at 87%, in the metropolitan area, it is significantly low in the rural areas, therefore the priority should be placed on the rural areas to increase the water coverage ratio.

2) The national average of the sewerage coverage is very low (27%). While continued efforts should be made to raise the rate in the metropolitan area (53%), urgent action should be taken to promote the installation of sewerage piping networks, particularly in the rural areas for a higher ratio.

3) The water treatment ratio is low at 30%, even in the region covered by IDAAN (the rate in the rural areas is likely to be much lower), so it is necessary to

40 While the cost of bulk water produced by IDAAN itself is 6 cent per m³, the cost of bulk water purchased from ACP is 16 cent per m³ and the cost of bulk water purchased from Aguas de Panama is 24 cent per m³.

encourage capital investment in water treatment facilities to construct new facilities.

(ii) Challenges at National Government Level

1) Although the role and accountability of the central government concerning the water and sanitation sector has been reorganized, not enough obvious effects have yet appeared. Thus, ERSP and MINSA should continue to give instructions to and supervise IDAAN, whereas the government should strictly monitor what is to be done with the large amount of subsidies allocated to IDAAN from the national treasury and encourage IDAAN to rectify its financial position.

2) Since the current collection system levies water tariffs combined with the fees for garbage collection and disposal, the two charges should be separately stated in the bill for better understanding of the users.

3) Regarding the approval for hikes in the tariff, the government should take it into account that the tariff level has remained unchanged for 20 years. It still needs to consider a revision, paying attention to the payment capacity of the current users and the unfair balance of payments among users (i.e., more than half of the users do not pay their bills).

(iii) Challenges at Utility Level

1) IDAAN should strive to increase the water coverage ratio (currently 87%) in the metropolitan area of Panama, whereas utilities outside the metropolitan area should take immediate action to improve the ratios of regions they are responsible for.

2) The proportion of users who have access to the water supply service for 24 hours (55% at present) compared to the population as a whole should be increased.

3) To raise the collection ratio (45%), utilities should reinforce their duties concerning collection, make sure the process from meter-reading to issuing of bills is working, and make regulations concerning illegal connection to the service stricter.

4) As a measure to deal with high UFW, mainly due to leakage, necessary repair and refurbishment must be performed. If the cost for repair is beyond

the financial ability of the utilities concerned, they must take proactive action to secure financial resources, including requests to the supervisory agencies.

5) It is necessary to raise the sanitation ratio (Currently 53% for the region covered by IDAAN) with a considerable expansion of the sewerage network, and to improve the water treatment ratio (30%) by the construction of additional water treatment facilities. Since these comprehensive measures for upgrading the sewerage system requires a large amount of capital investment, the utilities concerned should make efforts to participate actively in drawing up long-term investment plans for the government, and to secure funds required for capital investment from the national treasury (subsidies).

4. Costa Rica

(1) The Present Situation and Structure of the Water Supply and Sanitation Sector in Costa Rica

Costa Rica has an area of 51,000 square kilometers and a population of about 4 million, of which approximately 60% reside in urban areas and 40% in rural areas. It is a small country like Panama. The largest urban area of the country is the Gran Area Metropolitana (Great Metropolitan Area), which consists of the capital city of Jose_ and three surrounding municipalities (Alajuelo, Cartago, and Heredia), where approximately half of the total population is concentrated. Although Costa Rica is a small country in terms of territory, it is favored with water resources because of its affluent precipitation, high mountain high rainfall ranges and numerous rivers. However, due to the high density of population in the metropolitan area of San Jose and other urban areas in recent years, deterioration of the water environment, caused by untreated wastewater discharged into watercourses, has become a problem.

Costa Rica shows high water coverage. The ratios in urban areas covered by (i) Costa Rican Institute for Water Supply and Sewerage (AyA)⁴¹, a water supply and sewerage utility, (ii) ESPH⁴², and (iii) municipalities, are almost 100%. In rural areas,

41 Instituto Costarricense de Acueductos y Alcantarillados : AyA

42 E.S. Publicos de Heredia, S.A : ESPH

too, the ratio is at a relatively high level between 75% and 100%.

On the other hand, sanitation coverage is much lower. The sanitation coverage ratio in the area served by AyA is 47%, whereas the average sanitation coverage in municipalities is 11%. The rural areas, served by the Administrative Associations of Water Supply and Sewerage (ASADAs) and the Administrative Committees of Rural Water Supply (CAARs), lack any sewerage networks, and thus septic tanks and latrines are utilized.

The structure of the water and sanitation sectors in Costa Rica is shown in Figure 6, The Ministry of Environment and Energy⁴³ (MINAE) is responsible for the water sector, securing water sources, and issuing licenses concerning the water and sewerage services (though the services are managed by municipalities). MINAE is in the process of establishing the “New Law of Water Resources (Ley del Recurso Hídrico)” which aims to stimulate both the industries and the municipalities to treat their wastewater and to comply with present discharge standards at the time of the study. Meanwhile, the Ministry of Health (MINSALUD) is in charge of controlling the drinking-water quality, as well as the discharge of contaminants to water resources, in accordance with the “General Health Law”. All water and wastewater projects must be approved by MINSALUD. On the other hand, environmental impact assessments to be performed prior to construction have to be reviewed and approved by MINAE. As for regulation and control authorities, the Regulatory Authority of Public Services⁴⁴ (ARESEP) is in charge of control and approval of water and sewerage tariffs for all the sector utilities with the exception of the municipalities. However, the tariffs of the municipalities are approved by the Controller’s Office (Controlaria).

The major water and sanitation utility in the country is the Costa Rican Institute for Water Supply and Sewerage (AyA), which is also authorized to provide guidance and approval on the setting of tariffs

and to give direction and supervision to small utilities in rural areas in addition to its own operation as a utility. Other water and sanitation utilities include Heredia Public Services Company (ESPH), which provides infrastructure, mostly in urban areas such as Heredia in the proximity of San Jose. This public company operates the service independently without being directed by MINAE.

(2) The Present Situation and Problems at the Government Level in Costa Rica

This section analyzes problems at the national government level using the evaluation items selected in Chapter 2, in light of the current situation in Costa Rica.

(i) Accountability system

The accountability system and the authorities in the sector at the government level are not clear. For example, AyA is authorized to direct and supervise utilities in rural areas, although it is a utility itself. Thus there is no entity that takes responsibility for the comprehensive supervision of the sectors, and the accountability system is somewhat dispensed.

Because various entities are in charge of guidance and approval of setting of tariffs according to the target utility, such as ARESEP, AyA, or Controlaria, there is a possibility that the administrative guidance on the water and sewerage tariffs may be inconsistent.

(ii) Investment Plan

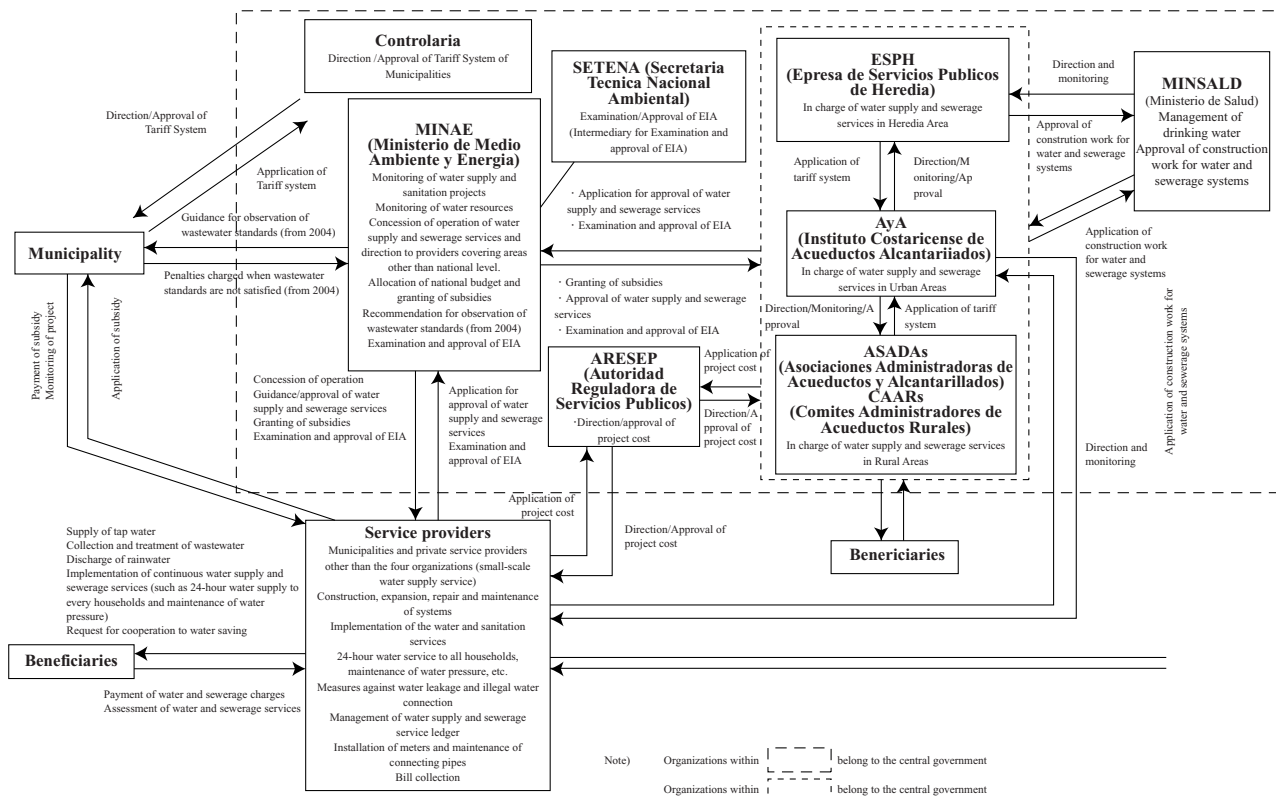
No medium-term and long-term national plans or policy for the sector are defined. Although the budget for the water and sanitation sectors has been on an upward trend, the growth is low in comparison with other public sectors⁴⁵

The government infused 20 million dollars of budget in total into the sector for eight years from 1991. AyA received 91% of that budget, most of which was allocated to water supply with the allocation to sanitation extremely low at about 4%.

43 Ministerio del Medio Ambiente y Energía : MINAE

44 Autoridad Reguladora de los Servicios Público : ARESEP

45 While the investment in such public sectors as health, education, social assistance and energy increased in the range of 5% to 7% of GNP, the investment in water and sanitation increased in the range of 0.5-0.7% of GNP.

Figure 6: Structure of the Water and Sanitation Sector in Costa Rica

Source: Prepared by SADEP Study Team based on reference materials

(iii) Subsidies

Governmental subsidies are available for water and sanitation utilities, and no particular problems have been confirmed in Costa Rica.

(iv) Tariff Policy

The tariff level is determined in consideration of the required operation and maintenance costs and the affordable payment levels of beneficiaries. The tariff has been revised every year in recent years.

It includes a tariff for wastewater collection, but it does not include a tariff for wastewater treatment. The cost for wastewater treatment seems to be financed by a subsidy from the government.

Because individual municipalities support poverty alleviation in their own ways in Costa Rica, the water supply and sewerage tariffs are designed on an individual basis in accordance with their supportive measures. The tariff levels in areas covered by AyA are set on a regional basis in a

manner that sustains the operation and maintenance in each region. This tariff policy tends to increase the burden on each user in less-populated areas. The central government takes measures to correct such imbalances among regions.

(3) The Present Situation and Problems at the Utility Level in Costa Rica

The main water and sanitation utility in the country is AyA, which operates the water and sewerage systems in most of the urban areas, as well as in some rural areas. Another public company, ESPH, currently operates the water supply systems of three (3) municipalities located in the proximity of San Jose (Heredia, San Rafael and San Isidro)⁴⁶.

In the other urban areas of the country that are not operated by AyA, the main operators are the Administrative Associations of Water Supply and Sewerage (ASADAs - Asociaciones Administradoras de Acueductos y Alcantarillados Sanitarios) or

⁴⁶ ESPH is a public company transformed in 1998 from a private company owned by three (3) municipalities located in the proximity of San Jose (Heredia, San Rafael and San Isidro). In addition to the water supply and sanitation service, ESPH operates electricity supply, public lighting, and the Internet service.

Administrative Committees of Rural Water Supply (CAARs) organized by the municipalities themselves. There are some 1,700 ASADAs operating in the 38 Municipalities of the country. In some municipalities, private firms operate small water supply services.

As representative operators in Cost Rica, the Costa Rican Institute for Water Supply and Sewerage (AyA) and Heredia Public Services Company (ESPH) will be focused on for study (Table 9).

(i) Service Provision

<Costa Rican Institute for Water Supply and Sewerage (AyA)>

While the water coverage has been considerably improved to 98%, the sanitation coverage ratio remains undeveloped at 47%. In addition, the wastewater treatment ratio is extremely low at 4%.

<Heredia Public Services Company (ESPH)>

The service area covered by ESPH is limited to three urban cities in the neighborhood of San Jose, where the water coverage ratio has reached 100%.

Existing sewerage systems are decrepit, as in the case of AyA, and wastewater is discharged without being treated to rivers, which is a great concern for water contamination.

ESPH depends on underground water sources to a large extent within the San Jose metropolitan area and within the territory of ESPH. However, untreated wastewater is discharged through the sewerage system in the San Jose metropolitan area into rivers, contaminating the underground water sources from the river.

(ii) Operation and Maintenance

<Costa Rican Institute for Water Supply and Sewerage (AyA)>

One of the reasons for the high UFW ratio (48%) is the leakage problem. As for the number of staff per 1,000 connections, it is a little higher than the ideal value at 6.3, but the service efficiency seems to be generally acceptable.

<Heredia Public Services Company (ESPH)>

Judging from the acceptable indices including the operating ratio and the tariff collection ratio, the performance as a utility is considered acceptable. However, the UFW ratio is relatively high at 45%.

The number of staff per 1,000 water and

sewerage connections is as low as 2.6. Therefore, the company seems to be under a good management with a smaller number of staff members than the ideal number (5 persons). What is more, since there is no particular complaint from the users concerning the quality of their services, their service seems to be more or less efficient.

(iii) Financial Management

Both AyA and ESPH show high collection ratios, and their working ratio and operating ratio are quite acceptable, too. Their satisfactory performance is considered to be attributable to their sound tariff collection systems, and efficient operations minimizing unnecessary expenditure. On the other hand, water supply and sanitation utilities in under-populated areas such as ASADAs stand in poor financial positions.

(4) Challenges in the Water and Sanitation Sector of Costa Rica

Taking all the analyses above into account, problems that should be solved at the sectors, national government and utility levels are summarized below.

(i) Challenges of the Sectors

1) While the water coverage ratios are adequate in general, and the priority in future should be placed on improvement of the ratios, particularly in the rural areas.

2) The sewerage ratios lag behind the water ratios as a result of the traditional policy to attach greater importance to the water supply. In future, the sector should shift the priority to the sewerage system, organizing sewerage networks and improving water treatment ratios nationwide (which will also contribute to the development of the tourism industry in Costa Rica).

(ii) Challenges at the National Government Level

1) Thanks to the policy of the central government giving priority to the diffusion of water supply networks in the urban areas, a great achievement can be observed in the water supply system. In future, the government should promote the development of water supply networks in the rural areas, as well as the spread of sewerage networks and

Table 9: Result of Evaluation Items of on Major Utilities in Costa Rica

No	Indicator		AyA	ESPH	Municipalities	ASADAs, CAARs	Ideal value
Service provision (water service, sanitation service)							
1	Water coverage (%)	Urban area:	98	100	98 1)	-	Nearly 100
		Rural area:	75	100	-	N.A.	
2	Service quality of water supply		Acceptable	12-hour service during drought	Occasionally interrupted	Occasionally interrupted	24h water service
3	Sanitation coverage ratio (%)	Urban area:	47	33	11		Nearly 100
		Rural area:	-	-	-	N.A.	
4	Sanitation coverage ratio: (%)		4	4	4	N.A.	100
5	Sanitation coverage ratio/ water coverage ratio		0.48	0.33	0.11	N.A.	1.00
Operation and maintenance							
6	Unaccounted for Water (UFW: %)		48	45	50 or more	50 or more	30
7	Staff per 1000 water connections (SWC: persons)		6.3	2.6	N.A.	N.A.	5.0
Financial management							
8	Working ratio (WR: %)		72	66	73-93	98	70
	Operating ratio (OR: %)		89	86	83	125	100
9	Tariff collection rate (CR: %)		96	97	50	N.A.	90

Note: 1) Including ESPH.

Source: Prepared by SADEP Study Team based on reference materials

investment in construction of wastewater treatment facilities.

2) In order to shift the priority, as suggested above, the central government and advisory agencies should upgrade their accountability systems and draw up long-term national plans and policies, and reconsider the distribution of budgets.

(iii) Challenges at the Utility Level

1) AyA and ESPH operate their services more or less efficiently, but their UFW ratios which stand at 48% and 45%, respectively, together with the ratio of 50% or above for municipalities, do not indicate satisfactory performance, compared to other indices. At the same time, although the water supply piping networks have good coverage, the high UFW ratio seems to be attributable to leakage due to the deterioration of the networks. Hence, in future, the utilities concerned should conduct appropriate operation and maintenance, primarily of repair and

refurbishment of piping systems, so as to decrease the UFW ratio.

2) ESPH relies heavily on deep wells as water sources during the dry season⁴⁷. Since more water is consumed than the replenishment rate of available groundwater, the lifespan of the deep wells is estimated at 10 years or so. It is necessary to promote the development of other water sources that are available sustainably, even in the dry season.

3) The improvement of water coverage and wastewater treatment ratios is a task which not only the central government but also the utilities should tackle actively, but since it requires a large amount of capital investment, it is necessary for the utilities to make an effort to obtain funds from the national treasury, to commit themselves to approach supervisory and other related agencies continuously over a long period, and participate in the activities of such agencies.

⁴⁷ As for ESPH, for 80% of the rainy season supply comes from surface water and only 20% from groundwater, whereas during the dry season 30% of the supply comes from surface water while the remaining 70% comes from deep wells (250-300 m depth).

Chapter 4. The Role of PSP in the Water and Sanitation Sectors in Developing Countries

This chapter analyzes the objectives for implementing Private Sector Participation (PSP) in the water supply and sanitation sectors of developing countries, as well as the types of implementation and the subsequent results, and examines the contributions of PSP in realizing sustainable water supply and sanitation sectors. It also elicits lessons learned and factors to be considered in implementing PSP, from examples in six Central and South American countries (Argentina, Brazil, Bolivia, Chile, Colombia and Mexico), the Philippines and Malaysia. Building on this, the chapter subsequently gives a broad overview of the status of PSP implementation in the water and sanitation sectors of the focused Four Countries (Mexico, Peru, Panama and Costa Rica), and summarizes challenges related to PSP.

1. Management System that the Water and Sanitation Sectors should aim at

Behind the chronic deficits of the utilities in the sector - public organizations, state-run public bodies, and public companies (hereinafter referred to as public corporations) - lie the following problems extracted in Chapter 3.

(i) The accountability at the central government and utility levels in the water and sanitation sector is not clear; or the locus of responsibility for management is ambiguous because of the presence of organizations that do not function properly.

(ii) The central government is unable to provide clear policies and plans, therefore, although an appropriate investment in the sector is urgently required, the investment amount itself is decreasing, and this weakens the quality of the water and sanitation services.

These factors discourage the activities of the entire sector, and make it almost impossible to remedy the problems, which include a large amount of leakage, low collection ratios, excessively large amounts of current account expenditure, and a small amount of capital investment.

These problems must be solved regardless of the

means - either the public sector makes voluntary efforts, or, PSP is introduced when that is impossible. Either way, the following management system seems to be vital.

1) The Establishment of a Management System on a Standalone Basis

Public corporations, regardless of whether or not they will introduce PSP, should make continued efforts to establish a management system on a standalone basis. Since water is one of the Basic Human Needs which have to be supplied as a universal service (see Chapter 1), it is not realistic to expect the water and sanitation sectors to be perfectly financially independent (management without any subsidies) (see Chapter 2). Nevertheless, it is still important for the organization in charge of the sector to set an independent entity as an ideal objective, and continue making efforts to improve and bring the management close to the ideal form.

Under a profit-conscious management system, it is effective to introduce a system of assessing the degree of achievement by means of setting easily understandable objectives, that is, showing clear numerical objectives, and also, if possible, setting numerical targets for individual sections or staff members.

2) Improvement of Service Quality for User-Oriented Service

The public corporations should commit themselves to successful maintenance and improvement of the service quality, together with the necessary higher efficiency through improvement of management. They are also required to take a management stance of being accountable to their service users concerning efforts for improvement and the standard of service in order to obtain the understanding of their customers.

2. The Purpose and Current Situation Concerning the Introduction of PSP

In cases where it seems almost impossible for the public sector to establish such a system with its own self-reliant efforts, the introduction of PSP serves as an alternative solution. While the water and sanitation services have been traditionally provided by the public sector, they are in recent years widely provided

in France, Spain, the U.K, and other developed countries by government-private joint or private companies. Subsequently in Latin American countries, too, the failure of many public corporations in offering appropriate water and sanitation services led to the adoption of PSP in an increasing number of countries in the 1990s. Since 1993 when a concession of private water supply and sewerage service companies became successful in Buenos Aires, the capital of Argentina, the water and sanitation sectors in Latin American countries have heightened its momentum towards the introduction of PSP. Many public corporations have begun entrusting, not only the operation of the facilities, but also the ownership of their assets, to private operators.

However, now that the case in Buenos Aires, which had been considered successful, has shown the vulnerability to foreign exchange risks and other problems, it is not necessarily common to simply consider the introduction of PSP to be an absolute device for success. There are arguments for and against PSP in the water and sanitation sectors and many countries are still assessing the possibility of PSP introduction. Hence, from the viewpoint of the sustainable sectors, it is essential to examine cases where PSP can serve as an effective device, as well as the timing of the introduction, and the form of PSP, if it is to be adopted, before appropriate advantage is taken of it.

3. The Decision-Making Process Toward the Introduction of PSP

Whether or not PSP can improve the performance of the water and sanitation sectors inevitably depends on the correct understanding of existing problems, a judgment of whether it is impossible to solve the problems through self-help efforts within the public corporations and, if so, the right decision concerning the option of PSP which leads to the solution to a problems.

In some cases, problems may be solved through appropriate measures, and guidance and supervision at the government level, or through self-efforts by the public corporation itself. Where such is the case, the feasibility of solving the problems on the government or utility side must be considered first. Nevertheless, there is a limitation on the capability of the

government and the public corporations on one hand, while a potentially high efficiency is available at the private sector on the other. And at the same time, so long as the sector has a potential value for investment from the viewpoint of private companies, the introduction of PSP may well be a policy option to take into account.

This section examines the process of decision-making over the introduction of PSP by dividing it into two steps: the judgment of whether or not PSP should be introduced (step 1), and the feasibility and option of PSP if it is to be introduced (step 2) (Figure 7). The primary aim of Step 1 is to rectify problems in the management of the public corporations through self-effort without the introduction of PSP. This is the first possible solution which the public corporations should make use of so as to solve their problems. Even so, not all public corporations can resort to this method, since, in fact, the problems have often arisen because the public corporations cannot solve them from the beginning. In such cases, Step 2 (introduction of PSP) is to be considered. The flow of the selection of options of PSP is summarized below.

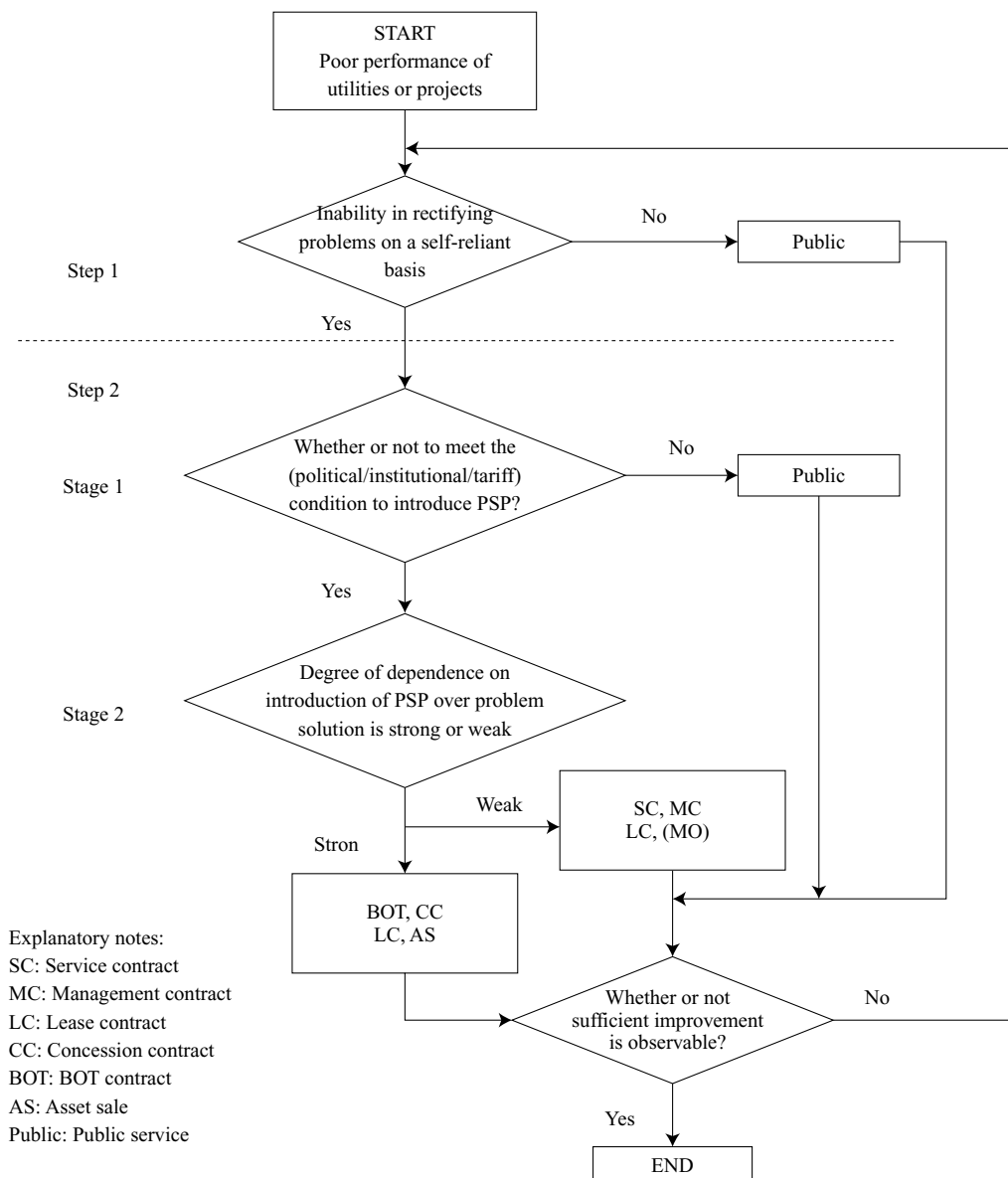
(1) Step 1: Management Reform through Efforts by Public Corporations

The purpose of step one is for the public entity to rebuild its management with its own self-reliant efforts. The following are possible renewals of the management with the self-dependent efforts.

(a) Voluntary Reformation of the Management of Public Corporations

The voluntary reformation of the management suggests that public corporations should make self-reliant efforts to rectify the current inefficient management without resorting to, in particular, substantial revision of laws and other settings. However, as is often observed in the public sectors, they are highly likely to fail to do so, because their accountability is quite ambiguous and they can be restricted by overstaffing due to strong labor unions and loose employment regulations, and thus the problem arising from both labor and management sides makes the management inefficient.

Whether PSP should be introduced to take advantage of the impact from outside for

Figure 7: Flow Chart of the PSP Selection Process

improvement, or voluntary, internal efforts should be utilized for the renewal depends on the degree of labor-management cooperation. If labor and their cooperation is difficult, voluntary reform of the management is hardly a desirable choice, but if their collaboration can be expected to some extent, the following method is likely to be an alternative choice.

(b) Introducing Private Company Management Techniques by Public Corporations

The introduction of private company management techniques is simply to adopt efficient know-how from the private sector, while retaining ownership of

assets. This method does not involve the participation of private companies. In this method, public corporations themselves adopt the principle of competition as a basic principle as in the private sector, and introduce management skills based on the market principle so as to establish a management system where profitability is pursued. The specific nature of the management techniques is identical to that in the PSP options described subsequently, whereby the public corporations themselves promote the reform.

(2) Step 2: The Introduction of PSP

Step 2 is used when the public corporations are unable to rectify their problems from within, and thus is aimed at renewing the management system with the help of private companies. Since problems and the environment of individual public corporations are all different, the PSP option to be adopted varies accordingly. In the selection of a specific PSP option, consideration follows two stages:

(a) First Stage

In the first stage, the following three basic conditions needed to implement PSP in this sector must be considered. These are 1) political commitment, 2) the institutions and 3) tariff structure and level.

1) Political Commitment

One important prerequisite for the participation of a private company is continuous political support, which determines how the public accepts PSP implementation. At the same time, if it is seen that PSP cases in neighboring countries and at home ended in failure, an uncooperative attitude of the people towards companies taking part in PSP activities will make it difficult to proceed with the operation. It is essential for the government to assist private companies involved by calling for understanding among the people, and, for this purpose, to make the PSP policy as clear as possible.

2) The Establishment of Institutions

Institutional foundation must be established in order to make the introduction of PSP effective, and regulations and laws should be added or revised, if necessary, so that any possible hindrances for PSP can be relaxed or removed.

3) The Establishment of Tariff Structure and Levels

In the cases where the tariff system is distorted due to political considerations or other reasons, it should be revised prior to the implementation of PSP to the extent possible. If the system excessively favors particular industries or users, the tariff system is likely to fail to gain the understanding of the people even if PSP is adopted. On the other hand, if the tariff level is excessively low due to reasons related to social policies, the low tariff level will suppress the management of the private companies participating in the PSP operation, and they are likely to be obliged to raise the level. Where this is the case, the private

companies involved may encounter considerable resistance and non-cooperation, and thus any distortion should be corrected to the extent possible in advance.

(b) Second Stage

The second stage involves selecting the option of PSP to implement once the appropriate conditions for doing so have been established. Here, "how much private companies should be committed to solving the existing problems" should be taken into account in the criteria. More specifically, the following three factors will be assessed:

1) Capacity of Public Corporations to Carry out Projects

If the public corporations' capacity for carrying out projects is low, more involvement from the private company is required. It is necessary to first evaluate the capacity of the public entity and then determine what level of improvement can be achieved by itself, and how much improvement could be achieved through the involvement of a private company. With regard to the ability to collect bills, for example, it is necessary to consider the required collection system - how much the private companies are expected to perform in the collection of bills, how much authority they are given concerning the collection of bills, and so on.

2) Need for Private Investment

The private company's involvement in the services will be even larger if the public entity can count on it for capital procurement. In general, water and sanitation sectors suffer from more serious shortage of funds for refurbishment and expansion of their facilities than other sectors. After determining the amount of public funding that can be used to cover the investment necessary, the public entity needs to assess how much private capital will be needed.

3) Asset Ownership Issues

If the private companies involved take ownership of the assets, the degree of their commitment becomes much greater. The management ability of the companies directly reflects on the success or failure of the PSP operation. Therefore it is crucial to consider how to select private companies, and how much share of the ownership should be given to them.

4. Options and Effects of PSP

Various options of PSP are available in accordance with the degree of commitment of the private companies involved (Table 10), and individual options have different effects. This section highlights the following six options - (1) service contract, (2) management contract, (3) lease contract, (4) concession contract, (5) BOT contract, and (6) asset sale of property (see also Figure 8).

In cases where the potential of private companies is taken advantage of in the form of entrusting them with part of the operation, the degree of commitment of the private companies is small. Therefore, suitable PSP options would be (1) service contract, (2) management contract, and (3) (weak) lease contract. On the other hand, in cases where the potential of a private company is reflected in the service operation as a whole, greater commitment is required and suitable PSP options would be (3) (strong) lease contract, (4) concession contract, (5) BOT contract, and (6) asset sale.

The most common PSP options in the water and sanitation sector in Latin America are (1) service contract, (2) management contract, (3) lease contract, and (4) concession. Since these options do not involve the sale of public assets, they are easily accepted both politically and socially, and have been implemented in a large number of countries including Argentina, Bolivia, Brazil, Chile and Mexico.

In the meantime, (5) BOT contracts, whereby private companies construct new facilities and have ownership of them, is frequently adopted in wastewater treatment projects. When new wastewater treatment facilities are constructed in Latin American countries which are short of those facilities, it requires not only initial capital investment from private companies but also subsequently efficient operation and maintenance, and sound financial management, to take advantage of their management know-how. Therefore, the BOT method where the private companies have ownership would be appropriate. In cases where new facilities are constructed under the BOT method, since the ownership of the existing facilities, which belong to the nation (Government property), is not transferred, it is more likely to be acceptable to the people.

In PSP involving (6) asset sale, since the private

company management capability has a great impact on the services, a careful, strict judgment is required for its adoption. Although not so many PSP projects have been undertaken under this option, six cases in Chile and three in Brazil were carried out and produced certain achievements. In the cases of Chile, concession contracts were agreed to gain the understanding of the people concerning the PSP operation, and the property concerned was sold in a tendering process, which secured transparency for the operation. (It seems that, if any particular problems arose in the water and sanitation services, even if the public corporation was replaced by a private one under a concession contract, they did not show any negative reaction against the following stage, that is, the asset sale.)

Following are some details of the PSP options (1)~(6) (Figure 8)

(1) Service Contracts

This type of contract is suitable for a case such that a portion of work from a public entity (e.g. minor services such meter reading) is outsourced to a private company for a relatively short period of time (one to two years) (Figure 8 (1)). The main purpose of this contract is to make operations more efficient. Almost all the burden of responsibility and risk related to the corresponding water and sewerage project as a whole is ultimately borne by the public entity, while the responsibility and risk taken on by the private company is extremely limited.

In this type of contract, public entities are able to make the service operations more efficient in the region covered by the contract with simple contract terms and procedures. Also, this format allows public entities to outsource work appropriately, slim down their organization, and focus resources on their core business. Moreover, since the size and scope of the contract is small, there is little risk and damage suffered by either side even if the execution of the contract fails, which also facilitates contract cancellations and re-bidding.

This option requires little complicated knowledge from either party, and serves well as a first step in implementing PSP as it can easily gain public understanding. However, the extent of PSP benefits at this level is limited.

Table 10: Characteristics of PSP Options

PPP Option	Service Contract	Management Contract	Lease Contract	Concession Contract	BOT Contract	Asset Sale
Financing investments	Public sector	Public sector	Public sector	Private sector	Private sector	Private sector
Financing working capital	Public sector	Public sector	Private sector	Private sector	Private sector	Private sector
Contractual relationg with retail customers	Public sector	Public sector (on behalf of the public sector)	Private sector	Private sector	Private sector	Private sector
Private sector responsibility and autonomy	Low	Low	Low to Medium	High	Medium to High	High
Demand for private capital	Low	Low	Low	High	High	High
Financial risk for private sector	Low	Low	Low to Medium	High	High	High
Duration of contract / license (years)	1-2	3-5	5-10	20-30	20-30	License may be in perpetuity with provision to withdraw or revoke
Ownership	Public sector	Public sector	Public sector	Public or private sector	Private then public sector	Private sector
Management	Mainly public sector	Private sector	Private sector	Private sector	Private sector	Private sector
Setting tariffs	Public sector	Public sector	Contract and regulator	Contract and regulator	Public sector	Regulator
Collecting tariffs	Public sector	Public sector	Private sector	Private sector	Public sector	Private sector
Main objectives of Private sector Participation	Improve operating efficiency	Improve operating and technical efficiency	Improve operating and technical efficiency	Mobilize private capital and expertise	Mobilize private capital and / or expertise	Mobilize private capital and expertise

Source: Based on the Ontario SuperBuild Corp., "Study 8: Water and Wastewater Markets, Investors and Suppliers" Jan., 2003, which was edited by the SADEP Study Team

(2) Management Contract

In a management contract, the private company takes on additional management responsibilities beyond those included in a service contract. If it succeeds in increasing operations efficiency, the private company is rewarded for its managerial skills and if it fails to do so, it will be penalized as the contract stipulates. The flow of capital and services is the same as that of a service contract (Figure 8 (2)), but the contract terms are slightly longer, 3-5 years. Normally, individual contracts with users are agreed by a

contract private company on behalf of the public entity. The public entity gives stronger incentives to the private company for improvement of the services in that this option gives it the same advantages as for service contracts, but lets the private company take greater responsibility for the operation of the services. It is thus the next easiest contract option, after a service contract, for the public entity.

(3) Lease Contract

In this type of contract, a public entity leases the

water and sanitation facilities to a private company, which in turn collects tariffs from users, pays a leasing fee to the public entity (the owner), and makes a profit from the difference between these two amounts after covering operation and maintenance costs (Figure 8 (3)). The principal goals of this option are to make the operations more efficient and introduce management know-how from the private sector. The contractual period is longer than that of a management contract at a standard length of five to ten years. The public corporation holds the ownership of the facilities and conducts capital investment, whereas the private company is responsible for fundraising for the operation, agreeing contracts with users, and the operation of services. Thus, the risk the private company is required to bear is greater than that under a service or management contract.

The most notable feature of a lease contract is that any revenue from tariffs collected that remains after deducting the leasing fee, and operations and maintenance costs becomes the profit of the private company. Meanwhile, the public entity is guaranteed a certain amount of revenue in the form of the leasing fee from the private company during the contract term regardless of the company's revenue from tariffs collected or operations and maintenance costs paid. On the other hand, if the private company runs the services in the red, it will have to bear the deficit. This fact provides all the more incentive to the private company to minimize operations and maintenance costs, offer reliable service, and increase revenue from tariffs.

(4) Concession Contract

In a concession contract⁴⁸, the private company (referred to as a concessionaire) is commissioned with the comprehensive operation of the water and sanitation services (Figure 8 (4)). In the case of the water and sanitation sectors, the concessionaire does obtain the rights to use water and sanitation facilities, though in exchange it is required to take

responsibility for accomplishing a set of “concession targets” which relate to aspects such as the service quality and investment amount. The principal goal is to introduce capital and management and operations know-how from the private sector.

One of largest characteristics of this type lies in the fact that the private company is entrusted to make “new” capital investment (i.e. new investment as well as investment to repair and update existing facilities) in addition to operating “existing” water and sanitation facilities. Although in service, management and lease contracts, the private company is expected to improve the operations of existing facilities, it is still the public sector that is responsible for capital investment. BOT contracts, on the other hand, are primarily effective for “new” capital investment, but are not suitable for improvement of the operation of “existing” facilities. A concession, however, covers both improvement of operations efficiency of existing facilities and capital investment for new facilities. From the point of view of the public entity, a successful concession has the potential of resolving all of its problems in one fell swoop. And, from the private company’s perspective, it has the potential possibility of being a high-risk, high-return option.

(5) BOT Contract⁵⁰

In this type of contract, a private company constructs water and sanitation facilities with its own finance, operates them for a certain period of time, and subsequently transfers the ownership to the public entity (Figure 8 (5)). BOT contracts have been taken advantage of in many cases in sewerage systems in Latin American countries. However, since difficulty in collecting sewerage bills was predicted from the beginning, many of them stipulated that private companies are guaranteed to receive a certain amount of money from the collected bills from the public corporations during the BOT contract periods. The primary goal of this option is to thoroughly introduce

48 Concession contracts in water projects clearly state that the services cannot be cancelled or interrupted regardless of the length of contract. For example, in October 2003, a private company in Argentina called Aguas Argentina’s caused a major accident that disrupted the water supply in Buenos Aires, which was an infringement of their concession. As a result, ETOSS, the owner and agency overseeing Argentina’s public works and sanitation services, filed to impose a fine in excess of \$400,000 against the company for negligence of maintenance duties.

capital and management know-how from private companies, and the private companies involved play a much greater role than in other forms of contracts. The usual contract period is 20 - 30 years, reflecting the long lifespan of facilities in which the private companies have invested.

One of most defining characteristics of this option lies in the fact that the public entity commissions the operations of the services for a long period of 20 - 30 years in addition to the investment for facility development by giving approvals. This option is normally made use of in cases where the public entity lacks capital, know-how, and human resources and wishes to expand the service area through new capital investment. The amount of risk that the private company undertakes with this option is, of course, high given that it has to carry the responsibility of management for a certain period of time in addition to financing and capital investment. In return, however, it can prove to be an excellent business opportunity for the private company if it succeeds. Also, since the ownership of the existing facilities is not transferred to the private company, this option is palatable to the entire population and users of such facilities, and is also welcomed by new users resulting from a BOT project as long as the services and tariffs are set appropriately.

It should be noted, however, is the fact that the risk involved in case of failure is high for the public entity and the private company alike, requiring the use of caution when considering this option. The private company carries long-term political, economic and commercial risk, which tends to be high in financial terms. Under normal contractual conditions, the private company is obligated to provide services and cannot readily discontinue such services even if they become unprofitable. However, the risk of the private company defaulting on its obligations does exist and, depending on the wording

of the contract, could result in the public sector being forced to accept contingent liabilities if this were to occur.

(6) Asset Sale

In an asset sale, the public entity sells a portion or all of the service assets to private companies⁵¹ (Figure 8 (6)). Unlike concession contracts, the private companies assumes ownership of the assets, and, as the operator (or an equity holder) of the water and sanitation utilities, it becomes more responsibly involved in the management of the services. However, given the nature of the services being public, although the private company can acquire the assets, it is normally required to meet a certain set of goals pertaining to improvement of operations efficiency and service coverage. Besides, an approval by a regulatory body is required for tariff levels. The principal goal of this option is to infuse capital from the private company in addition to knowledge regarding management and operations.

Similar to a concession contract, the asset sale option can be approached multi-purposefully for problems in the water and sanitation sectors (improvement of operations efficiency of existing facilities and investment in new facilities). An asset sale also has the potential of providing short term benefits in the areas of improving the balance of fiscal revenue and expenditure, and decreasing public debt, (which is one of the reasons why the privatization and asset sale of public entities was so popular in the past in Central and South America). Furthermore, in addition to the fact that acquiring assets is an advantage in itself for the private company, an asset sale also allows the company to take initiative in managing the services as the operator itself (or the equity holder). However, it should be noted that this option involves various management risks at the level of private companies,

50 BOT: Building, operation and transfer. Since the ownership of the facilities involved belongs to the private company before they are transferred to public sector, "O" for the ownership is sometimes included in this abbreviation, and the method is called "BOOT" rather than BOT. Also, the private companies are frequently involved in this type of PSP operations at the stage of "designing," so the method is also called DBOT or DBOOT. Alternatively Or, to distinguish "O" for operation from "O" for ownership, "F" for finance is used instead of the latter "O," in that the ownership belongs to the private companies which "finance" the facilities. In this case, the method is called BOFT or DBOFT. In either case, this paper calls the method BOT contracts.

51 The proportion of assets sold in Chile accounts for 35 - 40% of the total assets. Not all the assets are sold in every case.

and is likely to be subject to resistance among the people/users at the time the introduction of PSP is planned or after the sales of assets. It is possible that national sentiments could have a negative impact on the management. These include resistance against the sales of national facilities to the private sector, which were built with taxes and fees paid by the people; a concern over the provision of the water and sanitation services by the private sector; dissatisfaction with the tariff level to be set; and so on. Hence, it is crucial to secure transparency of the process of introduction, and to be accountable to the people.

5. Cases where the PSP contributes to the Sustainability

The previous section showed that PSP takes various forms. This section examines various PSP activities seen in the World Bank's report and adopted in countries in Latin America and Asia, and is aimed at clarifying how the introduction of PSP has contributed to sustainable water and sanitation sectors.

(1) World Bank's Assessment of the Degree of Contribution of PSP

The Operations Evaluation Department of the World Bank (OED) carried out assessments of projects in which the World Bank assisted in the water and sanitation sector in the past⁵² (Table 11). Dividing the projects to be evaluated into (1) cases where PSP was introduced (with PSP⁵³) and (2) cases where it was not (without PSP⁵⁴), the analysis was made on the states of the sectors before and after the implementation of the project, giving certain assessments in accordance with eight indicators to measure their performances.

The conclusions of the World Bank evaluation are summarized below:

1) Enormous investment is required to increase the water and sanitation coverage rate, which tends to improve in proportion to the amount of investment

being made. PSP does not necessarily produce particularly outstanding effects (in that any improvement is hardly achievable unless a certain amount of capital is invested.). This is a reason why the margins of increased water supply and sewerage ratios under the PSP projects investigated (+14% and +10%, respectively) were not conspicuously greater than the figures (+16% and +9%, respectively) observed in the projects without PSP.

2) Since the collection of sewerage bills is not necessarily an easy task, financial profitability is not expected to come easily from the investment in sanitation services. Thus, normally, the sewerage service in general is financed by part of the revenue from the water supply service, a massive amount of subsidy, and low-interest loans. The margin of increased wastewater treatment ratio for projects with PSP (+6%) is less than that for projects without PSP (+22%). The substantial difference suggests that it is difficult to make profits in wastewater treatment projects because they require a large amount of investment, and thus that projects show a greater impact on the improvement of the service under the non-PSP (i.e., public) operation rather than under operations with PSP.

3) As for the operation and maintenance measured by the unaccounted for water (UFW) and Staff per thousand Water Connections (SWC), the introduction of PSP shows a greater improvement in projects than the absence of PSP.

(2) Lessons Learned from the Introduction of PSP

From past cases in six Latin American countries (Argentina, Brazil, Bolivia, Chile, Colombia and Mexico), in addition to the Philippines and Malaysia, This section describes a number of actual lessons learned from the past experiences in implementing PSP.

1) Political commitment (e.g. creating legal systems to support PSP and strengthening guidance from

52 Efficient, Sustainable Service for All ?, Operations Evaluation Department of World Bank, Sep. 1, 2003

53 (1) With PSP: Based on responses from 11 private companies engaged in PSP projects in Turkey, Colombia, Argentina, Indonesia, the Philippines, Bolivia, and Trinidad and Tobago.

54 (2) Without PSP: This covers 28 public projects, i.e. non-PSP projects, in countries such as China. Note that even though 18 out of the 28 projects are in China, considerations were made so that this does not influence the results.

Figure 8: Major PSP Options

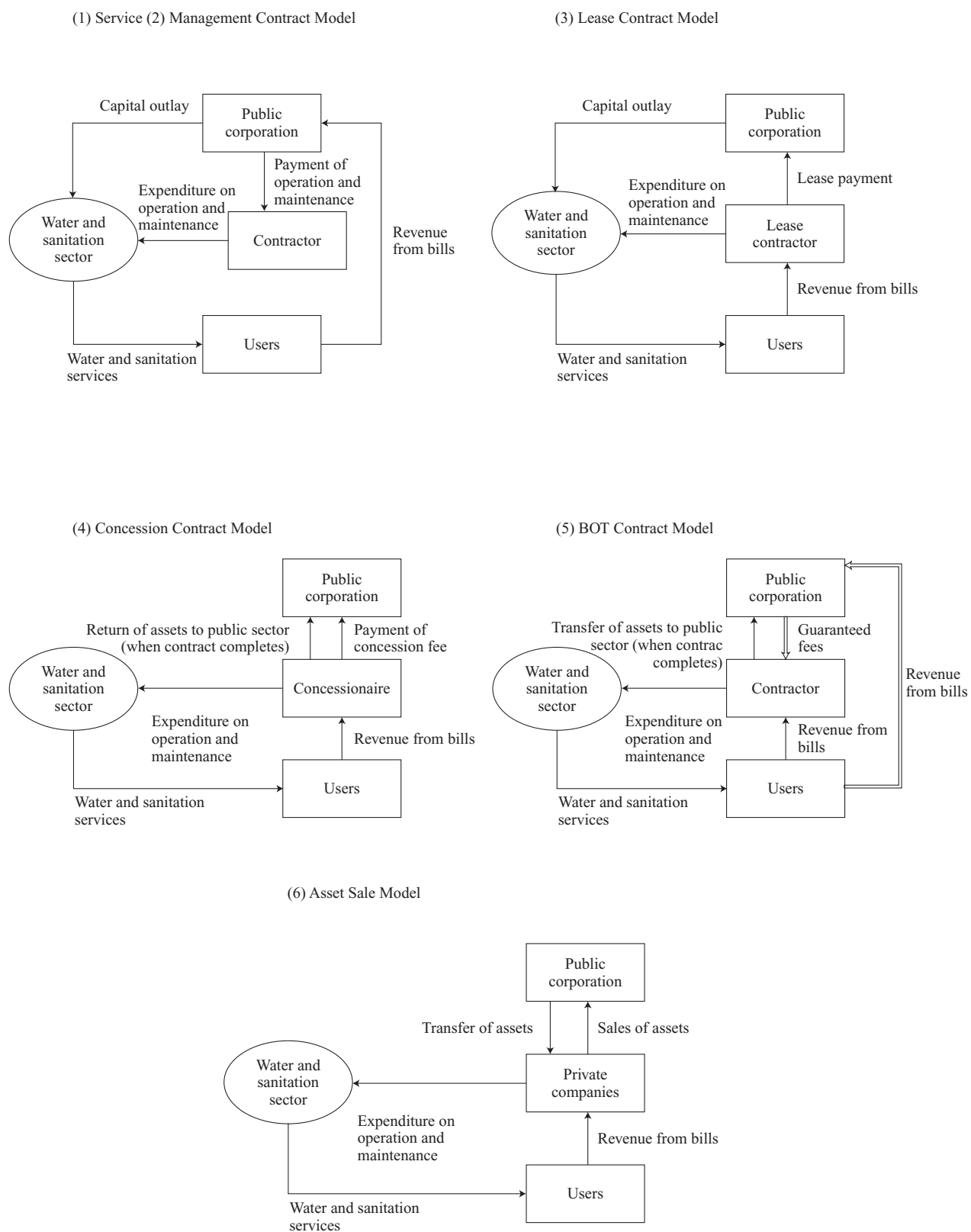


Table 11: Comparative Performance of Public and Private Water and Sewerage Projects

Performance Indicator	(1) With PSP		(2) Without PSP	
	Before Project	After Project	Before Project	After Project
1. Service-for-All				
1) Water Coverage ratio	66%	80% (+14%)	70%	86% (+16%)
2) Sanitation coverage ratio	38%	48% (+10%)	32%	41% (+9%)
3) Proportion of households connected to continuous water supply service	68%	94% (-26%)	N.A.	N.A.
4) Proportion of household connected to disinfected water	82%	97% (+15%)	N.A.	N.A.
2. Efficiency of Service				
5) Unaccounted for Water (UFW)	53%	46% (-7%)	40%	38% (-2%)
6) Staff per Thousand Water Connections (SWC)	8.2	4.2 (-4.0)	7.6	4.4 (-3.2)
3. Sustainability of Service				
7) Financial working Ratio	0.77	0.70 (-0.07)	0.71	0.66 (-0.05)
8) Wastewater Treatment Ratio	7%	13% (+6%)	9%	31% (+22)

Notes: UFW rate (%) = Losses / Total water distributed

Staff per Thousand Water Connections (SWC) = number of staff at the water supply service company / (number of households connected to water supply / 1,000)

Financial working ratio = operational cost (minus depreciation cost) / Tariff revenue

Wastewater treatment ratio = the proportion of wastewater volume which has been processed at the second treatment facility to the total volume of wastewater generated

Source: Formed according to the World Bank, "An OED Review of the World Bank's assistance to Water Supply and sanitation" Sep. 2003.

government agencies overseeing policy/regulation) supporting the project is indispensable if the project is to be implemented with speed and sustainability. (example: Concession in Cochabamba, Bolivia)

2) As water and sanitation projects are in essence public projects, ensuring accountability to the stakeholders - the beneficiaries in this case - is essential when implementing PSP. (example: Asset sale in Chile)

3) Suddenly raising tariffs immediately after implementing PSP can easily antagonize the public. Even if a tariff increase is necessary, 1) carry out the increase only after the private company under obligation has done everything it can to improve its service management, and 2) it is essential to closely examine the Willingness to Pay (WTP) and Affordability to Pay (ATP) to avoid an unacceptable sharp and sudden increase. It is also possible to use the range of tariff increases as a selection criterion in the bidding process. (example: Water and sanitation project in Manila, The Philippines)

4) When implementing PSP, private companies should be selected after having undergone a

thoroughly competitive bidding process. The PSP contract should clearly state where all responsibilities lie, the goals expected of the company, and any penalties and incentives related to carrying out the project. It is also preferable to include in writing options that allow adjustments to the contract as a measure to prevent possible problems in a long-term contract in the event that the program undergoes changes. (example: Water and sanitation project in Manila, The Philippines)

5) Even if PSP is urgently needed, drastic introduction of PSP is highly unlikely to gain the understanding of the users. Thus, ideally, a feasibility study (F/S) or other study has to be carried out first, and then PSP operations can be launched gradually in the form of, for example, service contracts or management contracts, and finally a lease contract or a full-concession contract could be adopted. (example: Aguas Calientes, Mexico)

6) As water and sanitation facilities can directly affect the lives and well-being of the public, and since they are created and maintained over many years at the expense of the public, one may think that public

entities should retain assets to the greatest extent possible, leaving the sale of assets as a last resort. (example: BOT contract on wastewater treatment facility in Mexico)

6. Implementation Status of PSP in the focused Four Countries

This section summarizes the current status of PSP implementation in the four countries surveyed in this study, and looks at the problems and issues in the water and sanitation sectors of these countries as outlined in Chapter 3, to examine the types of contribution of PSP towards creating sustainable water and sanitation sectors.

Mexico

(1) Current Status of PSP Implementation in the Sectors

In Mexico, the privatization of water supply and sanitation services began in the 1980s and expanded further in the 1990s. Currently, services where the private sector is taken advantage of include water treatment facilities for bulk supply of water, the management of wastewater treatment facilities, and the management of the water and sanitation services in municipalities⁵⁵. Mexico's experience in implementing PSP since the 1990s ranks second in Central and South America after Brazil in terms of the number of projects carried out (21) and sixth in terms of the amount invested. The PSP operation in Mexico is concentrated in the sewerage services, currently 26 wastewater facilities being under construction or operation by the private sector under BOT contracts. The promotion of constructing or upgrading wastewater treatment facilities reflects a national law concerning water⁵⁶ which has prohibited the discharge of untreated wastewater.

One characteristic of the introduction of PSP in the water and sanitation sector in Mexico is the presence of a policy (PROMAGUA⁵⁷) that supplies

financial resources to utilities who are highly motivated to improve operations efficiency, which allows them to be more active in planning PSP implementation. Apart from the BOT method, which has been increasingly made use of in the previous 10 years, some other PSP options have begun to be introduced. In Mexico City, there are plans to carry out individual PSP projects in three steps: (1) surveys of sewerage networks / meter installations (service contract), (2) water usage measurement / tariff collection (service contract), and (3) reduction in the volume of leaked water (concession - being planned). Additionally, there is also a water and sanitation service under full concession in Cancun, a rural area, and a management contract of a public-private partnership in Saltillo.

(2) PSP Issues and Possibilities in the Water and Sanitation Sectors

Since Mexico has suffered from low collection ratios (CEAM 36%, and SACM 50%) for many years, there is room to take advantage of service contracts, management contracts, or other PSP options to improve the ratios.

While the water and sanitation coverage ratios show reasonably acceptable figures, the wastewater treatment ratios are extremely low (CEAM 22%, and SACM 10%). Therefore wastewater treatment facilities should be constructed or upgraded as early as possible. For this, the construction of facilities, which is currently in progress under the BOT method of PSP, could be encouraged further.

As for the water supply service, the coverage ratio is, as stated above, generally acceptable. However, a high UFW due to a large volume of leaked water suppresses the management. Therefore, it is an option to improve the UFW through a concession contract, which includes capital investments for reducing the leakage.

55 CNA: La Participacion Privada en la Prestacion de los Servicios de Agua y Saneamiento - Conceptos Basicos y Experiencias", Mexico City, September 2003

56 Established in December 1992. In accordance with this law, any untreated water being discharged into public bodies of water must be stopped by December 2006 otherwise a fine will be imposed.

57 PROMAGUA (Programa para la Modernizacion de Organismos Operadores de Agua - Program for the Modernization of Water Operation Organizations) is funded through the BANOBRAS Infrastructure Fund (FINFRA) and is an assistance program targeting over 50,000 utilities (half of the total number in Mexico). The types of PSP envisioned by PROMAGUA include service contracts, management contracts, concessions and companies operated through public-private partnerships.

Peru

(1) Current Status of PSP Implementation in the Sectors

Peru has developed a legal system⁵⁸ that effectively utilizes private sector investment, and PSP is already being carried out in the communications and port sectors. However, the government and the people are not necessarily keen on the introduction of PSP, because of the outbreak of riots against the PSP operation that was to be introduced in the energy sector in Arequipa.

Partly because of this, although a concession contract was about to be concluded for the water supply and sewerage services in the metropolitan area of Lima in the 1990s, problems arose during the process of bidding, and the bidding was eventually cancelled. There has yet to be a single example of a PSP project implemented in the country's water and sanitation sectors.

Recently, however, preparations for the construction of a water treatment plant⁵⁹ are in progress, under a BOT contract, with a 27-year term already approved by the government, to apply for the region covered by SEDAPAL. The World Bank is considering the introduction of PSP as a strategy for the development of the water and sanitation sectors, which may lead to a change in the present perception of PSP activities.

(2) PSP Issues and Possibilities in the Water and Sanitation Sectors

Given that a legal system covering PSP implementation has been set up in Peru, there is room for improvement in utilization of PSP as a solution to the problems in the water and sanitation sectors. Before this can be accomplished, however, the following issues should be addressed at the government level: (1) establishment of the accountability of SUNASS (the government regulatory entity), (2) measures to construct and refurbish facilities in rural areas, (3) a revision of the tariff system which incorporates the tariff for wastewater treatment, and (4) the removal of the

negative impression of PSP arising from past experiences. Addressing these issues will pave the way for PSP application in future projects.

For this reason, possible PSP options to be examined include a service or management contract, which facilitates improvement of the low collection ratio due to the absence of meters in rural areas, or a concession or other contract including an increase in the number of meters installed.

The improvement of the extremely low level of the current wastewater treatment ratio requires a large amount of new investment, so that it is necessary to construct new facilities with private funds, and to encourage PSP using the BOT method, which is less likely to invite resistance from the public in that it does not transfer the ownership of the existing facilities to the private sector.

Panama

(1) Current Status of PSP Implementation in the Sectors

In 1995 the government of Panama started to privatize some public sectors which included communications, energy, and transportation. It also planned to put IDAAN, of the water and sanitation sectors, under the private operation of a single nationwide concession in accordance with the legal foundation (Law no.2 of January 1996) and a feasibility study was carried out in 1996, which also selected the PSP option. However, in the presidential election in 1999, all the candidates made pledges against the plan, which has not yet been realized at the time of this study. (This seems to be attributable to the fact that the public opinion was against the PSP operation.) There are PSP projects in Panama where private water companies, such as Aguas de Panama, supply water to IDAAN under a concession contract.

(2) PSP Issues and Possibilities in the Water and Sanitation Sectors

Given the small size of Panama, IDAAN covers most of the water and sanitation projects in the country. Thus, any problem arising from IDAAN immediately

58 The organization Proinversion is the primary point of contact and is working to utilize PSP to improve the quality of service in public works projects and to strengthen the competitiveness of the national economy. In working to accomplish this, the organization oversees efforts to try to attract private companies and plan PSP contracts in accordance with the law.

59 The scale of the project is US\$60 million and will have a water processing capacity of 172,800m³/day.

becomes a problem of national significance. Therefore, its privatization must be carried out under collaboration between the central government and other related organizations. As for the improvement of the financial position of IDAAN, an environment allowing PSP to function smoothly must be created. It is necessary for MINSA, a policy-making agency, to strengthen its guiding and supervisory power over the management of IDAAN, and for ERSP, an agency to approve tariff structures, to encourage the construction of an appropriate tariff system. In line with this, the privatization process should begin with minor aspects of the sector and achieve results steadily so as not to stimulate unnecessarily any negative sentiments of the public. Of all the problems of IDAAN, the following two will be solved with the introduction of PSP, and efforts must be made to do so.

First, poor indicators (Chapter 3) suggest that IDAAN does not manage its operation and maintenance appropriately, so that it is necessary to introduce PSP under a service or management contract for increasing the collection ratio. This will bring in a certain result within a relatively short time and result in obtaining the understanding and support of the public. The least radical PSP options, such as service and management contracts, should be taken advantage of with the revision of the tariff system where the bill currently incorporates charges for garbage collection and garbage treatment. Once they have attained certain results, a lease, concession, or other form of contract should be proactively considered to reduce the UFW, which requires a certain amount of investment.

Second, the water and sanitation coverage ratios and the wastewater treatment ratio of IDAAN are quite poor among the four priority countries, and thus they should be improved through capital investment. However, it is not reasonable to authorize IDAAN to make decisions concerning new investments since it is the organization that presently has problems in exercising management. Therefore, it is necessary to adopt a BOT-method contract using investment funds from the private sector to promote an increase in the fund for the investment in new facilities.

Costa Rica

(1) Current Status of PSP Implementation in the Sector

As a result of the establishment of the concession law in 1998 which covers approval for public services in the roads and transportation sector, future development in institutional and political conditions could pave the way for PSP implementation in the water and sanitation sectors. For now, however, past opposition to PSP implementation from public officials and the population have led to its postponement. Recent activity has nonetheless included AyA considering the use of PSP in the water and sanitation sectors, as well as ESPH considering it for use in water purification and wastewater treatment plant operations. Furthermore, various PSP options are considered in the modernization project of the sectors, which may be co-financed by JBIC and the World Bank.

(2) PSP Issues and Possibilities in the Water and Sanitation Sector

Costa Rica, like Panama, is a small country, and thus the central government has to play a great role in solving problems in the water and sanitation sector. Of the problems in the sector in this country (Chapter 3), the following ways of introduction of PSP seem to be effective for the solution of these problems.

While the water coverage ratio in Costa Rica shows a more or less acceptable figure, the improvement of the sewerage coverage ratio and the wastewater treatment ratio lags behind. Thus, there is possibility that in addition to the central government's positive decisions the participation of private funds through actively making use of BOT-method contracts, would lead to a substantial expansion of new facilities.

Among problems with the public corporations, AyA and ESPH, the large volume of water leaked is counted as a major one. Still, since their collection ratios are quite good, so long as the facilities are repaired or refurbished appropriately by the private sector under a concession contract, they are still able to increase the profitability, and serve as a strong incentive for a cut in the leakage amount. The introduction of PSP under the concession method could be considered as an option.

Chapter 5. Case Studies of Yen Loan Projects and Possibilities of Private Sector Participation (PSP)

This chapter takes up on going and future yen-loan projects (one each from Peru and Panama) as case studies, and simulates the profitability of the projects. Based on the assessments obtained, the feasibility of the introduction of PSP into the relevant yen-loan projects is examined. In general, in order to assure financial soundness at the utility level, it is ideal to assure the profitability of as many individual projects as possible among all the projects which the utilities in question are operating. However, in developing countries, many public companies involved in the water and sanitation services hold projects in deficit, and are confronted with financial difficulties. In this sense, assuring the profitability of individual projects is virtually a starting point for improvement of their own management.

The simulations of profitability of projects will be carried out by comparing and examining three or four scenarios. After obtaining the results of the simulations, the possibility of introducing PSP into the foregoing yen-loan projects is explored.

1. Estimation of Willingness to Pay (WTP) Using the Contingent Valuation Method (CVM) -a case study in Iquitos City, Peru-

Prior to a simulation of the yen-loan project in Peru (Provincial Cities Water Supply and Sewerage Improvement and Expansion Project (II), in Iquitos, Loreto), whether or not the current tariff level in the city of Iquitos was appropriate was examined. For this, attempts were made to estimate “Willingness to Pay (WTP)⁶⁰” which literally means the amount of tariff to the water and sanitation services which their users are prepared to pay in accordance with the results of a questionnaire survey⁶¹ using the Contingent Valuation Method (CVM) on one hand, and “Affordability to Pay (ATP)⁶²” which is the amount of tariff which the users can actually afford calculated based on household and other surveys (Table 12). The appropriateness of the current tariff level was evaluated in comparison with these WTP and ATP values.

(1) Estimation of Willingness to Pay (WTP)

A questionnaire survey addressed to the population of Iquitos, (1,000 samples) gave an estimated total amount of WTP of 16,242 thousand soles (approximately 494 million yen). The figure is equivalent to 83.9% of the current total actual amount of payment to the water and sanitation services. The estimated adoptable values of the additional WTP reaches 65.1% increase of the current payment amount for the water supply service and 144.5%

Table 12 Comparison of Willingness to Pay, Affordability to Pay, and Current Payment Amount of Water and Sewerage Tariffs

Item	Current average amount of monthly payment (Soles/month)	Affordability to Pay (ATP) (Soles/month)	Willingness to Pay (WTP) (Soles/month)
Water tariff	20.81	18.70~24.90	34.35
Sewerage tariff	6.48	6.90~ 9.20	15.84
Total amount	27.29	25.60~34.10	50.19

Source: SADEP Study Team

60 Willingness to Pay (WTP): the value expressed in a monetary term that direct beneficiaries are willing to pay at the maximum, when certain public goods or services are supplied or the environmental resources are improved under an imaginary setting (imaginary because it is difficult to evaluate the value in the real market). Beneficialies are asked about the value in a questionnaire survey.

61 For detail analysis, see “Estimation of Willingness-to-pay (WTP) for the Water and Sanitation Services through Contingent Valuation Method (CVM): A Case Study in Iquitos City, The Republic of Peru”, in this JBICI Review.

62 Affordability to Pay (ATP) : the value that users are able to pay for certain services, computed with reference to data on household incomes of residents in the region in question (users of the services) and the components of the expenditures.

increase of the current payment amount for the sanitation service, suggesting a strong preference among the residents to pay for the sanitation service.

(2) Estimation of Affordability to Pay (ATP)

While the foregoing WTP represents the largest amount willing to be paid against the assumed service, it is not appropriate to base the setting of tariff directly on the data, as stated in Chapter 2. This is because the tariffs for water and sanitation service need to be set within the range payable for many beneficiaries for the services to fulfill their role as public services, and thus the ATP is more frequently used for the setting of tariffs in practice. The ATP for the water and sewerage tariffs was estimated to be 18.7-24.9 soles/month and that for the sewerage tariff 6.9-9.2 soles/month (Table 12). Those estimates are found to be reasonable when cross-checking them with the components in the domestic budget expenses surveyed by the National Statistical Information Institution (INEI: Instituto Nacional de Estadística e Informática).

(3) Possibility to raise Tariff Rates considering WTP, and ATP

Comparing the estimated ATP and WTP values obtained in the above process with the current water and sewerage tariffs (Table 12), and obtaining a tendency of WTP by deploying a regression analysis with the Weibull model, an examination is conducted to see whether it is possible to raise the tariff level.

The possible range of ATP for water and sewerage tariffs in Iquitos City is between approximately 10% lower and approximately 20% higher than the current monthly payment level, respectively, based on the current tariff level, and therefore the room for a tariff level increase by 20%

or more is thus limited.

On the other hand, the estimated WTP considerably exceeds the current monthly payment level and ATP (about twice as much as ATP), which suggests that the residents of Iquitos surveyed have quite a strong willingness to pay. In this sense, the people surveyed seemed to show a favorable stance towards a rise in the tariff level.

However, in practice it is difficult to resort to an easy rise in the tariff level simply because of the high WTP, in that it will enlarge the gap to the ATP due to the income constraint. What is more, WTP obtained by the CVM was solely based on the approach from the users' (demand) side. In other words, the WTP acceptance rate curve simply shows the relationship between the WTP (acceptability rates) and various tariff levels presented, that is, the relationship between the levels of demand and the corresponding prices. In short, the acceptability rate curve cannot serve as an ultimate, sole measurement to obtain one particular optimal tariff level⁶³. Therefore, regarding it as a simple demand curve⁶⁴, and laying on it a supply curve which indicates the relationship between the tariff levels offered by the service provider (supply side) and the volume of supply, general diagrams of supply and demand curves were drawn up (Figure 9). For simplicity, the supply curves were depicted so that they interact with the corresponding demand curves at the point where the current tariff level is identical to the volume of demand. The following are the results of examination of the factors that cause the shifts in each curve.

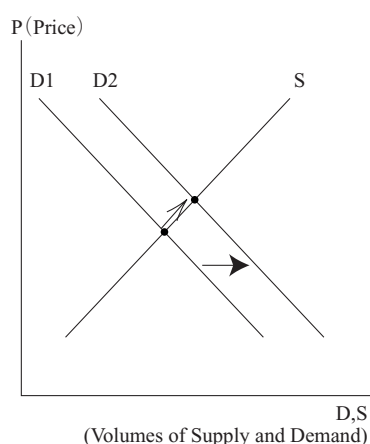
Where the effects of an income increase due to an economic growth on the demand curve are concerned, the increase in incomes raise the WTP (as well as the ATP), shifting the demand curve to the right (Figure 9 (1)), so that the equilibrium point

63 CVM can be an effective device to help political decision-making of policies to take, or to assure the financial sustainability of utilities and projects, but WTP values estimated under the method are nothing but a values computed based on figures that survey respondents give in reply to an imaginary scenario. Also, the CVM analyzes the event solely from the demand side, so that the value cannot be necessarily applicable to actual tariff systems. Upon setting the tariff level, it is necessary to analyze the system from the supply side, too, and to conduct a cost-benefit analysis in a comprehensive manner before making decisions concerning a reasonable tariff level.

64 As is obvious in the acceptability rate curve, the acceptability rate (vertical axis) takes 1 (all the users demand it) when the tariff (price) displayed by the horizontal axis takes zero, and approaches to zero (no-one demands it) as the price increases. Suppose that the acceptability rate is considered to be as a proxy variable for the volume of demand, and is set on the horizontal axis, while the price is set on the vertical axis. Then, the acceptance rate curve can be drawn reversibly in terms of the horizontal and vertical axes, which is identical to the standard demand curve (Figure 9).

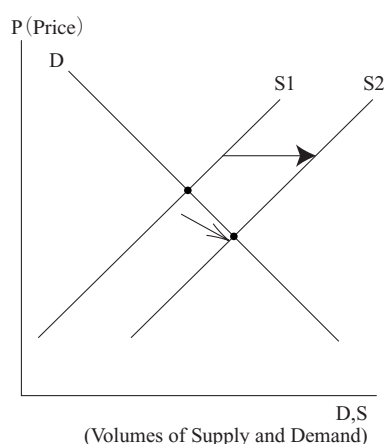
Figure 9 Supply and Demand Relationship in Water and Sanitation Services in Iquitos

(1) Case where demand curve shifts



D: factors for shifting – effects of income increase

(2) Case where supply curve shifts



S: factors for shifting: - rise in collection rate, improvement of UFW, Effects of adjusting personnel allocation on cost reduction

shifts to the right even if the supply curve remains unchanged, bringing in a positive impact of the combination of a higher price and the amount of supply and demand on the sustainability of the services. However, taking into account the fact that the actual growth rate of the Peruvian economy in the previous five years (1997-2002) was a mere 1.6% per year, and that this economic expansion was largely attributable to the growth in the industries in the urban area, the income growth in Iquitos, a rural area, is inevitably much slower. In other words, since the rapid increase of income (and ATP) cannot be expected, the upward shift of the demand curve is not likely to happen.

Factors that shift the supply curve, on the other hand, include a drop in the UFW rate, an increase in the collection ratio, and adjustment of the personnel allocation or staff to an appropriate level. If these factors lead to an increase in revenue and/or cost reduction, the supply curve will shift to the right (Figure 9 (2)), enabling an increase in the amount of services at the same tariff level. It is thus possible to expand the demand level while reducing the tariff level, taking into account the equilibrium point with the corresponding demand curve (where the intersection point shifts to the lower right).

As seen above, the understanding of WTP is of extreme importance in the sense that it gives essential information concerning assurance of sustainable services and the introduction of PSP, and also in the

political sense that it helps predict the response of the people towards tariff policies. Nevertheless, since WTP simply gives the picture of one aspect, the demand side, it is inadequate to overestimate it and hastily go for a rise in tariff level from the viewpoint of policy making. In order to increase the tariff level on the grounds of WTP, an increase in ATP due to an income increase should be a prerequisite, and if this increase is not likely to happen, the best, appropriate, and essential way to assure sustainability of the sectors is to rely on the self-reliant efforts on the supply side. Taking all this into account, measures for the city of Iquitos can be summarized below:

1) The current tariff level in Iquitos is more or less the same as the ATP of the users in question; the level nearly reaches the upper limit of the payment. On the other hand, however, as seen in the current collection rate of 55% (in regions covered by EPS Loreto), nearly half of the users do not pay their bills. In line with this, the top priority must be placed on making efforts to increase the collection rate from the viewpoint of sustainable service and the principle of equity.

2) The UFW rate in Iquitos (in regions covered by EPS Loreto) stood at an extremely high level, 63%. Therefore, the management of the service should be thoroughly strengthened to reduce it substantially.

3) So long as the efforts of the service provider bear fruit and improve the financial position, and the

population gives understanding support, since WTP shows a high level, too, it is possible in future to increase the tariff level within the range of the magnitude of increase in ATP, though it should be carefully considered.

2. Provincial Cities Water Supply and Sewerage Improvement and Expansion Project (II) in Iquitos City, Peru

This project covers the city of Iquitos in Loreto out of the Provincial Cities Water Supply and Sewerage Improvement and Expansion Project (II) (three cities of Iquitos, Cuzco, and Sicuani). The Water Supply and Sewerage Improvement and Expansion Project in the northernmost province of Loreto is aimed at an increase in the population able to enjoy water supply (approximately 225,000 people) and undertakes (i) new projects to refurbish water facilities to take in and convey water from the Nanay River of the Amazon water system (ii) the new construction of a water treatment plant (iii) the improvement of the water conveyance and distribution system (water network, tanks, distribution reservoirs) and (iv) new construction and repair of pump stations, and installation of meters (including replacement). At the moment, the sanitation service is not included in the yen loan project of Iquitos City, but the need for sewerage system development (in particular, upgrading of the wastewater treatment facilities) is still high⁶⁵. Therefore, There is possibility that it can be incorporated in a future yen loan project, a simulation was carried out for the improvement of the sewerage system, as well.

Basic assumptions are as follows. The Peruvian government subleases the fund raised from the yen loan to the implementation body, EPS Loreto. The fund for water supply and sanitation services will be financed by JBIC for 75% of the operation costs with the remaining 25%, the portion borne by the Peruvian side, provided by the regulatory agency of the project, the Ministry of Housing Construction and Sanitation,

and the municipalities involved.

(1) Water Supply Service of Iquitos City

Following the findings of the CVM carried out with a local questionnaire survey, the values of ATP and WTP of the users of the water and sanitation services in Iquitos were estimated. In accordance with them, a simulation analysis was conducted in cases where the tariff level of the water supply service under the yen-loan project was (A) the same as the current level (B) the lower value of the ATP and (C) the same as the WTP, and the financial position (during the project of 30 years) was forecast according to these three scenarios (Table 13).

Upon conducting simulations to see the profitability of the three scenarios, three objectives of the sector were taken in account (this is the same as the case when the sector achieves its targets in Scenario 2 in the next simulations of the sanitation services in Iquitos city.) : (1) the UFW rate will be halved by 2010 (2) the operation and maintenance cost will be reduced by 20% from the current level and (3) the collection ratio will be improved up to 85% by 2010.

As a result of the simulations, profitability measured by the Financial Internal Rate of Return (FIRR) seems to be assured to some extent in every scenario⁶⁶. As is clearly observable in Scenario (A), even if the current tariff level is maintained, so long as the utility achieves the expected improvements, the FIRR will reach 11.9% without any additional subsidies from the central government, proving that the case will make a profit to some extent.

At the same time, the current water tariff rate (20.81 sole/month) is already higher than the lower value of the ATP found in the local survey in Iquitos (18.70 soles/month) by 10% or so, so that the possibility of increasing the current rate seems likely to be marginal, although the CVM survey shows a high WTP (34.35 soles/month).

⁶⁵ Much of the wastewater in the city is flowing into the Nanay River, which is a water source for the civil drinking water system via the water area called Laguna de Moronacocha. As a result, the Nanay River and the lagoon, where wastewater concentrates, are significantly polluted.

⁶⁶ The Financial Internal Rate of Return (FIRR) required to assure the profitability is assumed at 12% (as in the analyses conducted in the subsequent sections in Chapter 5).

Table 13 Financial Simulation by Scenario (in Water and Sanitation sector in Iquitos)

Water tariff (sole/month)	Scenario (A) Current amount of payment 20.81	Scenario (B) ATP 18.70	Scenario (C) WTP 34.35
Financial internal rate of return (FIRR) (%) Estimated values	11.9	7.7	37.57

Source: SADEP Study Team

(2) Sanitation service of Iquitos City

Next, simulations to see the profitability of cases where the sewerage project is implemented with yen loans were carried out. In the simulations, four scenarios were designed, compared with one another, and examined one by one (the same method is deployed in the Panama Bay and Panama City Sanitation Project in the subsequent section). The order of the four scenarios (Scenario 1 to Scenario 4) meets the sequence of measures for management improvement, it is not appropriate to change the order under any circumstances. First, as the basic scenario, the project to be operated under the current condition and circumstances will be examined (Scenario 1). Then, the case where certain improvements have been achieved at the utility level (Scenario 2) is analyzed and the case where support from the central government is available (Scenario 3) is examined to see how the profitability of the project changes. Finally, the effect of an increase in tariff levels (Scenario 4) will be examined. In other words, this section sheds light on a potential change in profitability of the project when additional measures for improvement - from Scenario 1 to Scenario 4 - are carried out in this right order. In order to make an objective analysis concerning the appropriateness of an increase in the tariff level, Scenario 4 assumes that the level is increased by 20% which is based on the ATP and WTP values found in a local questionnaire survey by CVM addressed to the people in Iquitos, Peru.

The findings of the simulations of the sewerage project in Iquitos (Table 14) show that the implementation of this project in Scenario 1 (basic scenario) gives a negative value of FIRR. It would be difficult to assure a sound financial position under the current conditions.

The implementation of the project in Scenario 2

would improve the FIRR to 7.59%. In other words, if efforts made at the utility level lead to the improvement of the nature of the project, such as a smaller UFW rate, a reduction in the operation and maintenance costs, a higher collection rate, and so on, the financial conditions would be considerably improved. Thus, self-reliant efforts by the utility itself for management improvement and execution of reforms will be required primarily.

In Scenario 3, a governmental subsidy (financing 40% of the total project cost) will improve the FIRR to 14.07%, compared to the project in Scenario 2 (+6.48%). However, such a subsidiary policy can be realistic only when the government can afford to grant the subsidy. At the same time, easy dependence on the governmental budget may hinder self-reliant efforts of the utility towards the improvement, and thus a careful decision should be made.

In Scenario 4, an increase in the tariff level by 20% will improve the FIRR up to 19.24%, but the margin of the improvement (+5.17%) occasioned by the hike in tariffs is not greater than that attainable in Scenario 2 (self-reliant efforts by the utility: +8.08%) or in Scenario 3 (governmental subsidy: +6.48%). Moreover, the 20% increase in the tariff level would be far above the ATP, which may create a concern that it would not be politically and socially acceptable. To increase the tariff level, a long-term policy at the government level is essential together with the hike in the level, such as exercising measures to increase national income via economic growth and to increase the ATP level.

The results of the foregoing simulations, and the policy order (sequence) give a conclusion that, in order to assure a sustainable project, EPS Loreto, the utility of the project, first of all, should make efforts for the improvement of management under Scenario

Table 14 Financial Simulations by Scenario (in the Water and Sanitation sector in Iquitos)

Item		Scenario 1 (Basic case)	Scenario 2	Scenario 3	Scenario 4
Scenario		The profitability will be assessed on the premise that the current levels will be retained.	Scenario 1, plus self-reliant efforts of the utility itself	Scenario 2, plus governmental subsidy to finance part of the project cost	Scenario 3, plus an increase in tariff level
Utility level	Unaccounted for Water (UFW) ratio	Current level (63%)	Improved to about half of the current level by 2010	ditto	ditto
	Operational management cost	Based on the EPS Loreto Financial Plan 2003 - 2011	20% of the current level will be reduced by 2010	ditto	ditto
	Collection Ratio	Current level (55%)	Improved to 85% of the current level by 2010	ditto	ditto
Government level	Subsidies	As per the current plan	ditto	40% of the project cost will be financed by a governmental subsidy.	ditto
	Tariff Level	Current level (30% of the water tariff)	ditto	ditto	20% up on the current level based on the CVM study
Financial indicators	Financial internal rate of return (FIRR: %)	- 0.49	7.59	14.07	19.24
	Estimated values				

Source: SADEP Study Team

2, while reasonably taking on the element of Scenario 3 (governmental subsidy) as the situation allows. The right order is to carry out these measures, and then or in parallel, to consider Scenario 4 (an increase in tariff level) within the level of ATP.

3. Panama Bay and Panama City Sanitation Project

This project aims to purify the Panama Bay through the improvement of sewer pipe networks and sanitation facilities covering the whole area of Panama City. The plan for this project (including the IDB loan portion) consists of four components: (i) renovation of existing sewers and development of sewer pipes in areas not equipped with facilities preventing wastewater from flowing into the Panama Bay (ii) new construction and replacement of diversion manholes (iii) improvement of conveying pipes and pump stations and (iv) improvement of wastewater treatment plants, sludge treatment plants

and discharge ports. The term of the yen loan is set at 30 years, and simulations of forecasting the financial conditions are carried out for the four scenarios in the right order (the same as the foregoing case of the project for the sanitation sectors in Iquitos) (Table 15). at the time of this study, an yen loan has not yet been committed.

In the case where this project is implemented under the present conditions, that is, in Scenario 1, the FIRR takes a negative value. Even if all the UFW rate, the operation and maintenance cost and the collection ratio show highly satisfactory improvements, the FIRR still remains negative (Scenario 2), the reason being that the tariff for the sewerage system⁶⁷ is hardly collected at the moment and this makes the collection ratio at a low level. Thus, it is necessary to implement appropriate measures to collect the bills and to increase the rate gradually for the higher profitability of the project. At the same time, ERSP, a supervisory agency, is

⁶⁷ Laws stipulate that the upper limit of the sewerage tariff level is 50% of the water tariff level (and the actual rate currently used is 30% of the water tariff level).

required to take the initiative in the project.

If all the problems are rectified at the utility level in Scenario 2, and the central government injects a certain amount of subsidy as in Scenario 3, the value of FIRR turns around - if the subsidy accounts for 40% of the total project cost, FIRR would improve to 2.97%.

If the sewerage tariff is raised up to 50% of the level of the water tariff level (currently 30% of the water tariff), the upper limit of hikes defined in a relevant law after the implementation of all the measures for improvement laid down in Scenarios 2 and 3, the FIRR stands at 15.81%, making the project profitable (profitable when the rate is 12% or higher) with the effective improvement of +12.84%, together with the effects gained in Scenario 3. Also, an increase in the tariff level can be counted as a powerful measure since the water tariff level has remained unchanged for 20 years in Panama. In line with this, a review was made to see if the current level was lower than the appropriate level. For this, it might be appropriate, as in the case of Peru, to deploy the CVM to estimate a WTP, and take it into account. However, the review made with only reference to the ATP value⁶⁸ found that the current tariff level is at a reasonable level compared to the ATP. Thus, despite the fact that the level has not been raised over the past 20 years though the hike may have an impact on improvement of the financial position, an increase in the tariff level may not easily be implemented.

The results of the foregoing simulations suggest that the first step is the self-reliance efforts at the utility level for a better financial position, but at the same time that it is difficult to make this project profitable if IDAAN remains at the current performance. Hence, it is necessary to follow the “plan for optimizing IDAAN performance” in progress in order to reduce the UFW rate, improve the collection ratio, and steadily make the general operation and maintenance more efficient as pointed out in Scenario 2. Where subsidies from the central government proposed in Scenario 3, and an increase

in the tariff level in Scenario 4 are concerned, ideally the former should be incorporated so as to make the amount of the subsidy meet the expenditure on capital investment, whereas the tariff level should be increased in accordance with the current account expenditure. This is because, although both the measures have a positive impact on the financial position, the amount of subsidy has a constraint on the national budget, and an increase in the tariff level faces constraints from the political and social viewpoints. Since an increase in the tariff level is not an option that should be easily taken on, the appropriate course of measures is to realize the certain improvement through Scenario 2, and then use subsidies in Scenario 3 to form a fixed capital stock (expenditure on investment), and carefully consider tariff increase.

4. Possibility of the Introduction of PSP at the Project Level

The above case study revealed that, on the condition that the yen loan is used for the project, considerable efforts by the governments and implementation agencies of the borrower countries (government subsidization and management improvement of the implementation agencies) is essential to secure their profitability in every project. Setting these as a prerequisite, the introduction of PSP can be counted as an option to assure sustainable management at the utility level and serve as an effective device for improvement in yen loan projects. Although there are some limitations in yen loan projects because of the fact that the government of the borrowing country or the implementation agency needs to have ownership of the facilities (assets) constructed with the finance of the loan, PSP operations are still worthwhile. For example, various PSP options - service contract, management contract, lease contract, and concession contract - are available. (On the other hand, the use of asset sales in the privatization process in yen loan projects requires certain conditions because the ownership of the assets created by the loan is

68 The ATP value for water supply was computed with reference to data in the national household survey conducted by the Bureau of Statistics of the Panamanian Government. More specifically, the proportion of expenditure concerning the water and sanitation services to the household outlays as a whole was analyzed and compared with other components of the household expenditures for the calculation.

Table 15: Scenarios for Financial Analysis (Panama Bay and Panama City Sanitation Project)

Item		Scenario 1 (Basic case)	Scenario 2	Scenario 3	Scenario 4
Scenario		The profitability will be evaluated given that the current level will remain as it is.	Scenario 1, plus self-reliant efforts of the utility itself	Scenario 2, plus government subsidy to finance part of the project cost	Scenario 3, plus an increase in tariff level
Utility level	Unaccounted for water (UFW) ratio	Same as at present (48%)	To be improved to 30% by 2011	ditto	ditto
	Operational management cost	Current level	To be reduced by 20% of the current level by 2015*	ditto	ditto
	Collection Ratio	Same as at present (45%)	To be improved to 80% by 2011 (Government's target value)	ditto	ditto
Government level	Subsidies	Same as the current plan	ditto	40% of the project cost will be borne by the government	ditto
	Tariff Level	At 30% of the current water tariff	ditto	ditto	An increase by 66% from the current level (55% of water tariffs)**
Financial indicators					
Financial internal rate of return (FIRR: %) Estimated value		-13.16	-1.12	2.97	15.81

* In response to the high ratio of the electric power cost, the reduction goal of the total management cost is set at 20%.

** The tariff level is assumed to be raised to 50% of the water tariff which is the upper limit allowed in the current law, from 30% which is equivalent to the average water tariff of developing countries in Latin America.

Source: SADEP Study Team

transferred from the borrowing organization to a third party.)

(1) PSP for Water Supply and Sanitation Services in Iquitos City, Peru

Although the legal system for PSP has been established well enough to operate PSP activities, the introduction of PSP itself has to be conducted gradually with careful consideration in the light of the fact that the public opinion is not necessarily favorable to the introduction that the project site is in a rural area, and that EPS Loreto is not in a sound financial position.

Possible introduction of PSP, if any at this stage, includes improvement of the collection ratio and reduction of the operational management cost through service contracts or management contracts (in this case, the investment into measures to deal with unaccounted for water needs to be made by EPS

Loreto).

(2) PSP for Panama Bay and Panama City Sanitation Project

Taking into account the fact that IDAAN is slow in its self-reliant reforms, that the introduction of PSP in the past did not go successfully, and that the current political and public opinions do not show support or understanding of PSP, there are many problems to overcome to produce positive effects with the introduction of PSP.

The most realistic option is based on the political and public opinions concerning the current PSP operations. A service contract will be the most realistic option for a discrete project, a management contract as the second, if this project is treated as an independent project within the framework of the organizational reform of IDAAN in the mid and long terms.

Chapter 6. Recommendations for the Roles of PSP in Realizing a Sustainable Water and Sanitation Sector

This chapter takes all examinations made so far and presents recommendations the roles of private sector participation (PSP) in achieving sustainable water and sanitation sectors.

1. The ideal configuration for the water and sanitation sectors

Water and sanitation services are an indispensable basic human need (BHN), and must be provided for all the people in the country in question. Thus, it is necessary to boost the coverage ratios in the water and sanitation sectors extensively and rapidly, while maintaining a certain quality of the services. To do that, the entire water and sanitation sectors, not to mention individual utilities, will be called on to maintain a sustainable, sound and lean financial position.

Necessary expenses in the water and sanitation sectors are financed by revenues from tariffs charging beneficiaries for the services, but the sectors cannot necessarily be financed by such revenues alone. Thus, under normal circumstances, a substantial proportion of the operation and maintenance costs, as well as funds for capital investment, are financed by public funds (subsidies) or funds raised by the floatation of long-term bonds. In developing countries, in particular, many beneficiaries tend to be low-income households or face poverty problems, and thus are not capable of affording the services, so that, in practice, the service providers are obliged to rely on a large amount of public budget from taxes (i.e., there is a chronic deficit in the public entities and companies in charge of the services). However, if the sum of the burden borne by the people - tariffs collected by the water and sanitation sectors and subsidies - exceeds the total value of the benefits from the sectors, problems arise from the viewpoint of the national economy, in that it implies a reduction of resources for development which could have been allocated to other sectors.

The development of a sustainable water and sanitation sectors essentially requires an appropriate

vision for long-term investment, with which the utilities involved should make management more efficient, make the financial position healthier based on stable collection of tariffs, and continue providing quality services for the long term.

2. The role to be played by PSP

Generally, PSP is counted as a solution at the project level. If operational improvements are efficiently implemented with respect to individual projects or suppliers using PSP, there will also be positive effects on other projects and suppliers. Accordingly, it will contribute to the improvement of sustainability of the sector as a whole.

In Latin America, as a result of failures of many public organizations and companies in providing appropriate water and sanitation services, attention was drawn to the potential introduction of PSP and PSP was in fact introduced in the 1990s. A concession contract concerning the water and sanitation services in Buenos Aires agreed in 1993 was instrumental in accelerating the introduction of PSP operations in the water and sanitation sectors in Latin American countries.

However, PSP is not necessarily a cure-all for any water and sanitation services. Rather, a lot of problems in the sectors (shortage of funds for investment, overstuffed organizations, low tariff levels, low collection rates, etc.) can actually be solved by the self-reliant efforts of the public companies themselves. An important thing is to explore the possibility of handling the problems, first, with self-dependent efforts of the public sector, rather than easily resorting to the introduction of PSP. A PSP operation should be considered when the public sector cannot overcome the problems with its own efforts, and the problems are likely to do harm to the sector as a whole.

3. The PSP options and their applicability

Generally, when PSP is introduced, there are a variety of PSP options that may be selected depending on the degree of commitment of the private sector: (i) service contract, (the simplest option), (ii) management contract, (iii) lease contract, (iv) concession contract, (v) BOT contract, and (vi) asset sale.

When selecting an appropriate PSP option, the type of the problem for which improvement is expected by the utility is important. Moreover, rather than starting out with an option involving high risk to be borne by the private sector, it is reasonable to begin with an option with a low investment risk for the private sector, and shift gradually to options that involve higher risks while deepening the mutual trust between the parties. For example, even the concession contract concerning the water and sanitation sector in Buenos Aires, which had been a success in the 1990s, failed to continue its operation due to the sudden change in the foreign exchange rates. Thus, a careful, thorough examination is required to introduce a long-term PSP operation with high risks.

From the lessons learned from the past experiences of the introduction of PSP to the water and sanitation sectors, several key issues must be highlighted.

First, a successful PSP requires not only political commitment surrounding the services (institutional building, strengthening of the functions of related organizations, etc.), but also accountability to users of the services. Second, if tariffs are impetuously raised immediately after introducing PSP, the support of public opinion will be lost, and in fact, there is a danger that negative feelings will be provoked. Thus, every effort must be made to avoid this. Third, utilities must be selected by means of carefully conducted competitive bidding, and contracts need to include the necessary items for long-term continuation of the work.

4. Procedure for introducing PSP

The introduction of PSP and the approach up to the point of introduction can be generally divided into two steps.

The objective of Step 1 is for the public entity to reform its management through its own self-help efforts. This is the first measure that public corporations having management problems should take. Looking at the water and sanitation sectors in Latin America by country, there are more than a few cases in which the sustainability of the sectors is questionable because of problems such as high rates of UFW and low tariff collection ratios. From this

standpoint, at step1. public corporations aim at grasping their own problems and improve their performance with employer/employee cooperation as well as private sector management techniques. It is assumed that at Step 1, the public entity will initiate improvements to achieve its ideal stance by carrying out what should naturally be done. As a result, even if PSP is introduced in Step 2, the risk borne by the private sector will be lessened and the business foundation will be strengthened.

Step 2 is aimed at solving problems with management know-how of the private sector and forming sustainable water and sanitation sectors. Before implementing this step, various environments allowing the introduction of PSP must be established as the first stage: political commitment, legal foundations, tariff system, and so on. After the establishment of these conditions to some extent, as the second stage, PSP options essential for the problem solution are selected, and they should be introduced gradually.

5. The possibilities for PSP in the focused Four Countries

In the four Latin American countries included in this study, namely Mexico, Peru, Panama and Costa Rica, the question of how PSP might contribute to solving problems was examined, starting from elements such as sector analysis and the status of PSP introduction. The results are described below for each of those countries.

(1) Mexico

Mexico has a proven performance in PSP introduction since 1990. The country is also progressing with the legal infrastructure to accept PSP activities, such as the enactment of the national law concerning water, and the establishment of funds for infrastructures. Thus, it seems that PSP will be able to contribute to the water and sanitation services in Mexico. In the sewerage sector, revised laws prohibit the discharging of unprocessed wastewater into rivers from 2006, and the construction of wastewater treatment facilities is an urgent task. At the sector level, the CNA is required to promote sector reform on a voluntary basis.

Because Mexico has accumulated experience

and know-how, it would be effective to introduce service contracts or management contracts in order to improve the operating efficiency of existing facilities, or to take advantage of BOT contracts for constructing wastewater treatment facilities which require a large amount of initial investment.

(2) Peru

Peru has been somewhat negative about the introduction of PSP, reflecting the negative public opinion of privatization. However, the introduction of PSP has been gathering momentum in recent years: the approval of private-sector projects for building water treatment plants based on BOT contracts in regions covered by SEDAPAL.

In Peru, the requisite political commitment has been obtained, such as the legal framework relating to private investment, and it is possible to introduce PSP for the purpose of achieving sustainable water and sanitation sectors.

For the introduction of PSP, it will be necessary to simultaneously undertake the action to establish the legal system and care for low-income households. From the standpoint of sanitary conditions, the application of PSP to the construction of the sewerage system would be effective.

Since public utilities (EPS), in rural areas are required to improve the current quality of services and produce greater efficiency, a concession contract may well be an appropriate option. However, unless a certain scale is involved, it is unlikely to attract the participation of private companies. Thus, if the merit of scale cannot be expected, a service or management contract seems to be an effective option.

(3) Panama

In Panama, the public shows a strong resistance against the introduction of PSP, so that a privatization plan already determined to commence was called off. Thus, at the moment, there is no prospect of introducing PSP in the water and sanitation sector in Panama.

As for the current state surrounding the water and sanitation sectors in this country, a fundamental problem is observable in the sector: although IDAAN suffers from a chronic financial deficit, it is failing to deal with it on its own.

In light of the situation seen above, IDAAN, first of all, must renew its recognition of the needs concerning the water and sanitation services, and make a serious effort to achieve improvement. For this, it is ideal to introduce PSP partially under a service contract, and then aim at greater efficiency within a short period under a management contract (for mid and long-term achievements, the Government should consider organizational reform of IDAAN, together with other PSP options).

In Panama, there is room for proactively taking advantage of a BOT or other contract for the construction of important facilities or new wastewater treatment facilities.

(4) Costa Rica

In Costa Rica, judging from the fact that enterprises such as ESPH run efficient operations, PSP could be efficiently implemented, if it is correctly utilized. Therefore, the water and sanitation sectors should ideally take the initiative in encouraging the introduction of PSP across the country.

AyA is planning to introduce PSP in the future, and it would be effective to do so as a remedy for its high unaccounted-for water (UFW) ratio.

If PSP were introduced in the services provided by AyA and ESPH, since their collection rates are more or less good, it is desirable to focus on the reduction in the UFW ratios. Where appropriate PSP options are concerned, since ESPH and other public companies can relatively freely deploy their activities in the public sector in Costa Rica, a concession contract seems to be an option in that it gives the discretion to some extent to the public companies involved.

In Costa Rica, because the infrastructure related to the sewerage system is underdeveloped throughout the country, the introduction of PSP may be ideal if a BOT contract is agreed, so as to take in the know-how of private companies for the sewerage services.

References

- ADB Reference "Best Practices for Promoting Private Sector Investment in Infrastructure"
- _____. Reference "Performance Monitoring Indicator Data Sheet"
- Dickinson College/World Bank (2002) "Effective Water Service Provision: Performance targets for a well-run utility"
- Harris, Clive, Private Sector Advisory Services (2003) "Private Participation in Infrastructure in Developing Countries: Trends, Impacts, and Policy Lessons."
- Hazen and Sawyer, (2003) "Addendum to Panama Bay and Panama City Sanitation Project"
- Idelovitch, Emanuel, WB, (1995) "Private Sector Participation in Water Supply and Sanitation in Latin America"
- IDB, (2003) "Private Infrastructure at the Subnational Level: Challenges in Emerging Economies"
- _____. (2003) "Report on Water Pricing/Cost Recovery in the Baltic Sea Countries"
- _____. (2003) "F/S for the Expansion Plans of the Drinking Water Supply and Sewerage Systems at Minimum Cost, Final Report-Iquitos, Vol. 2 Book1/8 Tex Part 1/2"
- _____. (2003) "F/S for the Expansion Plans of the Drinking Water Supply and Sewerage Systems at Minimum Cost, Final Report-Iquitos, Vol. 2 Book2/8 Tex Part 2/2"
- _____. (2003) "F/S for the Expansion Plans of the Drinking Water Supply and Sewerage Systems at Minimum Cost, Final Report-Iquitos, Vol. 2 Book3/8 Tex Part 1/2"
- _____. (2003) "F/S for the Expansion Plans of the Drinking Water Supply and Sewerage Systems at Minimum Cost, Final Report-Iquitos, Vol. 2 Book4/8 Tex Part 2/2"
- _____. (2003) "F/S for the Expansion Plans of the Drinking Water Supply and Sewerage Systems at Minimum Cost, Final Report-Iquitos, Vol. 2 Book6/8 Add. Study"
- _____. (2003) "F/S for the Expansion Plans of the Drinking Water Supply and Sewerage Systems at Minimum Cost, Final Report-Iquitos, Vol. 2 Book4A/8 Exhibit Part 2/2"
- _____. (2003) "F/S for the Expansion Plans of the Drinking Water Supply and Sewerage Systems at Minimum Cost, Final Report-Iquitos, Vol.1,2,3,4 Book 8"
- INEI (2002) "INEI Encuesta Nacional de Hogares - Ivtrime del 2001"
- JBIC (2000) "Special Assistance for Project Formation (SAPROF) for Provincial Cities Water Supply and Sewerage System Improvement and Expansion Project in the Republic of Peru—Final Report—"
- _____. (2000) "Implementation Program for Provincial Water Supply and Sewerage System Improvement and Expansion Project in the Republic of Peru"
- _____. (1995) "Feasibility Study for the Sanitation of the Valley of Mexico, Final Report, Mexico"
- OECF (1997) "The Study of the Wastewater Treatment Privatization Project in Malaysia"
- Project Finance International (2003) "Mexico looks offshore for water investors"
- _____. (2002) "Struggling for capital in the US and global water sector"
- _____. (2001) "Water gets more attention"
- Project Finance International Americas Report Latam Water (1999) "Opportunities and challenges for the private sector in Latam Water"
- SEDA Loreto, (2002) "Financial Plan of SEDA Loreto, 2003 - 2011"
- Sotomayor, Maria Angelica: , WB Note, (2003), "Colombia - Expanding Services to Low Income Areas; Comparing Private and Public Utilities No.24"
- UNDP-World Bank (1999) "Willing ness to Pay but Unwilling to Charge"
- _____. (1999) "Do Cross-Subsidies Help the Poor to Benefit from Water and Wastewater Services?—Lessons from Guayaquil—"
- UTCE Ltd./Japan PFI Association (2003) "Impact Evaluation Study on Public-Private Partnership—Republic of the Philippines—"
- WB OED (2003) "Efficient, Sustainable Service for All?"
- WB, (2003) "Colombia: Expanding Services to Low-income Areas Comparing Private and Public Water Utilities No. 24"
- _____. (2002) "Private Participation in Infrastructure: Trends in Development Countries in 1990 to 2001"
- _____, and PIAF, (2003) "Private Solutions for Infrastructure in Mexico, "Country Report for Private Participation in Infrastructure""
- ACP, Panama, (2002) "ACP Carpeta"
- _____. (2002) "ACP Informe Anual 2002"
- AyA (2001) "Estados Financieros Auditados de AyA al 31 de diciembre del 2001"
- AyA/Banco Interamericano de Desarrollo Washington, D.C., (2003) "Análisis de la concesión de acueducto y alcantarillado en la ciudad de Montería"
- Business Transformation Advisors, Inc (2002) "Plan de Transformación Institucional 2002-2005—Estrategia de Rentabilización—"
- _____. (2002) "Plan de Transformación Institucional 2002-2005—Análisis de la Situación Actual—"
- _____. (2002) "Plan de Transformación Institucional 2002-2005—Estructura Organizativa y Administrativa Propuesta—"
- _____. "Panamá en Cifras"
- _____. (1997) "IDAAN Memoria 1996 - 1997"
- _____. (1998) "IDAAN Memoria 1997 - 1998"
- _____. (1999) "IDAAN Memoria 1998 - 1999"
- _____. (2000) "IDAAN Memoria 1999 - 2000"
- _____. (2001) "IDAAN Memoria 2000 - 2001"
- _____. (2002) "IDAAN Memoria 2001 - 2002"
- _____. (2001) "IDAAN Informe a la Presidencia 2000 - 2001"
- _____. (2002) "IDAAN Informe a la Presidencia 2001 - 2002"
- _____. (2003) "IDAAN Informe a la Presidencia 2002 - 2003"
- _____. (2003) "IDAAN Resumen de Proyectos de Inversiones al 30 de noviembre de 2003, IDAAN Proyectos de Optimización"
- _____. "IDAAN Proyecto de Optimización (Biwater)"
- _____. "IDAAN Estructura Orgánica"
- _____. (2002) "IDAAN Funcionarios Totales al Año 2002"
- _____. (2001) "Dirección de Servicios Financieros"
- _____. (2000) "Dirección de Servicios Financieros"
- _____. (1999) "Dirección de Servicios Financieros"
- CNA, (2003) "La Participación Privada en la Prestación de los Servicios de Agua y Saneamiento - Conceptos Básicos y Experiencias, Mexico city"
- _____. (2003) "Estadísticas del Agua Mexico"
- _____. (2002) "Compendio del Programa Para la Sostenibilidad de los Servicios de Agua Potable y Saneamiento en Comunidades Rurales 1998-2002"
- _____. (2001) "Programa Nacional Hidráulico 2001-2006"
- Dirección de Estadística y Censo, Panama "Dirección de Estadística y Censo"
- Dirección Financiera, (2003) "Instituto Costarricense de Acueductos y Alcantarillados—Proyecciones Financieras Período 2002-2012—"
- ENNIV, Instituto Cuanto, (2000) Resultados preliminares: ENNIV-2000"
- EPS Grau S.A / Emfapatumbes S.A. "Plan de Promoción—Para la Concesión de los Servicios de Agua Potable y Alcantarillado de las EPS—"
- ERSP, Panama, (2002) "ERSP Memoria Anual 2002"
- _____. (2002) "ERSP Estructura Orgánica"
- Hazen and Sawyer, (2003) "Addendum to Panama Bay and Panama City Sanitation Project"
- IDAAN, Panama "IDAAN Manual de Organización y Funciones (Último Borrador)"
- _____. (2001) "Plan de Transformación Institucional 2002-2005, Estructura Organizativa y Administrativa Propuesta"
- _____. (2001) "Plan de Transformación Institucional 2002-2005, Estrategia de Rentabilización"
- _____. (2001) "Plan de Transformación Institucional 2002-2005, Análisis de la Situación Actual"
- INEI (2002) "INEI Encuesta Nacional de Hogares - Ivtrime del 2001"
- MINSA, Panama "MINSA Normas para Aguas Residuales"
- _____. "MINSA Comunidades con Necesidades de Redes (de Alcantarillado)"
- SEDA Loreto, (2002) "Financial Plan of SEDA Loreto, 2003 - 2011"
- _____. (2002) "Balance General y Estados Financieros"
- _____. (2001) "Balance General y Estados Financieros"
- Total Urbano del País, Panama, (1999) "V Encuesta de Ingresos y Gastos de los Hogares 1997/98"